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Authors: Pietsch, Theodore W., and Kabat, Alan R.

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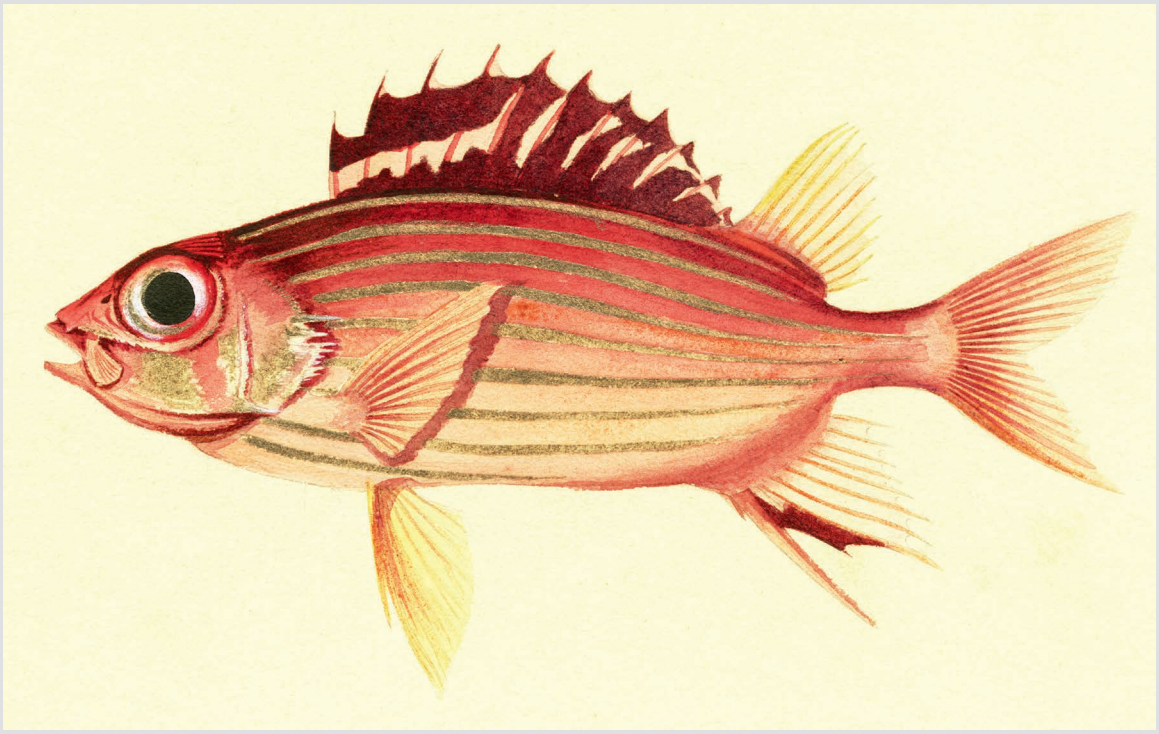

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"IN ORDER TO STUDY CONCHOLOGY": ANDREW GARRETT (1823–1887) AND HIS 1859 EXPEDITION TO THE KINGSMILL ISLANDS (KIRIBATI)

THEODORE W. PIETSCH[1] AND ALAN R. KABAT[2]

ABSTRACT. Andrew Garrett, a self-taught naturalist and artist best known for his work as a conchologist and ichthyologist, spent his entire adult life documenting the flora and fauna of the Pacific Islands. Although he focused primarily on molluscs and fishes, he collected and described many other organisms, both marine and terrestrial. He also made hundreds of watercolor drawings, primarily of fishes but also molluscs and other marine invertebrates, most of which have never been published. Although he produced a number of publications on his own, his greatest legacy lies in documenting the rich faunas of these islands, which have since suffered high rates of extinction, and in making vast amounts of zoological specimens available to others who later published on his material, describing countless numbers of new species.

Key words: Andrew Garrett, Pacific Islands, Polynesia, Micronesia, Gilbert Islands, Kiribati, Conchology, Ichthyology, Molluscs, Fishes, William Harper Pease, Louis Agassiz, Cesar Godeffroy, Albert Günther

> *A young man has been sent out to the Pacific Ocean to ransack the Gallipagos, Navigator and Sandwich Islands, and his collections for less than three years can fairly stand comparison with any collection of any expeditions sent out from Europe. None of these expensive expeditions have brought home collections equal to those made by a boy of this state.*
>
> —Louis Agassiz, *Boston Courier*, 26 February 1859[1]

INTRODUCTION

Andrew Garrett, sailor, explorer, and self-taught naturalist and artist, best known for his work as a conchologist and ichthyologist, devoted his entire adult life to collecting and illustrating Pacific Island plants and animals. In addition to fishes and molluscs (marine, freshwater, and terrestrial gastropods, as well as bivalves, squids, and octopuses), he collected many other organisms, including plants, sponges, corals, crustaceans, insects, echinoderms, amphibians, reptiles, birds, and mammals—many of which he carefully documented with detailed notes and descriptions of morphology, coloration, habitat, modes of locomotion, etc.—as well as soils and rocks and a few anthropological artifacts (Warren, 1860: 265; Damon, 1863: 57; Thomas, 1979: 15). He also made hundreds of watercolor drawings, primarily of fishes but also

[1] School of Aquatic and Fishery Sciences and Burke Museum of Natural History and Culture, University of Washington, 1122 NE Boat Street, Seattle, Washington 98105-5020. Author for correspondence (twp@uw.edu).

[2] Museum of Comparative Zoology, Harvard University, 26 Oxford Street, Cambridge, Massachusetts 02138.

[1] Quoted by the *Boston Courier*, 26 February 1859, from an address to the Massachusetts Legislature given by Agassiz on 18 February 1859 (see also Damon, 1859: 52; Winchell, 1859: 136–137).

molluscs and other invertebrates.[2] Although he produced a number of papers on his own (see Appendix), mostly describing new species of molluscs and fishes, the vast bulk of his discoveries reached publication through description by eminent professional zoologists of his day. The collections, images, and hundreds of pages of detailed descriptive notes that he left behind are especially important because they document the rich faunas of these islands, including large numbers of endemic species—many of which are now extinct, while others may never have been known and whose loss would have gone unnoticed, were it not for Garrett's efforts—shortly before major changes occurred as a result of modern human commerce (Régnier et al., 2015; Cowie et al., 2017).

LIFE OF ANDREW GARRETT

Andrew Garrett (Fig. 1) was born in Albany, New York, on 9 April 1823, the third child of a family of 14.[3] His mother, born Joanna van Neau (spelled Nean, Neah, or Noah in various sources) Campaneaux, was a native of Belgium, of a good education, speaking several languages; his father was Francis Garrett, originally from Canada (Cooper, 1887: 2, 1888: 92). Andrew spent his early years in rural Middlebury, Vermont,[4] where he acquired an intense interest in natural history and a remarkable curiosity and independence (Thomas, 1979: 16). Legend has it that on one occasion at the age of eight, he left home without notice, traveling alone to visit a museum about a hundred miles away, returning safely some days later (Averell, 1887: 82; Cooper, 1887: 2, 1888: 92; in retrospect, this anecdote seems exaggerated or entirely implausible). In 1834, when only 11, he was apprenticed for a period of 5 years to learn the art of molding in an iron

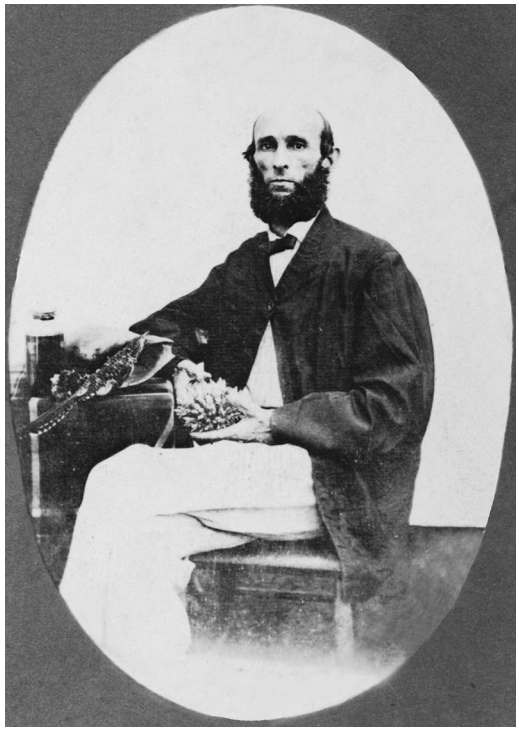


Figure 1. Andrew Garrett (1823–1887), *carte-de-visite*, taken in Papeete, Tahiti, about 1863. Courtesy of the Museum of Comparative Zoology, Harvard University (MCZ Archives, Portrait Collection). Used with permission.

[2] Major collections of Garrett drawings are presently housed at the Ernst Mayr Library, Museum of Comparative Zoology, Harvard University (a large number depicting fishes, molluscs, and other invertebrates); the Zoology Library, Natural History Museum, London (489 fishes); Library and Archives, Bernice P. Bishop Museum, Honolulu (about 130 molluscs, 43 fishes); and Ewell Sale Stewart Library, Academy of Natural Sciences of Drexel University, Philadelphia (20 nudibranchs).

[3] For information on the life of Garrett, we have relied heavily on Garrett himself, as revealed in his surviving correspondence, archived in the libraries of the Museum of Comparative Zoology (MCZ), Harvard University, and the Bernice Pauahi Bishop Museum (BPBM), Honolulu, but also on Garrett's principal biographer, the late William Stephen Thomas (1952, 1954, 1979), as well as the publications of Damon (1858, 1859, 1863), Günther (1873), Averell (1887), Cooper (1887, 1888), Anonymous (1892), Dall (1900), Spoehr (1963), and Clench (1979).

[4] Garrett to Barnard, dated Hilo, Hawaii, 29 April 1857 (MCZ Archives, bAg 363.10.2, no. 2).

foundry. Anxious to escape a dull life and keen to see the world, Garrett, at the age of 16, went to sea as a sailor (Damon, 1863: 57)[5] aboard the brig *Bogota*, commanded by Captain Granville Manter (1801–1884). The ship departed New Bedford, Massachusetts, on 10 September 1840,[6] and for the next 3 years, Garrett traveled extensively, visiting nearly all the islands of the West Indies, the Azores, Cape Verde, the West African coast, and Brazil. Returning home to New Bedford in 1842, he later wrote:

> I now went to work at my trade again, spending my leisure time in studying Shells and Plants. Still my love for seeing new countries was not in the least abated, so I traveled and worked in various parts of the Southern, Middle and Western States. I have lived in Boston and spent many a happy hour in the Museum of the Society of Natural History;[7] also in wandering about the suburbs of the city with Bigelow's *Flora bostoniensis*[8] in my hand, and studying plants. Having traveled in 23 different states in the Union, and visited all the principal cities, I concluded to go abroad again.[9]

In 1846, Garrett signed on as a crew member of a whaling vessel out of New Bedford—the bark *Edward* commanded by Captain Edwin A. Luce (1808–1886). Bound for the Pacific, the *Edward* departed New Bedford on 6 June 1846 and returned in 1849 with 1,816 barrels of sperm oil. The ship's register has 23-year-old Garrett listed as "Anthony Garrett," a "greenhand," 20 years old, of light skin and brown hair.[10] Soon thereafter, Garrett shipped over to another whaler, the *Eliza L. B. Jenney*, under the command of Captain James Allen (1817–1860) (Damon, 1858: 76), that took him to various ports throughout the tropical Pacific, including the Bonin, Ryukyu, Mariana, and Hawaiian islands, as well as China, the Philippines, and some Australian and East Indian localities (Thomas, 1979: 17). During a short stay in Honolulu, where the *Jenney* put in for supplies and freshwater on 22 May 1847 (Anonymous, 1847),[11] Garrett became so enamored with the appearance of the islands that he "was determined at some future time to settle upon them."[12]

Everywhere he went aboard the *Jenney*, while his shipmates used their shore leave to seek whatever diversions they could find, Garrett spent his free time scouring the beaches and tidal flats searching for marine organisms (Spoehr, 1963: 103). At the end of the voyage in May 1851, he returned to the ship's home port of Fairhaven, near New Bedford, with 20 cases of shells. When asked why he subjected himself to the rigors of whaling, he replied, "In order to study conchology" (Damon, 1858: 76).

Returning to the Hawaiian Islands on his own in the spring of 1852, traveling by way

[5] Garrett to Barnard, dated Hilo, Hawaii, 29 April 1857 (MCZ Archives, bAg 363.10.2, no. 2).

[6] Crew list for the brig *Bogota*, Register for Seamen's Names and Descriptions, 1840, property of the New Bedford Port Society, held on location at the New Bedford Whaling Museum, New Bedford, Massachusetts (Mark D. Procknik, New Bedford Whaling Museum, personal communication, 12 November 2019).

[7] The Boston Society of Natural History, an organization dedicated to the study and promotion of natural history founded in 1830 (see Johnson, 2004).

[8] A reference to Jacob Bigelow's (1787–1879) *Florula bostoniensis*, first published in 1814, with subsequent editions in 1824 and 1840.

[9] Garrett to Barnard, dated Hilo, Hawaii, 29 April 1857 (MCZ Archives, bAg 363.10.2, no. 2).

[10] Crew list of the bark *Edward*, Register for Seamen's Names and Descriptions, 1846, property of the New Bedford Port Society, held on location at the New Bedford Whaling Museum, New Bedford, Massachusetts (Mark D. Procknik, New Bedford Whaling Museum, personal communication, 12 November 2019).

[11] Marine intelligence, Port of Honolulu (Anonymous, 1847).

[12] Garrett to Barnard, dated Hilo, Hawaii, 29 April 1857 (MCZ Archives, bAg 363.10.2, no. 2).

of Rio de Janeiro and San Francisco,[13] Garrett settled in Hilo, which served as home base for collecting trips to various other island groups throughout Polynesia. In May 1860, he left Hawai'i for the Society Islands, where he remained until July 1863 (Damon, 1863: 57; Garrett, 1884: 18). Following short stays at other island localities, primarily the Tuamotus (1864–1865), Samoa (1866), the Cook Islands (1867–1869), and Fiji (1867, 1868), he returned to the Society Islands in 1870, making Huahine his last permanent home (Cooper, 1887: 2, 1888: 92).

FINAL DAYS ON HUAHINE

On 26 June 1887, Garrett wrote to William Dell Hartman (1817–1899) of West Chester, Pennsylvania, a colleague of long standing and a highly regarded conchologist in his own right, who had obtained from Garrett "one of the finest collections of Polynesian land shells in the world" (Anonymous, 1899: 62; see also Smith, 1902: 422):

> As regards myself I have bad news to write and think this probably will be my last letter directed to you. I have been troubled some time back with a diseased mouth. The French doctors in Tahiti call it a very bad cancer and it has developed too far to be successfully treated by surgical operation. In fact, it has been so bad and painful that life is a burden and for some time I have been unable to work in my collection, which numbers over 8,000 species and 30,000 examples. It is hard to give them up and join the large majority. I may possibly linger along for several months. I am too weak to write much, so I will thank you over and over again for your past kindness to me.[14]

Garrett died on 1 November 1887 at the age of 64. His grave in Huahine, Society Islands, was described by ichthyologist Alvin Seale (1871–1958), who was then a member of the staff of the Bernice P. Bishop Museum (BPBM), Honolulu, employed as a field naturalist to collect ethnographic and natural history specimens: "New Year's Day, 1903. Early visited the house where the Naturalist Andrew Garrett lived and worked, and later visited his grave, which is near the sea and under a big Tamanu Tree . . . incircled [*sic*] with a neat iron fence."[15] Recalling his early visit, Seale (1946: 9) later wrote:

> In the island of Huahine, under a large Hau tree near the landing at the village of Fare, I came suddenly upon a modest stone monument upon which was engraved the following words: "In Memoriam Andrew Garrett, Conchologist, born at Albany, New York State, 9th April 1823, died on this Island 1st November 1887." This well-known naturalist was one of the first to do real scientific work in the Society Islands. Shells collected by him may be found in almost all museums and his wonderful colored drawings of fishes published in "Fische der Südsee" have never been surpassed.

FEARS OF BEING EATEN

While collecting on Viti Levu, Fiji Islands, in 1867, Garrett was terrified of being consumed by cannibals. He expressed

[13] Garrett to Barnard, dated Hilo, Hawaii, 29 April 1857 (MCZ Archives, bAg 363.10.2, no. 2).

[14] Garrett to Hartman, dated Huahine, Society Islands, 26 June 1887; quoted here from Smith (1902: 485) and Thomas (1979: 26); original in the Carnegie Museum of Natural History, Pittsburgh, but apparently now lost (Timothy A. Pearce, personal communication, 17 January 2020).

[15] Alvin Seale, "Expedition to South Eastern Polynesia, 1901–1902" (BPBM Archives, MS case 3, p. 22).

his trepidation in a letter to John Gould Anthony (1804–1877), a Cincinnati businessman and amateur conchologist who later became associated with Louis Agassiz at Harvard University, donating his large collection of shells to the Museum of Comparative Zoology (MCZ) and eventually joining the MCZ staff in 1863 as its first curator of molluscs (Turner, 1946: 89): "I have much to fear from the natives who are very savage, they having lately killed a Bishop. While I was at work in the Viti group the natives killed and ate an English Missionary[16] and eight native Teachers."[17]

These events were later recalled by Garrett in a letter to Hartman: "They killed several whites, including a missionary, while I was there. The latter, together with several native teachers, were served up at one of their cannibal feasts. Shortly after I left the group [of islands] there were a number of white residents killed by savages, showing what risks the shell collector experiences when searching these regions."[18] More than a decade later, Hartman responded by way of a letter to Henry Augustus Pilsbry (1862–1957), then editor of *The Nautilus*, who published an extract as follows: "Mr. Garrett was wont to tell me of the great danger to be encountered by these collectors in these islands from the natives. When he was collecting in some of these islands he was obliged to be a walking arsenal and would never trust a native behind his back for fear of being stabbed and dragged off into the bushes and eaten" (Pilsbry, 1891: 46).

GARRETT THE PHOTOGRAPHER

All the while in the islands, Garrett collected when and wherever he could, amassing huge collections. Thousands of his specimens were shipped off to individuals and institutions in the United States and Europe (Lee, 2012: 13). When unable to collect for reasons of travel or bad weather, he worked to improve himself. Well aware of his lack of scientific training, he learned to read and write Latin, taught himself to draw and paint, compiled his own library, and learned the art of photography (Damon, 1863: 57; Spoehr, 1963: 104; Clench, 1979: 96; Thomas, 1979: 18, 23).

How and exactly when Garrett became interested in photography is unknown. The earliest mention of this pursuit comes to us from a news item published on 4 August 1863: "He [Garrett] is now contemplating a still more extensive voyage among the South Sea Islands, including the Marquesan, Navigator [Samoa], Friendly [Tonga] and Fejee [Fiji] groups. A period of not less than five or six years will be occupied in these new explorations. He is perfecting himself in the photographic art, as he will go prepared to take views of natural scenery, animals, and the inhabitants of those remote regions" (Damon, 1863: 57).

In early September 1863, Garrett wrote to his agent, Samuel Hubbard of the Pacific Mail Steamship Company in San Francisco, to request the latest in photographic equipment. Hubbard purchased and shipped to Honolulu a complete wet-plate photographic apparatus, including a camera, plates, and chemicals, at the then-sizable cost of $376.16:

> I have yours of the 8th Sept & according to your request I have purchased the articles you ask for, & I trust they will answer your purpose & you will meet

[16] A reference to the murder of Rev. Thomas Baker (1832–1867), a Wesleyan missionary, on 21 July 1867 (see Damon, 1868a: 9, 1868b: 98; Susu, 2009).

[17] Garrett to Anthony, dated Huahine, Society Islands, 15 September 1872 (MCZ Archives, bMu 1089.10.1; see also Spoehr, 1963: 114; Thomas, 1979: 25).

[18] Garrett to Hartman, dated Huahine, Society Islands, 28 November 1878, as quoted from Thomas (1979: 25); original in the Carnegie Museum of Natural History, Pittsburgh, but apparently now lost (Timothy A. Pearce, personal communication, 17 January 2020).

> with all the success you desire. . . . If you should ever take any views I wish you would send me some & I will pay you for them. I should like a few pictures of the distinguished natives of the South Seas. I would also like a few of your drawings of fishes for myself. I want to frame them.[19]

By the mid-1860s, Garrett's photographic activities were apparently well known, at least among his close colleagues. William Harper Pease (1824–1871)—surveyor, conchologist, and fellow collector in Hawai'i, who first corresponded with Garrett in March 1857[20] and who often served as a mentor (Greene, 1960: 4; Kay, 1975: 8–18; Thomas, 1979: 19–20; Johnson, 1994: 3)—wrote to Garrett on 20 January 1864:

> Honolulu since you left, has been a lonesome place to me. Not a day passes, however, without my dreaming over your fortune & success. I have imagined that the missionaries might decide that your photographs were a useless article of furniture & discourage the natives from patronizing you, & then again I think I see you surrounded by a crowd of natives, dancing & shouting with the pictures. I shall be anxious to receive your first letter.[21]

Dissemination of information about Garrett's activities throughout the islands was due largely to regular reports published by Samuel Chenery Damon (1815–1885) in *The Friend*, a monthly journal devoted to "Temperance, Seaman, Marine and General Intelligence" for which Damon served as publisher and editor from 1843 to 1884 (see Damon, 1882). In the May 1867 issue of the journal, Damon (p. 36) wrote:

> Garrett, the Naturalist.—Letters have recently been received from Mr. Garrett, which report him as having visited the Samoan, Hervey [Cook Islands], and some of the Tonga islands of the South Seas, and in September or October, 1866, as on his way to the Fiji Islands. He pays his way by daguerreotyping and photographing. He is also collecting specimens in natural history. Agassiz has pronounced Mr. Garrett the most able and thorough collector of natural history specimens of any traveler in the Pacific.

A series of photographic portraits of native islanders taken by Garrett, along with his photographic equipment, all his books on conchology, dried plants, insects, part of his shells, bird skins, drawings, and field notes, were lost when his ship struck a reef off Viti Levu in late September 1868: "My Viti expedition was a most unfortunate one. When taking my departure after 2 years hard work I suffered shipwreck. . . . I regretted losing my notes and drawings which comprised descriptions of the soft parts of over 500 Mollusca and finished colored drawings of 60 naked Mollusca."[22]

George Boyne (1836–1913), a Sacramento, California, interior decorator and amateur naturalist who spent four years on Fiji, from 1865 to 1869 (Anonymous, 1906), on hearing of Garrett's misfortune, sent his condolences:

> I received your note this morning and I and others are very sorry that you have sustained so great a loss. We heard of her being on a reef 2 days ago, but from the

[19] Hubbard to Garrett, dated San Francisco, 9 October 1863 (BPBM Archives, MS group 141, box 1; see also Spoehr, 1963: 112; Thomas, 1979: 23).

[20] Pease to Garrett, dated Honolulu, 5 March 1857 (BPBM Archives, MS group 141, box 1).

[21] Pease to Garrett, dated Honolulu, 20 January 1864 (BPBM Archives, MS Group 141, box 1).

[22] Garrett to Anthony, dated Huahine, Society Islands, 15 September 1872 (MCZ Archives, bMu 1089.10.1; see also Spoehr, 1963: 114; Thomas, 1979: 25). By "naked Mollusca," Garrett was referring to nudibranchs of which he collected and illustrated numerous examples, many later used as the basis for new species described by the Danish malacologist Rudolph Bergh (1824–1909); see Bieler and Petit (2012: 4, 6, 20, fig. 17).

> information then gathered it was thought she would have been afloat again with but little damage. I deeply sympathize with you and can justly estimate the loss at the sum stated. I hope you may recover a little more and do not let the loss depress your spirit too much.[23]

Pease in Honolulu also responded to the loss with a sympathetic note, as well as a generous offer:

> Since writing yesterday, I have heard of your fearful almost overwhelming loss. Before this reaches you, you will have made up your plans, whether to remain & collect, or come up. I will forward you funds & help you to renew your photographic apparatus. My advice is to replace your collection at Fijis [*sic*], which is the most important part of your work. You are acquainted now with the localities & could make up your collection in one half the time. I have no letter from you, only heard from a gentlemen arrived here from Sydney, that he read an account of it in a Sydney paper. I hope you have not lost the whole & hope your Samoa collection at least is safe.[24]

The 1868 tragedy was not Garrett's only loss by shipwreck. A large collection of shells from the Society Islands, mostly destined for Harvard, was shipped aboard the famous clipper *John Gilpin*, which, departing Honolulu on 30 November 1857, bound for New Bedford, struck the underwater portion of an iceberg off the Falkland Islands on 29 January 1858, and began taking on water. The next day, the ship was abandoned—a total loss, having accidentally caught fire with 4.6 meters of water in her hold (Anonymous, 1858). Luckily, Garrett had retained duplicates of most of the shells (Damon, 1858: 76, 1859: 52).

Despite the unfortunate loss of photographs in the 1868 shipwreck, 28 images made by Garrett for the Godeffroy Museum in Hamburg (see below) have survived. Recently exhibited by the Staatliche Kunstsammlungen Dresden and featured in a catalog of the exhibit published by the Dresden State Art Collections (Matthias and Theye, 2017: 44; Hoffmeister-zur Nedden and Matthias, 2018), the images consist of portraits of native islanders from Tahiti, Fiji, Tonga, and Vanuatu.[25] All are ambrotypes, a photographic technique that was popular in the 1850s and 60s in which a low-contrast and underdeveloped negative image on glass is provided with a dark background, thus rendering a positive image. The skill required to make ambrotypes is considerable—it is a wonder that Garrett, with all his other activities, took the time and had the expertise to produce such beautiful results while working in such remote areas.[26]

COLLECTING FOR LOUIS AGASSIZ

On 29 January 1855, no doubt in need of financial support but also aspiring to become a professional collector (Thomas, 1979: 18), Garrett wrote to Louis Agassiz (1807–1873) from Hilo, enclosing a number of his drawings and offering his services:[27]

> My learning, in this remote part of the globe, of your love of the natural sciences, particularly Ichthyology, has induced me to send you these drawings of some of the fishes that are found about our group of islands. If they will be of any service to you, I will continue to make

[23] Boyne to Garrit [sic], dated Levuka, Fiji, 28 September 1868 (BPBM Archives, MS group 141, box 1).

[24] Pease to Garrett, dated Honolulu, 10 April 1869 (BPBM Archives, MS group 141, box 1).

[25] There is also a Garrett ambrotype of a native Tongan missionary in the MK&G Collection (2020).

[26] Some of Garrett's images can be viewed on the Staatliche Kunstsammlungen Dresden (2020) website.

[27] Garrett to Agassiz, dated Hilo, Hawaii, 29 January 1855 (MCZ Archives, bAg 363.10.1).

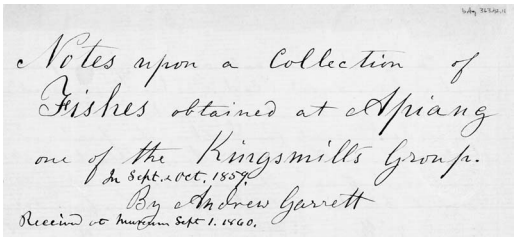

Notes upon a Collection of
Fishes obtained at Apiang
one of the Kingsmills Group.
in Sept. & Oct. 1856.
By Andrew Garrett
Received at Museum Sept 1. 1860.

Figure 2. A sample of Andrew Garrett's handwriting and signature from the title page of his 33-page, unpublished report on the fishes collected at Abaiang, Kingsmill Islands, sent to Louis Agassiz at the Museum of Comparative Zoology, Harvard University, with dates added by an unknown hand (MCZ Archives, bAg 363.42.11). Used with permission.

> sketches of every kind that are found in the neighboring sea and forward them on to you, so that in the event of your observing any new species, or, such as you would like specimens of, you can inform me and I will send them to you in some of the home-bound whale-ships. Say to New Bedford where I could notify some person to receive them and forward them on to you.
>
> I do not make any pretensions to a knowledge of Ichthyology, no, far from it, for I do not know the names of half a dozzen [*sic*] species. Yet I will endeavor to write a description of each species, although I hardly know what to observe. I send a description of three species so that you can see whether they would be of any use to you in determining the names [Fig. 2].
>
> If you should condesend [*sic*] to receive my future drawings (which I am in hopes of improving) and descriptions, I could desire you to give me a few hints in regard to describing, drawing and preserving specimens that you may want.

Agassiz, who in 1847 had accepted an appointment as lecturer at Harvard University, and who, anxious to establish a network of collectors, had solicited contributions throughout the world, was pleased with what he saw. In September 1856, almost 17 months later, Garrett received a letter from James Munson Barnard (1818–1904), writing on Agassiz's behalf, inviting Garrett to become a zoological collector on a permanent basis. Barnard was a wealthy Boston merchant and amateur naturalist who studied natural history under Louis Agassiz, and who, at a time when Agassiz was burdened with debts incurred in publishing his *Recherches sur les poissons fossiles* (1833–1843), "took charge of the enterprise, and later on rendered him the greatest service in his money affairs, saving Agassiz the nervous wear and tear that would have destroyed him some years sooner. From 1855 to 1865, Barnard was his ever-ready encourager, advisor, and helper, at a period when Agassiz was always in want of money to foster his favorite studies" (Ward, 1881: 16; see also Ware, 1906: 838).

Responding to Barnard on 10 October 1856, Garrett was enthusiastic but, at the same time, he made his needs clear:

> Your kind and encouraging letter, dated July 17/56, I received last month. In regard to collecting specimens for you and the learned Professor [Agassiz] I should be most happy to do so. Having no employment here at presant [*sic*], I was upon the point of returning to the United States this fall; but I am in hope of being able to make arrangements with you, and devote my *whole* time in making a complete collection of the fauna of this interesting group of islands.
>
> As regards the expense of making a good collection I am hardly prepared to say I shall require the assistance of one native all the time, to assist me in dredging and diving. I shall be obliged to pay him about 6 dollars a month and find him in food. Many of the specimens I shall purchase from the native fishermen, especially the rarest kinds. And, as there is no smaller coin in circulation here than

> 12 1/2 cents, they will demand as much for the most trifling service that they may render me. While dredging I shall require an extra native who will demand 50 cents a day. I will also have to purchase a canoe which will cost me 30 dollars. Then there will [be] the expense of transporting specimens and materials from place to place, cooperage, and shipping. Then, clothing and food are very expensive here.
>
> I do not wish to make a speculation of the thing, I wish no more than sufficient to pay the expense and my support while engaged in it. I will undertake it and devote my whole time to it, for 400 dollars a year and you furnish me with alcohol, kegs and jars. Also sealing wax if you think it necessary. All my travelling expenses, for I shall have to visit the different islands of the group, I pay out of the above sum and every other expense occurring here. When I state that it will cost me 15 dollars to go to Honolulu and back, and, all other things that I have mentioned will leave me scarcely more than sufficient to support me. One thing I will warrant you, that is that I will work hard, and send you more than that in value, in good specimens, in every branch of Natural History.[28]

Garrett thus became part of a team of voyager-naturalists, hired by Harvard University, who searched for unusual species of fishes and other marine animals all over Polynesia, to sketch and paint them as lifelike as possible and to send specimens preserved in alcohol for the growing collection at Harvard.[29] But as Garrett began to forward specimens and drawings, Agassiz felt it necessary to provide guidance on how and what to collect:[30]

> The principal merit of collections of objects of nature is not desired, in our days, from the accidental circumstance, that they may contain new species, but from the opportunity they afford of elucidating natural laws. The collector ought therefore to have his attention constantly turned to this important end and must on that account collect in a particular way. ... [Whenever] an animal is common in a locality visited ... large numbers of specimens ... ought to be gathered, of all sizes from the smallest to the largest, as they will afford the means of ascertaining the range of variations of the species, the relative number of males and females; if there is a difference in the frequencies of the sexes, etc. ... As to remote localities, say adjoining islands, or opposite shores of the same island, specimens must always be collected of everything, whether they differ or not, otherwise it is impossible to ascertain the range of their geographical distribution and mode of association. Trusting to one's recollection to decide whether species are the same or not is very deceptive.

Agassiz ended his letter with praise for Garrett: "I have been very much pleased with the drawings as well as the descriptions of An. Garrett. They will be invaluable materials to clear up the Nat. Hist. of the Pacific Ocean."

Encouraged by Agassiz, Garrett worked to perfect his collecting techniques: "I have read the Prof.'s note, and will collect according to his instruction."[31] Haphazard at first, he soon developed a set of protocols that he applied whenever possible:

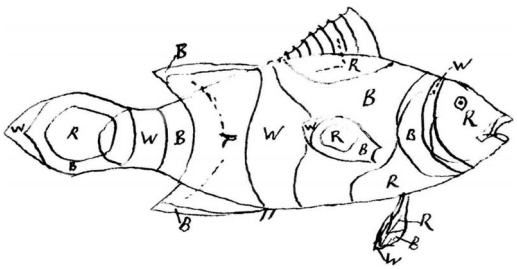
[28] Garrett to Barnard, dated Hilo, Hawaii, 10 October 1856 (MCZ Archives, bAg 363.10.2, no. 1).

[29] For accounts of other naturalists hired to collect for Harvard during the 1850s and 1860s, see Spoehr (1963).

[30] Agassiz to Barnard, intended for Garrett, dated Cambridge, Massachusetts, 28 August 1857 (BPBM Archives, MS group 141, box 1).

[31] Garrett to Barnard, dated Kohala, Hawaii, 8 January 1858 (MCZ Archives, bAg 363.10.2, no. 10).

I have found occupation enough in collecting such specimens as do not often occur, and noting down the colors, habits, mode of locomotion of every species. But I find it slow work notwithstanding the abundance of specimens which present themselves on every hand. For instance, when searching along the coast I have to take pencil and paper, an assortment of small jars, boxes and calabashes, which my native boys carry. And when I find anything which I wish to preserve, I first note the depth of the water, kind of bottom, its mode of locomotion if necessary, and colors while alive. And I find it necessary to preserve them in water while carrying them about, so that their delicate parts will remain perfect, until I can place them in alcohol. I find it necessary to make rough sketches of many objects, in order to give a clear idea of their markings, which



cannot be done in text. For instance, if I wish to convey an idea of the distributions of the colors and markings in a fish, I make a rough sketch like the one above. The region marked W is white, R bright red, B black and the outlines describe the distribution of those colors.[32]

COLLECTING FOR THE CALIFORNIA ACADEMY OF SCIENCES

In addition to his relationship with Agassiz and the Museum of Comparative Zoology, Garrett by 1857 was also collecting for the California Academy of Sciences (CAS). Unfortunately, most of the records of this association were lost in the fire that followed the Great San Francisco Earthquake of 1906.[33] However, a letter from William Orville Ayres (1817–1887), then secretary of the CAS, dated 23 December 1856, has survived, informing Garrett that on 12 May of that year he had been elected a Corresponding Member of the Academy (Anonymous, 1856).[34] On 18 November 1857, Ayres wrote again to thank Garrett for receipt of a shipment of specimens, drawings, and descriptions, and to let him know that his paper (Garrett's first scientific contribution) had been published in the Academy's *Proceedings* (see Garrett, 1857).[35] In September 1863, after Garrett returned to Honolulu following 3 years in the Society Islands,[36] John Boardman Trask (1824–1879), then Curator of Geology and Mineralogy at the Academy, wrote saying that 20 gallons of alcohol were being sent, hoping that Garrett would collect for the Academy: "If you have any thing [*sic*] more to part with in the line of specimens, send them along. Our maw is capacious enough to receive all that you can dispense with, a very hungry institution is an Academy of Natural Science and one apt to be bashful in begging."[37]

[32] Garrett to Barnard, dated Papai Puna, Hawaii, 13 July 1857 (MCZ Archives, bAg 363.10.2, no. 4).

[33] Seth Cotterell, California Academy of Sciences, personal correspondence, 15 November 2019.

[34] Ayres to Garrett, dated San Francisco, 23 December 1856 (BPBM Archives, MS group 141, box 1).

[35] "Your specimens and drawings & descriptions were all safely delivered; the specimens are in the cabinet of the Academy & the publication of your paper was commenced in our Proceedings as you will see by the copy which I send you herewith" (William Orville Ayres to Garrett, dated San Francisco, 18 November 1957; BPBM Archives, MS group 141, box 1).

[36] "During the years 1860 to 1863, I made a much more thorough exploration than any of my predecessors, and, by searching in nearly every valley in the [Society] group, discovered over 50 new species" (Garrett, 1884: 18).

[37] Trask to Garrett, dated San Francisco, 4 September 1863 (BPBM Archives, MS group 141, box 1).

The association with the CAS continued at least through 1866, when, on 4 January 1866, William Healey Dall (1845–1927), then a member of the CAS and of the Scientific Corps of the Alaskan Western Union Telegraph Expedition (1865–1867), acknowledged a "very acceptable donation of shells," thanking Garrett for his "zeal in collecting" and the "valuable nature" of his collections.[38]

GARRETT AND THE HOUSE OF GODEFFROY

As early as 1863, the relationship between Garrett and Agassiz began to wind down (Spoehr, 1963: 115; Thomas, 1979: 23) and on 2 May of the following year it was officially terminated. Agassiz provided the following explanation:

> Having three times written to you at different periods last year to inform you of the condition of the Museum and of our inability to go on with your explorations as had been done before, I write again in hope that you will favor me with an answer this time. The war has so completely crippled our resources by increasing our expenses that we can no longer afford to employ collectors as we have done and we have been compelled to suspend all expeditions to out of the way places. All that we can therefore hope to be able to do with your collections is to agree to take what you may collect at your place of residence wherever that may be, and pay you what will be a fair remuneration for your time and outlay. But as I have advised you before I shall not be able and not be compelled to refuse payment on any draft of yours especially if as last year the returns for the amt., which has been fair, are so [?] proportionate. I hope that the time will soon return when affairs will be in a more flourishing condition. Hoping soon to hear from you.[39]

The Harvard connection was soon replaced, however, by a similar arrangement with Johann Cesar VI Godeffroy (1813–1885), director of J. C. Godeffroy & Sohn, the House of Godeffroy, an important shipping and trading company, centered in Hamburg, Germany (Spoehr, 1963: 28; Evenhuis, 2007: 18–20; Bieler and Petit, 2012: 4). Godeffroy, in addition to his entrepreneurial skills, had an intense interest in natural history. Beginning as a small but ever-growing personal collection of molluscs, fishes, birds, and other animals, as well as cultural objects from localities around the world visited by Godeffroy's ships, he eventually established his own museum, which opened to the public in 1861 (Spoehr, 1963: 27; Evenhuis, 2007: 19; Bieler and Petit, 2012: 4, 9). By August 1866, in return for payment and free passage on company ships, Garrett was employed by Godeffroy to collect zoological specimens for the museum, specifically from Samoa, Fiji, Marquesas, the Tuamotus, and the Hawaiian, Cook, and Society islands (Spoehr, 1963: 115; Thomas, 1979: 24; Evenhuis, 2007: 19; Bieler and Petit, 2012: 6, 8). In addition to hundreds of specimens and descriptions received by Godeffroy in the late 1860s and early 70s was a collection of nearly 500 Garrett drawings of fishes. Impressed with the high quality of the drawings and detailed descriptions, Godeffroy passed them on to Albert Günther (1830–1914) at the then British Museum (Natural History) in London, with a request to edit and prepare the material for publication (Günther, 1873: i–

[38] "The Academy is still in existence and your very acceptable donation of shells has been already labeled and is in a condition to be added to the collections" (Dall to Garrett, dated San Francisco, 4 January 1866; BPBM Archives, MS group 141, box 1).

[39] Agassiz to Garrett, dated Cambridge, Massachusetts, 2 May 1864; a carbon copy digitized from microfilm (MCZ Archives, Agassiz Letter books, letter 440).

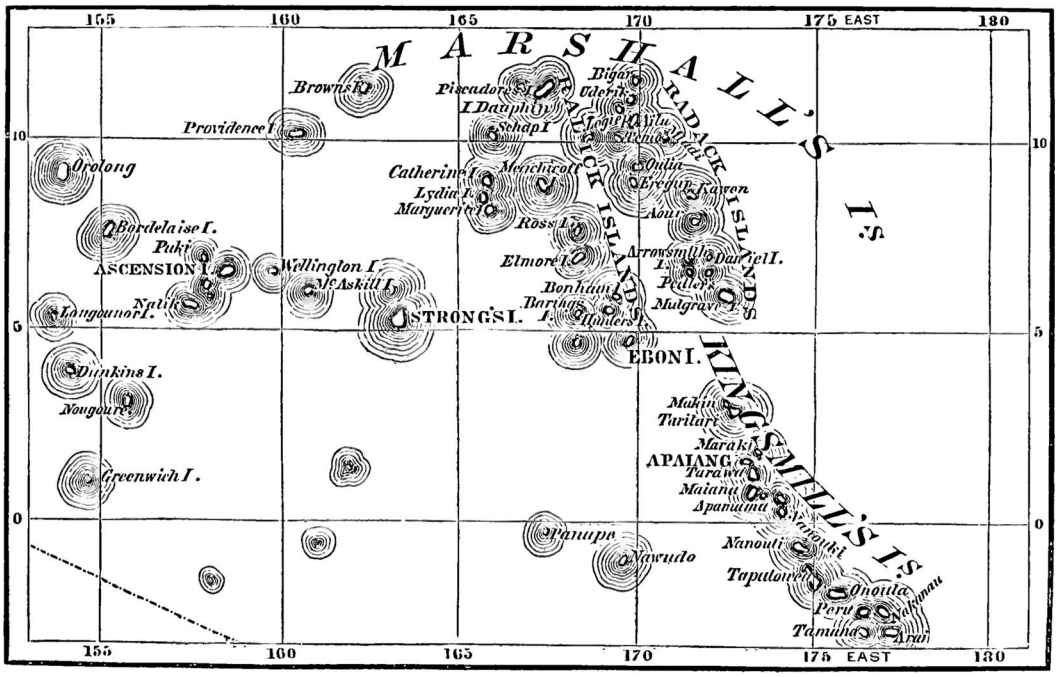


Figure 3. Eastern Micronesia, showing the islands and atolls of the Marshall and Kingsmill Islands, the latter now known as the Gilbert Islands. After Warren (1860: 210).

ii; Spoehr, 1963: 101): "We notice with pleasure the German House of J. C. Godeffroy & Son, doing business at the Samoa Islands and in Micronesia, are publishing a series of illustrated works on natural history, relating to Polynesia. Mr. Garrett, the American Naturalist, so well known throughout Polynesia, and who gathered all sorts of strange fish and sea 'monsters' for Prof. Agassiz, has found liberal patrons in J. C. Godeffroy & Son" (Damon, 1875: 100). The result was "Andrew Garrett's Fische der Südsee," published in Hamburg (1873–1910) in nine parts in the *Journal des Museum Godeffroy* and subsequently bound in three volumes—a work that was of primary importance to the next generation of ichthyologists (Thomas, 1979: 26; Saunders, 2012: 94).

THE KINGSMILL EXPEDITION

Among the letters that passed between Garrett, Agassiz, and Barnard, archived in the library of Harvard's Museum of Comparative Zoology, is a 32-page account, written by Garrett and addressed to Barnard, describing an expedition to the Kingsmill Islands, now known as the Gilbert Islands, part of the present-day Republic of Kiribati (Fig. 3). The only surviving, first-hand report of Garrett's activities and observations in the field, it has been transcribed and reproduced in full below. Other than changes in punctuation and a few minor spelling corrections, it remains here as Garrett wrote it. The names of taxa are as they appear in the manuscript—no attempt has been made to provide modern equivalents. Inconsistencies in spelling within quoted material (e.g., cocoe-nut, cocoa-nut, coconut) are maintained

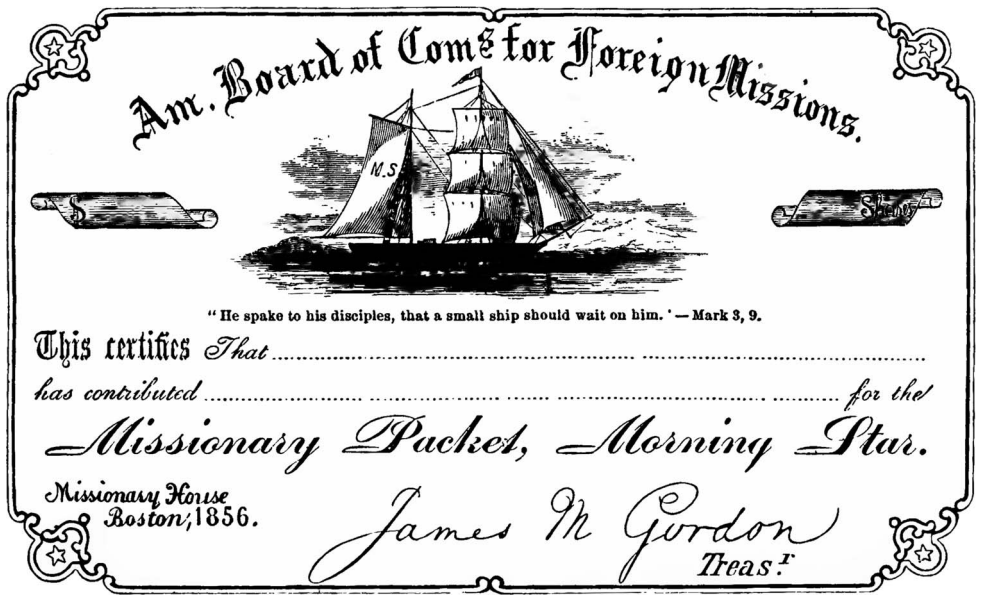


Figure 4. Certificate of stock in the *Morning Star*. The first of five missionary vessels of that name, the *Morning Star* was built at Chelsea, Massachusetts, by the American Board of Commissioners for Foreign Missions to aid in mission work in Hawai'i, Micronesia, and the Marquesas Islands. In August 1856, in response to a request from the Board of the Hawaiian Evangelical Association, the American Board appealed to children in the United States to help purchase a missionary packet by buying 10-cent shares of ownership. In return, the children received Certificates of Contribution. One hundred and twenty thousand American children became stockholders, and by year's end the *Morning Star*, a hermaphrodite brig (square-rigged foremast and fore-and-aft mainmast), had been built in Chelsea, Massachusetts, at a cost of $18,351. Launched on 12 November 1856, she sailed from Boston on 2 December 1856, under the command of Captain Samuel G. Moore, and arrived at Honolulu on 24 April 1857. She continued to sail between South Pacific missions until she was sold in 1866. For more of the history of the *Morning Star*, see Warren (1860), Bingham (1866), Bliss (1906), and Livingston (1969). After Warren (1860, frontispiece).

throughout, as are capitalizations and italicizations (i.e., underlining). Numbers within brackets refer to manuscript pages.

Garrett's account, dated Honolulu, Oahu, Sandwich Islands, 8 February 1860, begins with a salutation to James M. Barnard:[40]

> Dear Sir, Thinking that an account of my expedition to the Kingsmill Islands, would not be uninteresting to you, I send the following particulars. Agreeable to your instructions to explore and collect the fauna of some of the South Sea Islands, I sent a petition to the "Special Committees" who have controls of the Missionary brig "Morning Star" [Fig. 4], then lying at the wharf, and almost ready for a voyage to the "Micronesian" Islands. My humble request was favorably received and I was allowed a passage there and back on the most favorable terms, that is $1.50 a day while I remained on board, and no charge made for my packages either way. As the brig was to proceed direct to "Apiang,"[41] one of the Kingsmill Is. [Fig. 5], and from there to explore some islands to the westward, and after a three or four-month cruise was to return to the above Island again. Upon considering the intended voyage, I concluded it would

[40] Garrett to Barnard, dated Honolulu, 8 February 1860 (MCZ Archives, bAg 363.10.2, no. 23).

[41] Apaiang or Abaiang Atoll (consistently spelled "Apiang" by Garrett), also known as Apia, and in the past, Charlotte Island, the fourth most northerly atoll in the Gilbert chain of 16 atolls and coral islands.

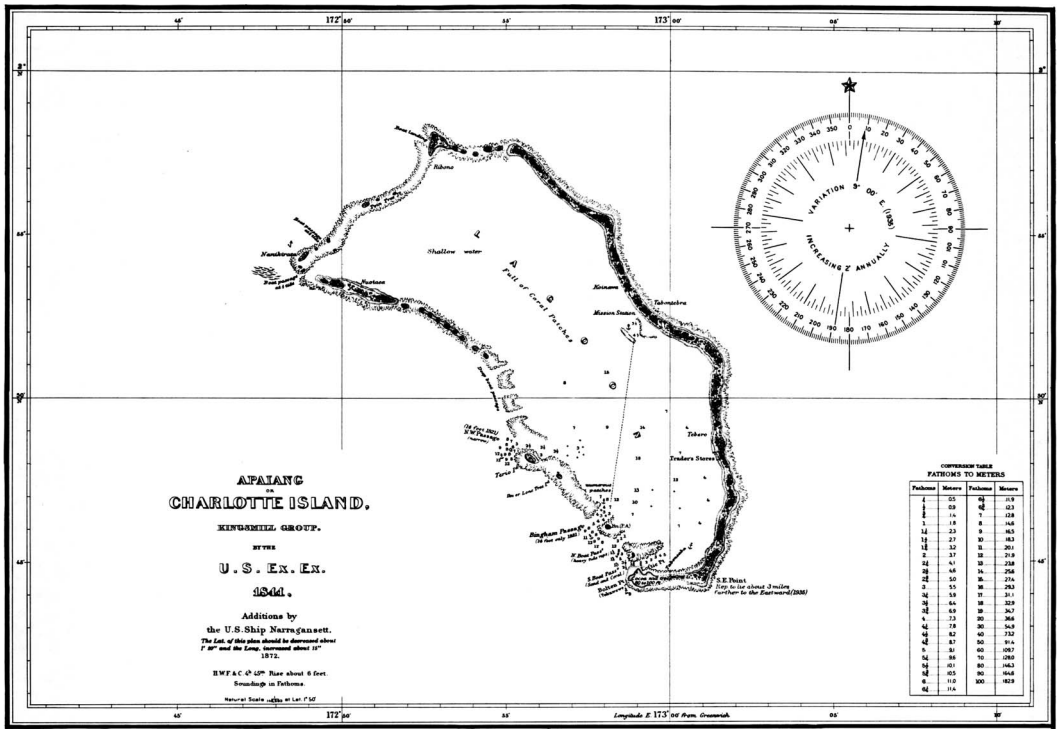


Figure 5. Chart of Apaiang or Charlotte Island, Kingsmill Group, the fourth most northerly atoll in the Gilbert chain of 16 atolls and coral islands, showing vegetation, dwellings, a mission station, passes, and other information, 1 inch to 2 nautical miles. U.S. Exploring Expedition, 1844, with corrections and additions by the U.S.S. *Narragansett*, Commander Richard W. Meade, 1872 (Heynen, 1978: 23, chart 189).

be advisable to locate myself at "Apiang," and remain there until the vessel returned from her western cruize [*sic*]. Every thing [*sic*] being arranged relative to my plans, I had an interview with Capt. Brown,[42] the master of the "Morning Star," who gave me much valuable advice in getting up my outfit of provisions and articles of traffic. The latter consisting of cutlery, edged tools, beads, calico, files, etc. I also purchased 400 feet of lumber [page 2] for making packages. The Captain advised me to lay in a stock of provisions for 4 months, as the island produced neither hogs, fowls or vegetables. My provisions, clothing and cooking utensils for the expedition cost me 125 dollars, so that, having returned in 5 months, and having paid my house rent, at "Apiang," I found I had about 5 dollars clear of expenses. I do not mention this with any complaint, but to give you an idea of the expense of collection, so that you may not find fault with some of my bills sent in to Mr. Brewer.

At 5 o'clock, P.M. Aug. 16 [1859], we cast off from the wharf and quietly glided out of the bay before the trade winds, that came sweeping through the beautiful "Waimea" valley, and at dark I could

[42] Captain John W. Brown, of New London, Connecticut, "an able seaman and a pious man" (Warren, 1860: 210), who was sent out by the American Board of Commissioners for Foreign Missions in 1858 to take command of the *Morning Star* following the retirement of Samuel G. Moore (Damon, 1860: 17; Livingston, 1969: 60).

just trace the outline of Oahu, which was soon shrouded in the gloom of night. On the following morning, after breakfast the bell tolled and the crew collected in the cabin, while the Capt. conducted religious service, after which he made a short but appropriate address to the men, explaining the nature of the voyage, and gave them some salutary advice relative to their conduct while among the various islanders that they may visit during the cruize [*sic*]. I will now give my daily observations as copied from my journal.

Aug. 20.—Up to this date we had been running before the trade-winds, toward the southward and westward, at the rate of about 180 miles a day. Many tropic-birds (*Phaethon*) and boobies (*Sula*) were seen, and two species of flying-fishes were [page 3] very abundant. One of the latter fell upon our decks, and was given to me by one of the officers. It proved to be specifically different from the two species obtained at the Sandwich Is. I regretted that I could not preserve the specimen as my alcohol, which I had told the mate to have handy to the hatch way, could not be got at without much trouble. I, however, made a colored drawing and drew up a description which I send.[43]

On the 24th we were half way to the Kingsmill Is. and the wind had hauled more to the southward and the weather looked squally. According to the Captain's observations we were in a current setting to the N. E. at the rate of about 2 1/2 miles an hour. Our latitude was seven degrees north of the equator. The following day was calm with rain squalls. Many Acalephae[44] was [*sic*] observed floating about. I scooped up a curious sea-weed on which was a small crab, several Anatifae [isopod crustaceans] and some fine lace-like coral. The Acalephae noticed consisted of the genus [*sic*] *Porpita*, *Velella*, and *Physophora*. We were soon favored with a strong breeze from the south east and were once more rolling and driving towards Micronesia. One day one of the crew captured a large fish (*Pelamys*) commonly called by seamen "bonita." I obtained from its stomach a new flying fish (*Exocoetus*) which, though much decomposed, I send with the collection.[45]

Aug. 31st Wednesday.—At 5 o'clock, P.M. we saw Maraki [Marakei], one of the Kingsmill group. Dana says "it is one of the prettiest coral islands [page 4] of the Pacific. The line of vegetation is unbroken; and from the mast head lies like a garland thrown upon the waters."[46] At dusk we hove to between this Island and "Apiang," intending in the morning to pass round the southern point of the latter. On the ensuing morning we were all much vexed upon observing that we had drifted down to the lea [leeward] end of "Apiang." The whole day was occupied in endeavoring to regain our

[43] Garrett's detailed, two-page description of this flyingfish, "taken about midway between the Kingsmills and the Sandwich Is.," has survived ("Notes upon a Collection of Fishes obtained at Apiang one of the Kingsmill's Group"; MCZ archives, bAg 363.42.11), but the drawing itself cannot be found (Andrew Williston and Robert S. Young, personal communication, 7 January 2020).

[44] Acalephae, a group of coelenterates, including the medusas (or jellyfishes), hydroids, and related forms.

[45] This flyingfish, in poor condition, was present in the collections of the Museum of Comparative Zoology, Harvard University (received on 31 December 1859, registered as MCZ 740, identified only to family) but has long since been discarded (Andrew Williston, personal communication, 13 March 2020).

[46] On the contrary, this is not a quote from Dana, that is, James Dwight Dana (1813–1895), a professor at Yale who published extensively on geology, but rather from Henry Theodore Cheever (1814–1897) (Cheever, 1851: 154).

former position to the windward, but the current proved to [*sic*] strong, so that at night we were glad to get an anchor down under the north west point of the land. The next day we made another attempt to beat to the windward on the west side of the island, but was [*sic*] obliged to anchor again before meridian at the same place. A few naked natives was [*sic*] seen on the beach, shouting or gesticulating for us to land. We lowered a boat and pulled in, but could not communicate with them in consequence of the surf. After dinner the breeze having freshened we lifted our anchor and made another unsuccessful attempt to beat, but night found us again at anchor at the same place.

Two natives came alongside in a canoe, bringing a few cocoe nuts, some Pandanus nuts, and two *Scomberoides* fishes. These I examined with care and found them to be the same species that occasionally visits the Sandwich Islands in large shoals. I send a drawing.[47] As I could not obtain a specimen, you can compare the drawing with the Sandwich Is. specimens, and easily determine. I also afterwards saw the [page 5] same species cooked at the Island of Ebon [Ralik Chain, Marshall Islands].

As it was useless to make another attempt to get to the windward, on the following morning we got under way and stood to the northward with the intention of working to the eastward and ultimately get to the southward and gain our point. To-day I saw a few *Janthina* [planktonic gastropods] floating past, but quite out of the reach of my scoop-net. At sunset, land was seen a point off our lea [leeward] bow, 15 miles distant. It proved to be a lagoon Island called "Tari-Tari" [i.e., Butaritari, Gilbert Islands] or Pitt's Is., which bears nearly due north and about 60 miles distant from "Apiang." During the night we made two tacks, and on the following day, Sunday the 4th of September, we stood close along the east coast of the above Island, and at dusk cited the small Island called "Makin" which is the most northernmost of the [Gilbert] group. The wind now hauled so that we were enabled to lay our course well to the eastward, and having continued that course about 160 miles, we got a favorable breeze to get to the southward. When we anchored at the north-west point of "Apiang" we were only 10 miles from the Mission, and in order to reach that place we are obliged to make a circuit of nearly 500 miles. On the 6th of Sept., we once more directed our course toward "Apiang." The following day the wind was very light and the sea uncommonly smooth. Numerous marine animals were floating about. Among them I noticed a *Carinaria* [planktonic gastropod] and many Acalephae. A [page 6] huge sword-fish (*Xiphias*?) came under our stern in pursuit of a small shoal of bonita (*Pelamys*) which had sought protection by keeping close to the rudder, where they were out of the reach of their enemy, whose long bill prevented him from making a dash at them. I have frequently seen this species of sword-fish in the north Pacific, and am unable to ascertain whether it has been described by any Naturalist. It may possibly prove new to science. Its length was about 6 feet, the beak included, which latter was about 20 inches long. When it exposed its sides it appeared to be closely barred vertically, and the caudal fin reflected the most intense azure blue. I have in former voyages seen them make a dash in a shoal of Bonita, killing and wounding several.

Late in the afternoon I captured a species of *Physophora* [siphonophore]

[47] Garrett's drawing of this *Scomberoides* is apparently lost (Andrew Williston and Robert S. Young, personal communication, 7 January 2020).

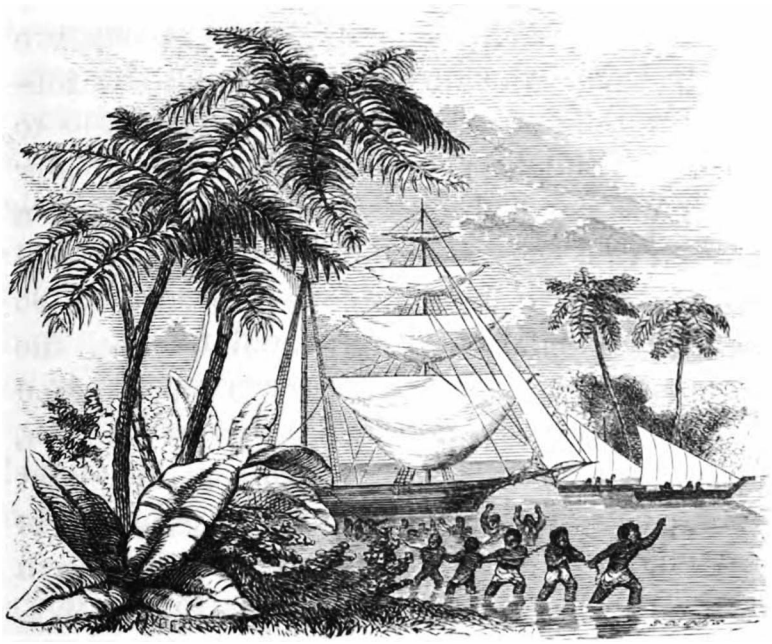


Figure 6. The missionary brig *Morning Star* entering the lagoon of Abaiang, Kingsmill Islands, on 12 September 1859. After Warren (1860: 195).

and a beautiful *Medusa*. Nothing can exceed the beauty and singular structure of these pelagic animals, and when placed in a jar of water their frail and delicate appearance cannot fail to attract attention of the most casual observer. The former consists of a delicate oblong bladder, distended with air, and from beneath are suspended a garland of filiform tentacular appendages, of a rich bluish purple color; these, when handled cause a stinging sensation like that produced by a nettle. Among the novelties scooped up was a *Velella* [siphonophore], though belonging to the same class of animals as [page 7] the former, yet are of different structure. It consisted of an oval, horizontal, cartilaginous disk, surmounted with a vertical, oblique crest, which seems to answer the purpose of a sail. Beneath the horizontal disk are suspended numerous short violet tentacles. But the greatest wonder obtained was a chain of those singular Tunicated Mollusca called *Salpae* [planktonic tunicates], whose wonderful mode of production has excited the astonishment of the scientific world. The chain when fished up consisted of about 20 individuals, all of which separated when turned out of the net into a bucket of water. They moved about quite lively, by forcing the water through their sack like bodies. A minute *Diodon* [porcupinefish] was also added to the collection.

On Friday the 9th of Sept., the Island of "Tarawa" [Gilbert Islands] was seen off on our lea [leeward] bow. We kept off and stood close along the eastern coast, and at 11 o'clock A.M. we sighted the Island of "Apiang" once more. At 2 o'clock we passed through the southern passage, and stood up the lagoon of the latter island, and at 4 o'clock dropped anchor off the Mission [Fig. 6]. Our

decks were soon thronged with half naked savages, bringing cocoe-nuts, Pandanus nuts, tody [toddy, fermented coconut juice] and cocoe-nut syrup to sell. After supper the Captain and myself went ashore and called upon Mr. Bingham,[48] the resident Missionary, who together with his amiable wife gave us a most cordial welcome. I noticed the table strewed with letters, those dear messengers from home and friends, which they had just received by our vessel. Capt. Brown, Mr. Bingham and myself now took an evening stroll through [page 8] the coconut groves, and after a walk of about half a mile we reached the village where the King resided. Mr. Bingham proposed that we should call and see him, and ask permission for me to remain here during the absence of the "Morning Star." We soon found ourselves in the presence of King "Tekaiia,"[49] and went through a formal introduction. His majesty was seated on a mat in front of a house, quietly smoking a short black clay pipe. He is a large corpulent man, and his only covering was an old mat wrapped around his loins. He readily gave his consent, when the object of my remaining was explained to him, having in view the presants [*sic*] that he would receive for his compliance. I now returned on board well pleased with my visit and reception by the rude Islanders.

On the following morning, after breakfast I went ashore, and it being low-water I had to wade some distance over the lagoon platform, which extends about 200 yards from the shore. Here I made a commencement of my researches, and the prospect was favorable for reaping a rich harvest. I obtained specimens of the *Cerithium nodulosum*, *C. columna*, *C. moniliferum*, *C. lineatum* and var: *asperum*, *Conus hebraeus*, and var: *vermicularis*, *Triton tuberosum*, *T. chlorostomum*, and an undetermined *Nerita*, *Conus* and *Cerithium* [marine gastropods]. I now crossed the narrow strip of land, which was about 400 yards wide, and examined the outer or eastern platform. Here I found many species of shells in abundance.[50] The most common was the *Engina mendicaria*, *Mitra litterata*, *M. paupercula* and *Ricinula* [page 9] *digitata* [marine gastropods]. The three former species [are] most generally found lurking under stones, and the *Engina mendicaria* was the most abundant of all, and gregarious in their habits. Among some coral boulders I found the *Purpura armiger*, *P. hippocastanum*, *Ricinula morus*, *R. arachnoides*, *R. horrida*, and the *Patella pentagona* [marine gastropods]. Toward the outer edge of the reef I picked up several specimens of the *Ranella bufonia* and a fine *Mitra pontificalis* [marine

[48] Hiram Bingham II (1831–1908), son of the pioneer missionary Hiram Bingham (1789–1869), leader of the first group of American Protestant missionaries to introduce Christianity to the Hawaiian Islands. Stationed at Abaiang in the Gilbert Islands from 18 November 1857 to 8 September 1865, the younger Bingham and his wife Minerva Clarissa Brewster (1834–1903) served as Garrett's host during his stay in 1859. For more on Bingham, see Rennie (1989); on the Bingham family, see Miller (1982).

[49] Tekaiia or Te-Kaiia, King of Abaiang, is mentioned several times by Jane Warren (1860: 291) in her history of the Children's Missionary Vessel *Morning Star*: "At times, when the confusion is great, king Te-Kaiia, who has become very regular in his attendance [at church services], commands silence, but he is seldom obeyed."

[50] In his "Remarks upon the Shells collected at Apiang," Garrett wrote: "While at the above island I collected every species of shells, both dead and alive, that I could obtain. Even fragments of shells, when they retained sufficient characters to determine the species, I carefully preserved, in order to make as complete a list as possible" (MCZ Archives, bAg 363.42.20).

Figure 7. The Episcopal Miter (left) and Marlinspike Auger (right), now known as *Mitra mitra* (Linnaeus) and *Oxymeris maculata* (Linnaeus), respectively, drawings by Andrew Garrett based on specimens collected at Ascension Island, now Pohnpei, in the Caroline Islands (see Fig. 3). Courtesy of the Ernst Mayr Library, Museum of Comparative Zoology, Harvard University. Used with permission.

gastropods; Fig. 7]. A species of *Ophiura* or serpent star-fish was very abundant.

I now returned to the mission and made arrangements with "Kanoa," one of the Hawaiian missionaries,[51] to occupy his house [Fig. 8]. He and his family were to take passage in the brig on her western cruise. During the afternoon part of my effects were landed and stored in the house.

On Monday, the 12th. Having landed all my packages, I took a stroll on the outer and inner platforms and added my shells and several specimens of *Brissus* [sea urchins] to my collection. The latter, of which, by employing many natives to search, I obtained hundreds of specimens during my brief residence. They are found buried a few inches deep in the sand in the eastern lagoon platform. Not a single specimen of this species occurred on the outer reef, though I afterward found a second, and much larger species in the latter location, which in a like manner does not occur in the lagoon.

This morning the King came on board and took breakfast with us. On this occasion he was [page 10] attired in a loose blue calico frock. At the table he partook of every dish, and enquired to Mr. Bingham the name of each. He seemed to be [of] a very quiet and peaceable nature. After the meal was over the Captain made him a presant [*sic*] of a roll of blue cloth, which he received without the least expression of gratitude, and immediately passed it to Mr. Bingham to take ashore. The latter gentleman informed us that his Highness commands so little respect from his subjects, that if he was to land with any presants [*sic*], they would soon obtain them by begging; so in order to retain anything that may be given to him on board of any vessel, he generally leaves them in the care of the missionaries.

Tuesday the 13th.—This morning Mr. and Mrs. Bingham and myself took a parting breakfast with Capt. Brown and

[51] John William Kalawaianui Kanoa (1823–1896), a Hawaiian missionary, associated with the Polynesian and Micronesian missions at least as early as 1855; assigned to Abaiang in 1857 and accompanied by his wife Kaholo (1833–1875), he was employed to assist Hiram Bingham in public worship and to teach the gospel to the local population (see Warren, 1860: 135, 159; Bingham, 1866: 38; Bliss, 1906: 62; Rennie, 1989: 125). According to Morris (1987: 138), "Kanoa worked alongside Hiram Bingham on the Gilbertese island of Abaiang in a relationship that was truly a partnership. Bingham respected Kanoa's efforts and praised his quick acquisition of Gilbertese." For more on Kanoa, see Morris (1987: 310–315, fig. 22).

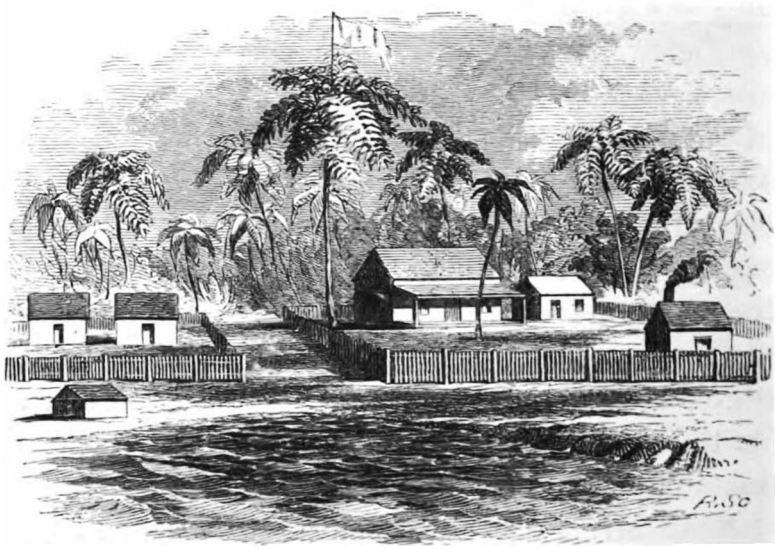


Figure 8. The Rev. Hiram Bingham's house on Abaiang, Kingsmill Islands, a "neatly-thatched cottage," with the twin dwellings of the Hawaiian missionaries Kanoa and Mahoe on the left, one of which was occupied by Andrew Garrett during his stay on the island in 1859. Warren (1860: 284).

his officers, after which the anchor was hove up and the "Morning Star" stood across the lagoon and passed out of the western channel. During the day I prosecuted my researches over the flats and was richly rewarded for my trouble. The specimen collected was a pretty starfish, which I found on the outer part of the lagoon platform. They were very irregular in the relative proportions of their finger-like rays, which averaged from four to five in number, and were of a pale tawny-purple color, with remote red granules on the upper surface. Under the loose clumps of coral, I obtained two species of sea urchins (*Echinometra*), many Crustacea and several fishes belonging to the genus [*sic*] *Serranus* [Fig. 9] and *Tetraodon*.

[Page 11] "Kanoa," the Hawaiian, before he left, recommended his native servant, and requested me to employ him. He instructed him to attend me on my excursions. His name is "Tamawa" [Temawa] and is a native of the island of "Maraki" [Marakei]. He is good natured and honest, though comparatively speaking a slave; that is, he owned no land or in fact property of any kind, and lived

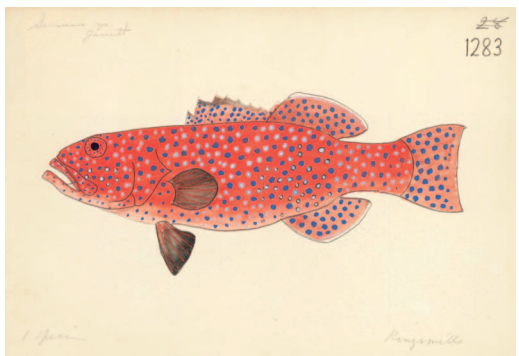


Figure 9. A serranid, probably the Squaretail Coral Grouper, *Plectropomus areolatus* (Rüppell), drawing by Andrew Garrett, based on a specimen collected at Abaiang, Kingsmill Islands; pencil, ink, and watercolor on paper. Courtesy of the Ernst Mayr Library, Museum of Comparative Zoology, Harvard University. Used with permission.

with a petty chief who was his master. When he was first introduced to me, he had on no other covering than an old ragged mat, tied around his loins, and held a light spear in his hand. His body is free from any tattooing, which is only practiced on the persons of the chiefs. On his breast was suspended the red carapace of a crab, and he had the usual native charms on his ankles, which consisted of a bit of grass encircling each. As I was unable to converse with him, we had reasons to pantomime, he sometimes interlarding it with a little Kingsmills, and myself with about an equal proportion of the English and Hawaiian languages, so that upon the whole we managed quite well.[52]

During the day my house was crowded with natives of both sexes, who watched all my actions with wonder and were incessantly plying me with questions in regard to my work. Wishing the crowd to leave so that I could open some of my packages, I told them as well as I was enable [*sic*], that the house was "tabu" for the remainder of the day. They went quietly out but remained in the yard, and I observed a pair of black eyes glistening at every crevice in the sides of the house, so that I was [page 12] obliged to postpone my work until night. In the evening "Temawa" through my instructions managed to cook some supper for me. No sooner had he commenced preparing the food then the crowd made a rush for the cook-house. Thinking that they would cause me much trouble if I allowed them too much liberty, I motioned them all to leave as the cook-house was strictly "tabu." They only annoyed me by blocking up the windows with their shaggy heads, being determined to get an insight into the mysteries of my culinary department. When I sat down to supper they seemed to watch every mouthful of food that I took. Upon the whole I found it very unpleasant, and could only hope that their curiosity would soon be satiated. When I had got through supper I passed some to my servant, but before he could eat a morsel he was pounced upon by a number of young boys and girls, who took possession of all, he not offering the least resistance to the young plunderers. The crowd having dispersed I gave him some more supper after which he took his spear and left, promising to call in the morning. I was occupied until nearly midnight arranging my collecting materials, trade, and provisions.

On the following day I was quite unwell and relied upon the natives to collect for me. They annoyed me the same as yesterday by crowding my house, and notwithstanding I watched them closely they managed to steal several articles. They kept me quite busy, notwithstanding my illness, in showing them [page 13] a music box, magnifying mirror and plates of Natural History. These were objects of wonder to them and I was obliged to exhibit them every hour to the gaping crowd, and they would give me no peace until I did so. While purchasing specimens, I noticed natives stealing some I had previously bought, and wished me to buy them over again. This of course I refused to do, and intimated that they already belonged to me; they quietly gave them up and merely laughed at the idea of being caught in their

[52] This optimistic ability to communicate with the locals is contradicted by Garrett in his "Notes upon a Collection of Fishes obtained at Apiang": "As regards their habits . . . and local names, I could do no more than secure some of the latter, as I could not converse with the natives [except] only by signs, and there was not one native on the Island who could speak a word of English" (MCZ Archives, bAg 363.42.11).

knavery. The specimens received consisted of shells, Crustacea and fishes.

During the afternoon having with some trouble got rid of the crowd, "Temawa" accompanied me on a visit to the nearest northern village, where he resides. O how much I was relieved to get away from the noisy rabble, and my walk through the cocoe-nut groves soon put me in good spirits. My servant led the way and tried to amuse me by pointing out any object that he thought would interest me. On our way I noticed some deep trenches in which was growing a species of Tarro [taro], the same as I have seen at the Sandwich Is. It requires an immense amount of labor to cultivate this vegetable, and though I tried [to eat] it several times, I found it hard and unpalatable. It is seldom eaten at the Sandwich Is., though it can, owing to the suitability of the soil, be easily grown.

Having reached "Temawa's" house a mat was spread for me to recline upon, and he regaled me with fresh young cocoe nut milk. In one corner of the house was a huge valve of the [page 14] *Tridacna gigas* [giant clam] filled with salt water, in which was a number of living specimens of the *Tetraodon insignitus* Richardson [pufferfish]. This species of fish was quite abundant on the lagoon flats, but of a much smaller size than figured in the Voyage of the "Samarang."[53] Near the house I captured a small lizard which is the same species that I have noticed all over the South Sea Islands. They were not abundant. I also caught two Coleopterans and observed some Lepidoptera and other small insects, some of which were familiar while others were new to me.

At dusk we returned, and having finished my supper I devoted the evening to preserving and examining the specimens obtained through the day. Of shells I found I had obtained 50 species since my arrival.

Sept. 15.—This was another busy day with me. My house being thronged with natives, some bringing specimens, while the majority came to see the wonderful box, mirror, and plates. Among the novelties obtained was a small white spatangoid sea-urchin, and a specimen of *Laganum*, probably the *depressum* of Lesson [sea urchin]. They are both quite abundant in the lagoon, the former, which is covered above with long fine hair-like spines, was obtained on the outer slope of the lagoon platform, where it buries itself in the sand. The fishes of which I obtained a number, were brought to me later in the day, and my place being so crowded that I could not even note down their colors, so I could only hope to do it when I obtained other specimens. [page 15] On this day several natives arrived from the Island of "Maraki" [Marakei], bringing with them several Kanaka[54] heads. They stated that there had been a battle among the natives, and the heads were of some of their friends, who had been slain, and they had cut them off and fled, to prevent them (the heads) from falling into the hands of the enemy.

Sept. 16th.—This morning I was much disappointed upon observing that nearly

[53] A reference to *The Zoology of the Voyage of H.M.S. Samarang, Under the Command of Captain Sir Edward Belcher, C.B., F.R.A.S., F.G.S., During the Years 1843–1846*, edited by Arthur Adams (Adams, 1850). The pufferfish referred to by Garrett appears on pl. 9, figs. 1 and 2.

[54] Kanaka, the general term for an aboriginal Polynesian of the Hawaiian Islands or a descendant thereof, derived from their own name for themselves, *kānaka ʻōiwi* or *kānaka maoli*, in the Hawaiian language.

all the fishes that I had put in the receiving liquor the night before, were spoilt. It must be owing to the intense heat. While occupied in selecting the best specimens and putting them in strong alcohol, a crowd of natives commenced shouting and pounding upon the door. Being anxious about my alcohol, which I wish to keep from their sight, I was obliged to close my packages, and admit them, as it would be useless to attempt to keep them out, which would only irritate them. The moment they entered, they smelling my alcohol, some of them exclaimed "te grog" which at once convinced me that they were familiar with that article, and I had much to apprehend. I can only hope to keep it from their sight and in the event of their discovering it to tell them that it is poison.

I now received a visit from the King, who came to see some of the wonderful things that I had in my possession. Nothing pleased him so much as some colored drawings of fishes, several of which he recognized, and told me their names. I afterwards obtained the same species, which are common to this group and [to] the [page 16] Sandwich Is. I have been obliged to show these wonders about 40 times to-day, so that I am sick and tired of it. The poor music box, how it has exerted itself to amuse the gaping savages. Wishing to make a presant [*sic*] to the King, he assisted me in clearing the house of the crowd, upon which I locked the door and closed the wooden shutter to the window. I now gave him various articles to the amount of about eight dollars; this consisted of 3 boards, which he took great fancy to, some calico, cutlery, edged tools, a few trinkets and some pipes and tobacco, which latter pleased him the most, though upon the whole he received them with indifference. While selecting these presants [*sic*], the rabble, which consisted of men, women, and children kept up a dreadful clatter at the door and window, they not in the least respecting the house that contained their King. The various articles that I gave him he left in my care, saying that he would call for them, some night.

To day [*sic*] the natives have been very tardy about collection, notwithstanding I pay them well for what they bring. On the flat fronting my house I found specimens of the *Arca holoserica*, *Cardium fragum*, *C. biradiatum*, *Natica mamilla* and the *Natica marochiensis* [marine molluscs]. The latter are paler than those found at the Sandwich Is., and have scarcely any markings. The *Natica mamilla* is very abundant and the animal is of a cream-white color, with a tinge of yellow at the anterior end of the cephalic lobe. They are, I should judge by the empty shells about [page 17] the native houses, much used as an article of food.

Sept. 17th.—Last night I obtained a young shark which was caught with a hook and line in the lagoon fronting my house. Among my early visitors I observed a young native woman who held a child in one arm and a Kanaka skull in the other. The latter was probably the skull of her deceased husband, or some dear friend. I have seen similar prepared craniums in the native houses, and though I offered high prices, yet no one would part with them. Frequently while the members of a family are eating, they will, if they have them in their house, place food before them, and often decorate them with a wreath of green leaves or flowers. The lower jaw is fastened to the cranium, at the socket, with twine made from cocoe nut husks. Some are beautifully prepared, being

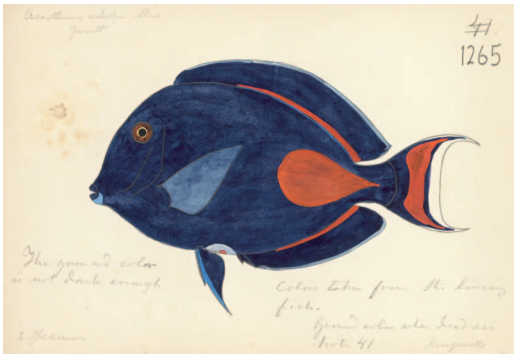


Figure 10. The Achilles tang, *Acanthurus achilles* Shaw, drawing by Andrew Garrett, based on a specimen collected at Abaiang, Kingsmill Islands; pencil, ink, and watercolor on paper. Courtesy of the Ernst Mayr Library, Museum of Comparative Zoology, Harvard University. Used with permission.

Figure 11. An acanthurid, the orangespine unicornfish, *Naso lituratus* (Forster), drawing by Andrew Garrett, based on a specimen collected in the Hawaiian Islands; pencil, ink, and watercolor on paper. Courtesy of the Bernice P. Bishop Museum (BPBM Archives, image SP-216320). Used with permission.

bleached white, while others are saturated with cocoe-nut oil.

These natives have the disgusting habit of anointing nearly every day, their bodies with cocoe-nut oil, and many, particularly young people, wear a neck lace neatly fabricated from odoriferous leaves, which they keep reeking with the above oil.

At low water I continued my researches on the lagoon platforms and found specimens of the following shells: *Oliva erythrostoma*, *Cardium alternatum*, *Lucina fibula*, *Sanguinolaria rugosa*, *Tellina rugosa* and the *Triforis corrugatus* [marine molluscs]. The former which is abundant, is smaller and lighter colored than any specimens that I ever saw. The animal is cream-yellow, dotted with brown.

[Page 18] On my return I found a crowd of natives before my house, many of whom had specimens to sell. These consisted of fishes, echinoderms, and a few shells and Crustacea. Among the former I remembered several Sandwich Is. species; these were an *Acanthurus* [Figs. 10, 11], two species of *Julis* and two of *Upeneus*. The fishes that were new to me were three species of *Balistes*, and three of the genus *Serranus*, and a fine *Diacope*. I find I have another difficulty to contend with; that is, most of the fishes are of two or three species, and the natives seem to think that I must purchase all, whereas there may not be more than three or four among 50 specimens that I may want. These I select and pay them well, so that they may not get discouraged and refuse to collect for me.

Sept. 18th Sunday.—This forenoon I attended the native meeting held at the north village, where a motley group had collected at the sound of a conch shell (*Cassis cornuta*). The church, which is situated on the southern outskirts of the village, is large and cool, the roof being thatched with Pandanus leaves, and the sides constructed of the midrib of cocoe-nut leaves, which are placed sufficiently apart so that the breeze has free ingress [Fig. 12]. Mr. Bingham tells me that only one native volunteered his services to help build the church, and that one was his servant. All the others demanding pay for their work. The service commenced as usual by singing in which some of the

Figure 12. Sunday morning on Abaiang, Kingsmill Islands: "We are going to church, you see; and Kanoa, my Hawaiian associate, is blowing a shell, to call the people to meeting, as we have no bell. Kanoa's wife, with one of her children, is just behind us [Hiram Bingham, in top hat, and his wife Clarissa]. Be sure to look at the king . . . in his long shirt, and under his umbrella. The queen will come too, for both are very regular in their attendance; and, what is better still, we hope they are Christians. The woman whom you see [on the far right] is a heathen, carrying her husband's skull as she goes on a visit to some other village." After Bingham (1866: 49–52).

natives attempted to join, but they decidedly have no ear for music. While the Missionaries were preaching, some seemed to be [page 19] attentive, while others embraced the opportunity to get a comfortable nap, or amused themselves, with that common and disgusting habit so prevalent among the South Sea islanders, with eating vermin from one another's head. A rude bench in front was occupied by the portly person of King "Tekaiia" who had as usual the old mat wrapped round his body. All the native men had similar mats round their persons, or short skirts made of cocoe-nut leaves, suspended from their loins, though a few made a display of old dirty shirts. The women had grass skirts like those worn by the men, and the children were quite innocent of any covering. Upon the whole they presented a wild and singular appearance. Though the Missionaries have been located here over two years they have as yet made little or no progress in improving these rude islanders, and I should judge from their appearance that to Christianize them will be a hopeless task. While conversing with Mr. Bingham upon this subject, I intimated that if he got one convert in 10 years more he would deserve credit. He seemed to agree with me, and said his duty was to persevere. Yet there is one redeeming trait in the social habits of the natives, that is they are far more virtuous than either the Sandwich or Society Islanders, notwithstanding the latter are said to be both civilized and Christianized.

Here I saw another instance of the little respect shown their King. During the service a common Kanaka came in and seated himself close alongside of him, and when reprimanded by Mr. Bingham for taking so much [page 20] liberty, he merely laughed and kept his seat. Soon after getting drowsy he took off his mat, his only covering, and having stretched himself his full length on the ground, he rolled himself up like a mummy and was soon sound asleep. Before the meeting was over I remarked many in the same predicament. Mr. Bingham says one of

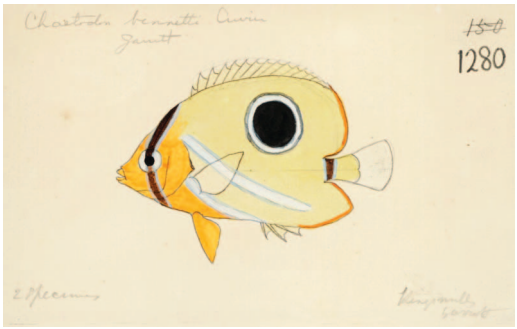


Figure 13. The bluelashed butterflyfish, *Chaetodon bennetti* Cuvier, drawing by Andrew Garrett, based on a specimen collected at Abaiang, Kingsmill Islands; pencil, ink, and watercolor on paper. Courtesy of the Ernst Mayr Library, Museum of Comparative Zoology, Harvard University. Used with permission.

his worst trials is to wake up the sleepers so that he can lock up the church. They requiring much shaking and coaxing to get them to move.

After the service was over they had a Sabbath school, the Missionaries attempting to teach, such natives of both sexes, as they could get around them, lessons from the bible.

I now took a stroll through the village, and saw most of the natives engaged in their usual employments, such as making mats, and preparing cocoe-nut oil. On my way home they offered to sell me some specimens, but I told them to fetch them to-morrow as this day was "tabu."

Sept. 19th.—The specimens added today, was [*sic*] the *Cassis erinacea*, *Cassis rufa*, *Conus striatus*, *Dolium perdix*, *Tridacna gigas* and the *Tridacna squamosa* [marine molluscs]. The animal of the former is of a light olive color and marked with minute black dots, which are encircled with emerald green rings. The animal of the latter species is purplish-slate, and broadly margined with crowded irregular shaped pale yellowish spots. "Temawa" told me that they were "kung kung" (good) upon which I gave him permission to help himself. He devoured a large portion of a small specimen, in a raw [page 21] state and apparently with much gusto. Among the specimens of fishes obtained was a Sandwich Island species of *Cirrhites*, the *Chaetodon lunulata* and *Chaetodon setifer* [Fig. 13]. I also purchased a small green turtle, probably the *Chelonia mydas*. Owing to the tides being unfavorable I cannot do as much as I could wish in collecting.

Sept. 20th.—This morning a native brought me a bird belonging to the crane family. I have frequently seen them wading about the flats in search of food, and seen them alight upon trees. The upper part of the specimen received was of a deep black-lead color, much paler beneath, and a white spot along the throat.[55] The new shells obtained was [*sic*] the *Littorina limax*, *Mitra colombelliformis*, and the *Mitra exasperata*. A crazy kanaka caused quite an excitement among us to-day. He first visited Mr. Bingham's house, where he behaved very rude, not having on the least thing to

[55] Not this bird, but another specimen said to have been collected by Garrett at Abaiang became the holotype of *Tricholimnas conditicius*, named and described by Peters and Griscom (1928: 99) as "one of a great host of specimens taken by that extraordinary genius, Andrew Garrett" (see Greenway, 1952: 2). Unfortunately, the specimen turns out to have been mislabeled; thus, not collected by Garrett and not from Abaiang but most probably from Lord Howe Island (Olson, 1992: 176). This begs the question that perhaps other Garrett specimens are also similarly mislabeled. Indeed, there is at least one other possible example of a mislocalized specimen: Garrett was "credited" with several records from Tahiti of a bird (the chattering kingfisher, *Todiramphus tutus*) that according to Van der Vliet and Jansen (2005: 124) is known only from Huahine and elsewhere in the westernmost part of the Society Islands, and not actually known from Tahiti. Van der Vliet and Jansen's conclusions, however, have been recently challenged by Lee and Holyoak (2017: 212).

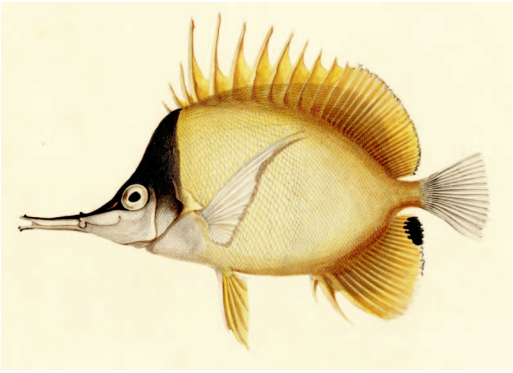


Figure 14. A chaetodontid, the longnose butterflyfish, *Forcipiger flavissimus* Jordan and McGregor, drawing by Andrew Garrett, based on a specimen collected in the Hawaiian Islands; pencil, ink, and watercolor on paper. Courtesy of the Bernice P. Bishop Museum (BPBM Archives, image SP-216319). Used with permission.

> cover his nakedness. I was next honored with a visit from him, though he behaved very quietly, merely gesticulating and talking, and offered at the time some specimens of the *Cypraea monita* [*moneta*] to sell. These I purchased giving him some fish-hooks. After a while he demanded his shells and returned the hooks. He now left, and visited "Mahoe"[56] the Hawaiian missionary, but did not behave so docile. He commenced pelting him with stones.
>
> Some natives came from the southern part of the island bringing a specimen of the *Cypraea testudinaria*, some very large specimens of the *Hippopus maculatus* [marine bivalve], and a large pentagonal star-fish. Of fishes many beautiful specimens [page 22] were added to swell my collection [Fig. 14]. Among them were some beautiful species of *Scarus* three of which are identical with Sandwich Island species. Among the novelties was a species of that singular genus of fishes called by Cuvier *Epibulus*, characterized by the excessive protractibility of their mouth which can be instantly protruded forming a long tube. I will also mention the *Chaetodon ephippium*, a *Zanclus* and a beautiful *Julis*. I feel quite encouraged, and prospects are quite favorable for getting together a magnificent collection.
>
> In the evening the King called and took supper with me, after which he took a bundle of the presants [*sic*], that I had given to him on a former visit, carefully concealing them under his mat and started for the village. He is a mere nominal king and seldom goes far from the village where he resides. The other day he visited the north part of the island, taking with him his wives, and was armed with a gun and two double barreled pistols. Yet he is a quiet and friendly native, and apparently well disposed towards the Missionaries and myself, though his limited authority would have no effect in keeping the natives in check, should they feel inclined to impose upon us.
>
> Wednesday Sept. 21st. O how I am interrupted and harassed by the natives, who, up to this time have crowded about my place during the day, demanding to see the foreign wonders. If I want to leave my house to collect, I have trouble to get them to go out. Some quietly leave while others are sulky and [page 23] wish to take their own time about leaving. As for writing, drawing or studying my specimens it is impossible. If I wish to note down the colors of fishes, and attempt to do it in the house, they crowd round me so that I cannot determine the colors properly, so I am often obliged to get the crowd outside and seat myself upon a mat among them to do my work.

[56] Joel Hulu Mahoe (1831–1891), another native Hawaiian missionary, who, along with Kanoa (see footnote 51), was employed to assist Rev. Bingham in teaching the gospel (Warren, 1860: 258; see also Bingham, 1866: 288; Morris, 1987: 386–390).

All my proceeding they look upon with wonder. I may perhaps be at this work in the midst of a crowd of natives in front of my house, when some stranger arrives from some of the remote villages. They instantly *demand* to see the wonderful things that have become the common talk of the natives, and expect that I will desist from any work that I may be employed at to wait upon them. If they are chiefs, they will also expect a presant [*sic*] from me. I really hope they will after a while get tired of my curiosities. But the prospect is, that I must show them to the whole population, which numbers over 3000; not very encouraging I will assure you. It will be a lesson to me hereafter, in the event of my locating myself among savages, never to show them any of the wonders brought from civilized lands.

Owing to the intense heat I have much trouble to preserve specimens of fishes in alcohol. I am obliged to place them first in alcohol nearly full strength, where I let them remain about six hours, then shifting them in spirits of full strength, where I let them remain about 24 hours, when they require [page 24] shifting into fresh alcohol. By pursuing this course and constantly attending to them my specimens have turned out beautiful, but I use much more alcohol to preserve the same number of fishes than I would use at the Sandwich Is. At first I was really discouraged, with my specimens. Fishes would become so much distended by the generation of gases, even to bursting, when placed in alcohol 75 per cent in strength. And then I must have so many different packages, that I lose an immense quantity of spirits by evaporation.

The new shells obtained to-day were specimens of the *Cypraea lynx*, *Cypraea caurica* and *Cypraea vitellus* [cowries] all found under loose clumps of coral on the outer edge of the lagoon platform.

Thursday, Sept. 22. Early this morning I was awakened by some natives shouting my name, and thumping upon the door. They brought me some fishes which they had probably caught the night before. These I purchased, together with some fine Crustacea, and a large *Murex*, the *Venus reticulata*, *Murex adusta* and the *Mitra cardinalis*. Some of the fishes received were very beautiful, especially the *Labroides*. Late in the day I received some fishes, brought from a distance. These I was obliged to put at once in alcohol, without noting down the colors, of such as were new. In order to preserve these, I am obliged to sit up until midnight or after, in order to change them into stronger spirits. All this day my house has been so crowded, that I could not get my regular meals, being obliged to take cold lunches, while the natives were watching me, and calling me stingy for not giving them a share.

[Page 25] It is really laughable to see the variety of objects that the natives bring to sell. Some fetch fragments of shells, pieces of beach worn corals, the legs of crabs, seed vessels, and one brought a small decapitated Chinese idol. The last article Mr. Bingham said, he brought, with two or three others from the states, and they were objects of wonder to the natives. Being obliged to show them about 40 times a day he at last got so tired of exhibiting them that his only resource [*sic*] was to knock their heads off and throw them into the lagoon.

Sept. 23d.—Last night my servant for the first time slept in my house all night. About 3 o'clock in the morning I was awakened by some natives knocking at the door and calling me by name. I

lighted a lamp, and saw "Temawa" standing at the door, in a complete state of nudity, brandishing his spear. Having ascertained their object in visiting me at so early an hour, I unbarred the door and admitted them. They had been fishing by torch-light and brought to sell a number of specimens of *Hemiramphus*.

During the day I added many fine specimens to my collection. Of these I will mention the *Pinna nigrina* [pen shell] which is somewhat rare in the lagoon. I remarked that every specimen harbored a small crab, though some contained two. The same species also occurred in another common species of *Pinna*, also found in the lagoon. By employing the natives to dive on the outer slope of the lagoon, I obtained several fine specimens of *Solecurtus* [razor clams], which were found buried in the sand. On the lagoon flat I found some empty valves of the *Tellina rugosa* and some live specimens of the *Cypraea vitellus* [marine molluscs]. The animal of the latter [page 26] species has a pale cinereous mouth, marked with irregular shaped black and white spots; the black spots are also punctuated with white dots. The mouth papillae are simply aculeate or two or three branched and either white or yellowish. The tentacles are dusky with pale bases. The upper surface of the foot is also dusky, becoming paler toward the margin, and pale umber beneath.

If this island produces but few species of insects, I must also add that some kinds are very abundant, and like the natives are my greatest torments. My place is literally swarming with flies, beetles, cockroaches and mosquitoes. The latter, in particular make any kind of sedentary employment perfect misery. The former annoy me by getting among my provisions.

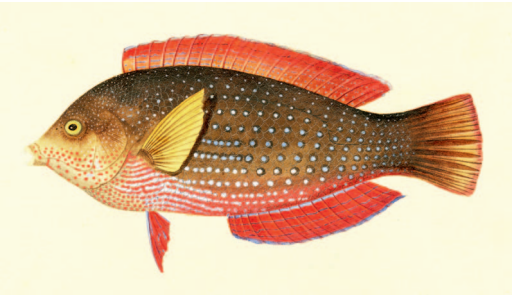


Figure 15. The pearl wrasse, *Anampses cuvier* Quoy and Gaimard, drawing by Andrew Garrett, based on a specimen collected in the Hawaiian Islands; pencil, ink, and watercolor on paper. Courtesy of the Bernice P. Bishop Museum (BPBM Archives, image SP-216322). Used with permission.

To-day I detected a native stealing some of my shells, and concealing them in his mat. I immediately charged him with the theft, and he gave them up. Not more than ten minutes before I had given him a biscuit as a presant [*sic*] and to show his "Kanaka gratitude" commenced pilfering. Shortly after this occurred, the King called, and I told him the circumstances of the theft and pointed the thief out to him. He merely laughed, as I supposed at the idea of his being caught. As usual, when his majesty called I handed him a pipe to smoke, and I noticed the common natives and even children, would ask him to give them a smoke, from the same pipe.

Sept. 24.—To-day I obtained beautiful species of *Anampses* and *Muraena* [Figs. 15, 16] both new to me [wrasses and eels]. Of the former genus I have collected two species at the Sandwich Is., both different from [page 27] the one obtained here. Having a severe head ache, I could have wished to have the house quiet, but the natives seemed to be more noisy than ever. None but an enthusiastic naturalist could have put

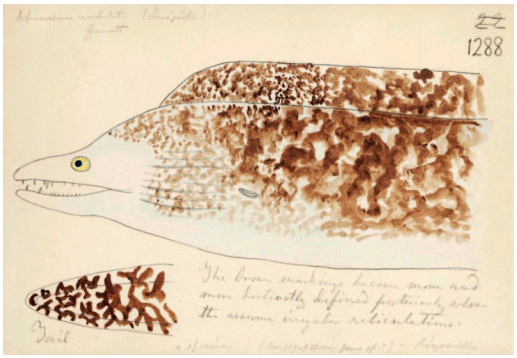


Figure 16. A muraenid eel, *Gymnothorax* sp., perhaps *Gymnothorax undulatus* (Lacepède), drawing by Andrew Garrett, based on a specimen collected at Abaiang, Kingsmill Islands; pencil, ink, and watercolor on paper. Courtesy of the Ernst Mayr Library, Museum of Comparative Zoology, Harvard University. Used with permission.

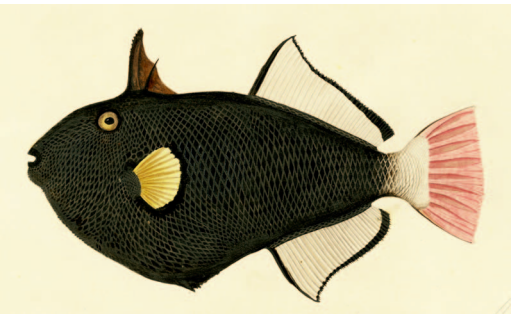


Figure 17. A balistid, the pinktail triggerfish, *Melichthys vidua* (Richardson), drawing by Andrew Garrett, based on a specimen collected in the Hawaiian Islands; pencil, ink, and watercolor on paper. Courtesy of the Bernice P. Bishop Museum (BPBM Archives, image SP-216318). Used with permission.

up with the trouble and inconvenience that I do. Having told the crowd that I was sick and desired them to leave, they did so, and I laid down for a few moments. Others came and commenced their usual clatter at the door. Seeing that I could get no repose in my house I locked it up and took a walk up to the village. I am so glad to see night come, when I can have an opportunity to take care of my specimens. After dark the natives who are suspicious of one another seldom wander about.

Sunday Sept. 25.—Last night, though very ill I was obliged [to] be up late to take care of my specimens, and when I retired I was so feverish that I could scarcely get to sleep. I would now and then get in a dose [doze] and imagined my house was crowded with natives, some offering specimens to sell, others begging for tobacco or to see the curiosities. Toward morning I fell into a sound sleep and at daylight arose and was much better.

During the forenoon I attended the native church and remarked that there was [*sic*] but few natives presant [*sic*]. Passing through the village the King made me a presant [*sic*] of a basket of baked fish, which shows that he is well disposed toward me. On my way home a native, who had been fishing, called me to his house to see if I wanted any specimens. I selected a new *Balistes* [Fig. 17] and a fine *Argyrosomus* which latter species also occurs at the Sandwich Is. [page 28] After dinner the insane Kanaka endeavored to get into my house by digging beneath the thatching. Two natives, to whom I had made several presants [*sic*], happening to pass, and seeing him forced him from my yard.

Sept. 26.—To-day I obtained the following shells: *Dolium pomum*, *Conus tulipa*, *Cypraea histrio*, *Cypraea caputserpentis* and a specimen of the *Cypraea mappa* [marine gastropods]. The first two and the last species are very rare here. I also obtained a few Crustacea on the outer platform.

Sept. 27.—A native brought me a live specimen of the *Cassis rufa* [marine gastropod]. The animal has a small quadrangular foot, which is of a brown-buff color beneath; the upper surface is flesh color and mottled with ferruginous-

brown and margined with orange. The tentacles are small, slender, tapering to a point, and zoned with ferruginous and black on a flesh colored ground. The head is pale and the mouth is colorless. On the outer reef I found the *Turbinella prismatica* [marine gastropod], which has, indeed a very appropriate specific name. The outer surface of the shell reflects the most lovely metallic colors. It occurred under a loose piece of coral on the outer part of the platform. The animal is blood red, freckled with white. Tentacles small, stout, with the eyes sessile on their middle. Foot oblong quadrate, small. I also picked up the following dead specimens: *Strombus gibberulus*, *Strombus floridus*, *Cypraea carniola* [*carneola*], *Cypraea helvola*, *Cypraea poraria* and the *Trivia childrenia* [marine gastropods]. Of worms and Crustacea I collect every specimen I can find as I am unable to determine the species.

[Page 29] A native brought me a singular white pearly worm a foot in length. They are found buried in the sand on the lagoon flats and are considered a delicious article of food by the natives who eat them raw. I also obtained some fishes and a singular crab. By my constant care my alcoholic specimens are in a fine condition. This evening I headed up a barrel, merely putting layers of paper between the specimens as I have not time to pack them properly, which I must do at the Sandwich Is.

Sept. 28.—Last night I did not retire until past midnight, being occupied with my specimens. I was awakened just at day break by a Kanaka, who, when I opened the door asked me to give him a smoke! I was so vexed that I ordered him to go out of the yard. He started muttering all sorts of Kingsmill curses. I had no sooner finished my breakfast, then the crowd began to drop in, some to dispose of specimens, but the majority were idlers. I have so many things exposed that I am obliged to be continually watching the natives, though lately they do not seem much inclined to steal. My servant night and morning brings me a cocoe-nut shell full of that delicious beverage called by seafaring men "toddy." This I mix about half water and use no other drink through the day. I find it very healthy and nourishing. Toddy is obtained from the spathe of the cocoe-nut tree. The spathe is tightly bound with cord, cut off just outside of the ligature, and a cocoe-nut shell suspended beneath to receive the liquid as it oozes from the wound. A tree yielding about two shells full in 24 hours. The natives are fond of this beverage, though they prefer it after fermentation has taken place, [page 30] or they boil it in cocoe-nut shells into a syrup which they mix with water. When well boiled down it becomes thick like molasses and has a sweet and pleasant taste. Toddy can also be manufactured into spirits or vinegar. One thing I must say to the credit of these natives, that is, they rarely make a bad use of it. I am told that on some of the Islands of this group the natives are inveterate drunkards.

To-day the natives brought me a poor specimen of the *Cypraea argus*, the pearl oyster (*Meleagrina*), *Cypraea arabica*, and on the lagoon flat I found the *Conus marmoreus* and the *Aplustrum amplustre* [marine molluscs]. The two latter are very rare. The natives have commenced begging to taste of my alcohol, notwithstanding I tell them it is poison. In order to excite their antipathy toward it, I caused some to burn before them, which made them stare with wonder at the fire water as they called it. But I found I had not gained much by the experiment, for

that was another wonder which *all* expected to witness.

Sept. 29.—On the outer platform I collected the *Mitra cucumerina*, *Mitra digitalis*, *Mitra fulva*, and, beneath the stones on the inner edge of the flat the *Triton bracteatus* occurred [marine gastropods], though much smaller and lighter colored than found at the Sandwich Is. The *Ranella livida* [marine gastropod, *Bursa*] also occurred in turning over stones and is also much smaller than the specimens found at the latter location, though the color of the animal is precisely the same. A native from the west side of the lagoon brought me a new *Julis* [rainbow wrasse], a red *Trochus* [marine gastropod], and some specimens of the *Pteroceras chiragra* and *Cypraea achatina* [marine gastropods]. During the evening I put up a package of Crustacea.

[Page 31] Sept 30.—The natives brought but few specimens to day [*sic*]. While breaking some dead coral to day on the lagoon flat I obtained a specimen of *Lithodomus* and the *Arca velata* [marine bivalves].

Oct. 1st.— I have been much annoyed to-day by a number of natives from the Island of Maraki [Marakei], who came as they said to see the wonders in my house. A native brought me a live *Harpa minor* [marine gastropod], which is indeed a beautiful object, when moving about. Among the specimens obtained I noticed the *Terebra flaminea*, *Terebra maculosa* [Fig. 7], a valve of the *Pecten pallium*, *Pisania flammulata* and the *Lucina punctata* [marine molluscs]. Also a horrid looking fish belonging to the genus *Synanceia* [venomous stonefish].

Late in the day while walking through the village, I passed the counsil [*sic*] house and was assailed by a most intolerable stench, coming from that building. Inside was the putrid corpse of an aged chief who had lately died at the north part of the Island, and had been brought here by the King's orders. The putrid remains was [*sic*] surrounded by men women and children, who seemed rather to relish the horrible stench. Two of the women I am told sleep near it during the night and even hug it to their bosoms. I have also been informed by Mr. Huntley,[57] an Englishman who has resided several years in this group, that he had seen wives, when their husbands had died, keep the corpses in their houses for a long time and sleep with them. He also states that he had seen them besmearing themselves with the filth as it oozed from the putrid remains.

Sunday Oct. 2. Ever since my arrival here the weather has been fine, though [page 32] very hot, the temperature rising 15° in the sun, but a greater part of the day we have had a fresh breeze from the eastward. In consequence of the Mission being established on the east shore of the lagoon, they are more exposed to the heat than they would have been had they build on the outer eastern coast. The natives invariably build their houses on the lagoon shore. Many of them are large neatly made and kept quite clean. They are thatched with the Pandanus leaves, and are raised about 4 feet from the ground, resting upon wooden posts or oblong blocks of corral. Their villages are also kept quite tidy, the streets being paved—if I may use the latter word—with fine worn shells and coral.

[57] Mr. Huntley is Thomas Huntly, a native of London, then a resident of Lahaina, Maui, Hawaiian Islands, under the employ of the trading firm of Charles Smith and Co. of Sydney, New South Wales (see Chase, 1858: 81–82; Bingham, 1861: 46, 1866: 56).

> Oct. 3. To-day I employed Mahoe the Hawaiian Missionary to make up my lumber into packages. The specimens obtained to day [*sic*] was the *Burgus latro* or cocoe-nut crab, two species of Gecko, one which is small inhabits the houses, the other which is large is found on the cocoe nut tree. Of shells I obtained the *Melampus luteus*, *Melampus fasciatus*, *Trivia nucleola* and *Cypraea fimbriata*.
>
> On this day the village has been put under a sort of "tabu" for three days, as they are about to bury the corpse in one of the houses. No one is allowed to light a fire, or smoke a pipe, within the outskirts of the village. This is the only instance of a case of their tabu system that came under my notice.

Garrett's account ends abruptly on 3 October 1859, despite the fact that he remained at the Mission on Abaiang for nearly another 2 months. Although he had expected to stay at least to the end of the year,[58] the record shows that he left the island aboard the *Morning Star* on 1 December,[59] arriving at Honolulu on 12 January 1860,[60] following a brief stop at Ebon Atoll in the Marshall Islands, where he continued to collect (Warren, 1860: 266). Some 2 months of narrative are therefore missing that cannot be accounted for. Nonetheless, what has survived provides a good idea of Garrett's dedication to his work and, at the same time, the difficulties he faced on a daily basis, from bothersome insects and annoying neighbors to threats of physical abuse and concerns of being consumed by cannibals.

SUCCESS IN THE KINGSMILLS

By all estimates, Garrett's time in the Kingsmills was highly successful. The few existing contemporary accounts, albeit anecdotal, are all positive and full of praise. Jane Warren (1860: 265), in her history of the *Morning Star*, wrote that "Mr. Garrette [*sic*] . . . found the Kingsmill Islands abounding with new wonders in every department of natural history, and felt himself compensated for all his labor by the valuable collections of shells, insects, fishes, &c, he had obtained. This collection was to be forwarded to America, for Professor Agassiz." Warren (1860: 302) goes on to say that "While Mr. Garrette [*sic*] was there, a new feature in Apaiang life appeared. At low tide the flats were scoured by people of all ages, in search of shells and other curiosities to sell to the naturalist."

Hawaiian missionary Samuel C. Damon (1860: 17), writing for *The Friend*, was equally enthusiastic:

> Mr. Garrett, the American Naturalist, who visited the Kingsmill Islands, in the *Morning Star*, has returned richly compensated for his labor. He spent most of the time, while there, upon Apiang, the island where the Rev. Mr. Bingham is located. Those islands have never been explored by a scientific naturalist, and we are assured by Mr. G. that they abound with new wonders

[58] In his "Remarks upon a Collection of Corals obtained at Apiang," Garrett wrote, "While residing at the above Island it was my intention to have made my collection of Corals during the month of December, the 'Morning Star' not expected to return until in January. But she unexpectedly returned the latter part of November, so that I could only make a hasty collection before leaving" (MCZ Archives, bAg 363.42.15).

[59] *The Morning Star* "Arrived at Ebon Nov. 3; left for Apaiang on the 4th, and arrived there after a rough and unpleasant passage of eleven days, touching at Jaluit [an atoll in the Ralik Chain, Marshall Islands] on the 5th, where all the Ralick chiefs are kept in durance, probably until spring, on account of the unusual roughness of the weather; they are all anxious to return to Ebon, but dare not put to sea in such weather. We remained at Apaiang discharging cargo, repairing sails, rigging, &c., until December 1, when we sailed again for Ebon, with Dr. [Luther Halsey] Gulick [1828–1891] and family on board, also Mr. Andrew Garrett, Naturalist—the former for Ebon, the latter for Honolulu" (Brown, 1860: 13).

[60] Marine journal, Port of Honolulu (Anonymous, 1860).

> in every department of natural history, particularly those of conchology, entomology and ichthyology. From our long acquaintance with Mr. Garrett, we are confident Professor Agassiz, and the lovers of Natural History of Harvard University, could not employ a more enthusiastic and indefatigable collector of specimens.

A year later, Damon (1861: 63) continued to praise Garrett's success in the Kingsmills: "Mr. Garrett spent weeks upon the reefs of Apaiang, and then left them as he asserted, but half explored, and doubtless ere this, Prof. Agassiz has exhibited Mr. Garrett's collections to the admiring classes of Cambridge University." In August 1863, following Garrett's return to Honolulu after having spent three years in the Society Islands, Damon (1863: 57) continued:

> He has visited every island, and every valley and reef of every island, collecting specimens of shells, fishes, and every variety of animals and insects. The extent of his collection may be indicated by the fact, that he has used three hundred gallons of alcohol in preserving these specimens. He has collected over 400 different species of fish. Each one of these is carefully painted from life. Some of his drawings, which we have examined, are executed with great skill and taste [Fig. 18]. The number of his specimens which were forwarded from the Society Islands, would not fall below ten thousand.

In a more official capacity, Louis Agassiz himself (1862: 74, 77), summarizing new zoological accessions in his annual report to the Board of Trustees of the Museum of Comparative Zoology, wrote: "From explorations carried out in foreign countries under the auspices of the Museum, very large collections have been received, through Mr. Garret [*sic*], from the Kings Mills [*sic*] and Society Islands." Of these, Agassiz mentioned substantial numbers of crustaceans and echinoderms as well as fishes: "The total number of specimens of Fishes received [by the museum in the past year] amounts to five thousand, comprising one thousand different species, the most important of which are those … collected by Mr. Garret."[61]

CONTRIBUTIONS TO PACIFIC ISLAND ZOOLOGY

Garrett's broader success as a collector, during the 40 years he spent among the Pacific Islands (1847–1887), is perhaps best exemplified by his private collection of shells, which, according to Clench (1979: 96) was "one of the most complete for Pacific areas of that period. It formed the basis for many early descriptions of specimens, and contains a number of type specimens or at least cotype or paratype specimens of species described by W. Harper Pease and other conchologists of the period." By Garrett's own estimate, the collection contained some 30,000 specimens, including more than 8,000 species (about half of which Garrett collected himself).[62] These numbers stand even after

[61] A search of the MCZ collections database (MCZBASE, 2019) and verified by MCZ collections managers (Andrew Williston, Ichthyology, personal communication, 6 January 2020; Adam J. Baldinger, Malacology, personal communication, 21 January 2020) produced a total of about 11,629 extant cataloged specimens collected by Garrett: 2,801 specimens of fishes, of which 133 lots (522 specimens) were collected at Abaiang during his time in the Kingsmills; roughly 4,089 specimens of invertebrates (excluding shells); 4,678 specimens of shells, of which 34 lots (225 specimens) are from Abaiang; plus 36 amphibians and reptiles, 13 mammals, and 12 birds. Note that these numbers do not include any material that might have been exchanged or donated to other institutions, or any uncataloged lots (or cataloged specimens that have not been computerized) that may exist as backlog material; it is possible also that Garrett specimens lacking locality data may have been deaccessioned.

[62] Garrett to Hartman, dated Huahine, Society Islands, 26 June 1887 (after Smith, 1902: 485; original letter in the Carnegie Museum of Natural History, Pittsburgh, but apparently now lost; Timothy A. Pearce, personal communication, 17 January 2020); see also Cooper (1888: 92).

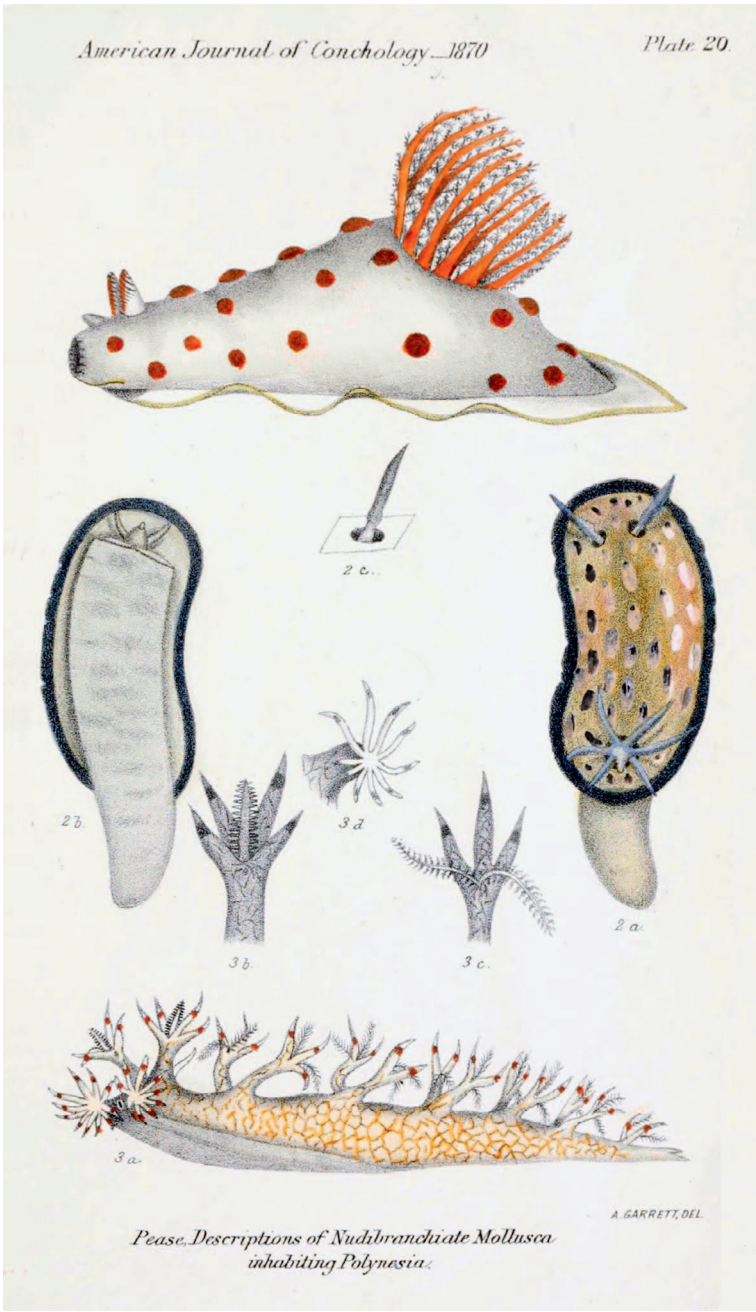


Figure 18. "The following series of nudibranchiate Mollusca was collected by Mr. Andrew Garrett, and the drawings from which the figures are taken were made by him from the living specimens, and may be relied on as strictly accurate": (1) *Gymnodoris ceylonica* (Kelaart), Huaheine, Society Islands; (2) *Goniobranchus albomaculatus* Pease, probably Society Islands; (3) *Bornella stellifera* (Adams and Reeve), Tahiti, Society Islands. After Pease (1871a: 301–303, pl. 20).

thousands of duplicates, over a period of some 30 years, from about 1855 to well into the 1880s, were shipped off by Garrett to many of his correspondents, individuals as well as institutions in the United States and Europe, resulting in scores of publications (Thomas, 1954: 69; Lee, 2012: 13). Among the more important recipients, and most prolific describers of new species, was Pease who, under an agreement with Garrett, made in April 1857, pledged that he would "pay a certain price for every new species" Garrett may find, in exchange for the "liberty of describing it."[63] Pease named a career total of more than 500 species of Pacific molluscs[64]—including 54 species of terrestrial snails (Smith, 1902: 423; Clench, 1975: 23) and some 26 previously undescribed nudibranchs (Pease, 1871a,b)—most of which were supplied by Garrett (Johnson, 1994: 3, 4).[65] Others include Wesley Newcomb (1818–1892), an American physician and naturalist who went to Hawai'i for his health and eventually became a government health officer, while devoting himself on the side to his hobby of conchology (Spoehr, 1963: 104; Thomas, 1979: 17–18); William Dell Hartman (1817–1899) of West Chester, Pennsylvania, who received from Garrett a large and important collection of Polynesian land shells from which he described 25 species (Anonymous, 1899: 62; Smith, 1902: 422); George Washington Tryon Jr. (1838–1888), malacologist at the Academy of Natural Sciences in Philadelphia (Dance, 1986: 144–146, 176); John Gould Anthony in Cincinnati (Spoehr, 1963: 104); Louis Agassiz at Harvard; and Johann Cesar Godeffroy in Hamburg (Spoehr, 1963: 116).

Garrett's collection went on sale after his death in 1887 and was eventually purchased by the Bernice P. Bishop Museum, Honolulu, apparently in late 1893, along with Garrett's correspondence, unpublished descriptions, and conchological library (Clench, 1979: 96). In the spring of 1899, William Healey Dall (1845–1927), by this time a curator of invertebrate paleontology studying recent and fossil molluscs at the United States National Museum, was hired by the Bishop Museum Trustees to make a critical examination of the collection. Dall arrived in Honolulu on 16 August 1899 and spent several months rearranging the specimens and verifying identifications. In his report to the Director for that year (Dall, 1900: 11; see also Dall, 1899: 83; Clench, 1979: 96), he estimated the collection to contain about 25,000 specimens and between 8,000 and 9,000 species, all "neatly mounted on card tablets with printed labels and very few are without complete identification and locality:"

> As might be expected from Mr. Garrett's residence and connections, the collection is particularly rich in Pacific Ocean material and leaving out of consideration a few great national collections like those of London, Berlin, Washington and Geneva the Garrett [collection] is among the most complete if not actually the best supplied with the shells of the Pacific Islands. The series of land shells of the Solomon and Hervey [Cook Islands] groups is the finest I have seen anywhere, and those of the Society Islands are probably very complete. . . . A certain proportion of the species were wrongly named, which is not surprising when we consider that Garrett had no access to a large library or museum, and was obliged in great part to rely on the identifications made by more or less competent collectors with whom he exchanged specimens.

[63] Pease to Garrett, dated Honolulu, 13 April 1857 (BPBM Archives, MS group 141, box 1; see also Kay [1975: 8]).

[64] Pease to Garrett, dated Honolulu, 10 October 1868 (BPBM Archives, MS group 141, box 1; see also Kay [1975: 1, 6, 10]).

[65] Garrett's total output was about half—242 new species according to the list published by Clench (1979: 97–102), but still remarkable considering that Garrett gave away most of his undescribed material to others.

In addition to Dall's favorable critique, high praise for Garrett's careful documentation of specimens and his detailed descriptions has come from many others. Malacologist Herbert Huntington Smith (1851–1919), in reviewing shells of the land snail genus *Partula* (commonly known as Polynesian Tree Snails) in the collections of the Carnegie Museum of Natural History, many of which were collected by Garrett, described him as "rigidly careful in noting localities; he kept a daily journal, and was in the habit of noting the discovery of every fresh species of shell, with the provisional name, and kept the species from each valley separate" (Smith, 1902: 423, see also p. 485; Solem, 1976: 7; Lee, 2012: 12). Among Garrett documents, originally archived at the Carnegie Museum,[66] was a catalog of the species of *Partula* that Smith thought important enough (primarily for its "careful notes on localities") to append to his 1902 publication (pp. 476–485), along with extracts from Garrett letters sent to William D. Hartman (Anonymous, 1899: 61–63).

Although most of Garrett's publications were short communications describing new species based on marine shells, his 98-page review of the terrestrial molluscs of the Society Islands (Garrett, 1884) contains extensive descriptions of the ecology, habits, and zoogeography of virtually all the land snails known from these islands (Lee, 2012: 13). In comparing Garrett's contributions to earlier and contemporary collectors, particularly those related to land snails, Henry Edward Crampton (1916: 28; see also Crampton, 1932: 130, and numerous other pages therein), then curator of invertebrate zoology at the American Museum of Natural History, stated that above all others, the name of Garrett stands out preeminently:

> He visited many groups of islands during his sojourns in Polynesia from 1860 to 1863 [1867], and from 1870 to the time of his death at Huahine in 1888 [1887]; the rich fruits of his masterly studies are the shells that were described mainly by [William Harper] Pease and the precise description of their habitats specified with an exemplary minuteness of detail in his own notable monograph [Garrett, 1884]. It is this work of Garrett's that forms a solid basis for the comparison of the present intrinsic and distributional characters of Polynesian species with their earlier conditions and situations.

Garrett's observational skills went well past the identification of species and rote listing of morphological characters. In many ways, he was well ahead of his time. Few if any of his contemporaries were interested in recording details of microhabitat, associations among sympatric species, reproduction, how a snail moves, what a living *Medusa* looks like when suspended in water, or the local vernaculars of plants: "A native who accompanied me while collecting [plants] gave me the native names of 25 species. As I obtained more than that number, I am inclined to suppose that I have specimens of nearly all."[67] Typical of Garrett's writing is the following description of *Aplustrum amplustre*, the Royal Paper Bubble:

> This beautiful species is rather abundant at certain seasons, on the sand flats on the lea [leeward] side of the island of Oahu, but rather rare at other locations. We have occasionally found fine specimens, lurking beneath stones and in crevices of rocks. A specimen occurred in the latter station in the month of

[66] Now apparently lost; Timothy A. Pearce, personal communication, 17 January 2020.

[67] "Notes upon the Flora of Apiang one of the Kingsmill Is." (MCZ Archives, bAg 363.42.18). In addition to plant names, Garrett recorded the local names of most all of the fishes he collected, but failed to do so for the molluscs ("Notes upon a Collection of fishes obtained at Apiang," MCZ Archives, bAg 363.42.11; see also Luomala [1985: 403]).

Figure 19. Two gastropods, the marine genus *Tonna* (left) and a terrestrial pulmonate gastropod (right), drawings by Andrew Garrett, localities unknown; pencil, ink, and watercolor on paper. Courtesy of the Bernice P. Bishop Museum (BPBM Archives, image SP-216327a, b). Used with permission.

> December with spawn attached. The spawn is whitish, like the animal, and consists of several irregular convolutions attached to a mass of pellucid jelly like substance. When the animal is placed in a jar of sea-water it presents, indeed, a beautiful appearance as it glides along, with its gorgeous shell, but partially concealed by the lateral margins of its broad, white, pellucid foot. When disturbed it can withdraw itself entirely within its shell.[68]

Of a sponge collected at Apiang, Garrett wrote "obtained in the lagoon. Color bright vermillion. While drying it, it was as offensive as any putrid animal matter."[69] In his report on the "Soils and Rocks Collected at Apiang," he wrote: "You will perceive by the specimens of the soil, that it is poor enough. Yet the natives manage to improve it a little by scraping up the decayed leaves, and vegetable mould [mold], and mixing it with the soil to grow tarro [taro]."[70]

Most conchologists, as the term implies, were content at the time to record only the details of the empty shell (coloration and morphology), paying little or no attention to the animal within, discarding it without examination as part of the process of preparing the specimen. Garrett, in sharp contrast, took a deep interest in the soft parts, describing and illustrating the whole animal when alive (Fig. 19) as well as details of internal anatomy following dissection (Fig. 20). The above-mentioned loss of his descriptions and drawings of the soft parts of over 500 molluscs in the 1868 shipwreck must have been a terrible disappointment, and a great loss to science.

While puzzling over the variety of color patterns displayed by certain groups of land snails, Garrett wrote: "With regard to Polynesian land shells I have seen nothing to convince me that food has anything to do with the color of the shell. *Partula rosea* and *varia*, which are the most variable in color, may in some localities be seen in countless numbers on different species of shrubs and ferns, old and young of the different colored varieties on the same plant. The same may be said of all the species, ground as well as arboreal."[71]

[68] "Conchological Notes and Descriptions of Supposed New Species of Shells and Mollusca," Part 1 (BPBM Archives, MS group 150, acc. 1979.333).

[69] "Notes upon Sponges collected at Apiang" (MCZ Archives, bAg 363.42.17).

[70] "Soils and Rocks Collected at Apiang" (MCZ Archives, bAg 363.42.16).

[71] Garrett to Hartman, dated Huahine, Society Islands, 10 October 1882 (quoted from Smith [1902: 484]; original in the Carnegie Museum of Natural History, Pittsburgh, but apparently now lost; Timothy A. Pearce, personal communication, 17 January 2020); see also Hartman (1893: 97).

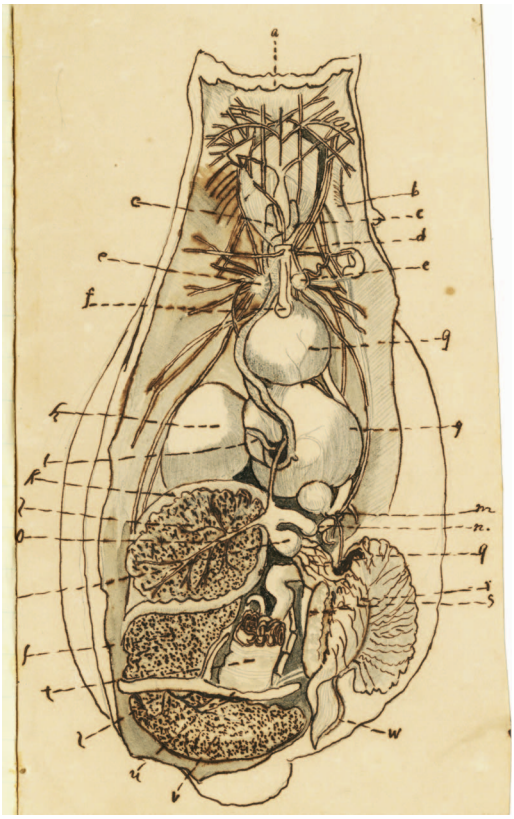


Figure 20. "*Aplysia* Laid Open to Show the Arrangement of the Viscera: a, Upper Part of the Oesophagus; b, Penis; c, Salivary Glands; d, Superior or Cephalic Ganglion; e, Inferior or Suboesophageal Ganglion; f, Entrance of Oesophagus into g, the First Stomach or Crop; h, The Third or True Stomach; i, The Second Stomach or Gizzard; k, Intestine; l, Liver; m, Posterior or Branchial Ganglion; n, Aorta; o, Hepatic Artery; p, Ventricle of the Heart; q, Auricle; r, s, Branchiae; t, Testis; u, Lower Part of Intestine; v, Ovary; w, Anus." Drawing and figure legend by Andrew Garrett, based on a specimen collected in the Hawaiian Islands; pencil and ink on paper. Courtesy of the Bernice P. Bishop Museum (BPBM Archives, image SP-216370). Used with permission.

In another example of Garrett's insight, writing in April 1857,[72] he was among the earliest to provide biological evidence of a common origin of the Polynesian peoples of Hawai'i and Tahiti:

> There is a great similarity in the marine fauna of these islands [Society Islands] and that of the Sandwich group. The natives, although almost speaking a different language, have the same names for objects common to both groups. Now in Boston, New York and Baltimore they have two or three different names for the same species of fish. While here I found natives living over 2000 miles distant from the Sandwich Islands, speaking almost a different language, yet have the same name for the same species of fish; what a contrast. All the Polynesian Islanders have, with few exceptions, a distinct name for every kind of animal, plant and mineral, no matter how small and obscure the object is. They as a mass have a better knowledge of the natural productions of their islands than the mass of people in the United States or Europe.

CONCLUSIONS

Of Garrett's personality little has been written. The author of Garrett's obituary, the Rev. Ebenezer Vicessimus Cooper (1852–1902), a missionary stationed at Huahine, Society Islands, from 1880 to 1893, and who was Garrett's neighbor for nearly 7 years, described him as "self-taught in every sense of the word, and his ability and achievements were wonderful and most striking. Outside his own special study, Conchology, he was deeply read in kindred subjects, and no branch of natural history seems to have been overlooked. He was very unpretentious, and no one from casual observation would imagine him to be a *savant*" (Cooper, 1887: 2, 1888: 93; see also Averell, 1887: 82).

In his dealings with others, as best exemplified in his correspondence, we are left with the impression that Garrett was kind, generous, and modest perhaps to a fault. Only rarely are there hints to the

[72] Garrett to Barnard, dated Hilo, Hawaii, 29 April 1857 (MCZ Archives, bAg 363.10.2, no. 2); see also Damon (1858: 76), Spoehr (1963: 109), and Thomas (1979: 22).

contrary. For example, he occasionally expressed considerable annoyance with his neighbors, sometimes approaching stereotypic criticism:

> It is the same here [Society Islands] as in the Sandwich Is.; indolence, drunkenness, and the most loathsome diseases are rapidly decimating the whole race. I cannot perceive as they have improved one iota in their moral or physical condition, notwithstanding 40 years of Missionary labor and intercourse with foreigners.[73]

> I have another source of anxiety, that is, I am obliged to use every precaution to prevent the natives from drinking the alcohol. They are as ravenous for it as old sailors.[74]

> The natives are indeed a very bad set to deal with and have caused me much trouble and anxiety. Having so many packages I was obliged to hire a suitable house, owned by a Missionary's son [Kanoa, see footnote 51]. I was lucky to obtain as good a place, for had I been obliged to go into a native hut I would have lost half my things. As it is I have had many articles stolen.[75]

Garrett's biographer, William Stephen Thomas (1979: 27), described him as "a shy man, apparently not endowed with an exuberant personality .... At times he seemed to lack normal assertiveness." Perhaps Garrett's greatest fault was his overconfidence in trusted individuals, who took advantage of his generosity and naiveté. The latter notion comes largely from Thomas (1979: 20) who, without citing specific evidence, placed doubt on the rapport shared between Garrett and Pease:

> The relations of these two men was [*sic*] friendly, although Pease took almost a paternalistic attitude toward Garrett. There was a difficult side for Garrett. It is true that, in a sense, he was an employee of the other man, but in some ways Pease seems to have taken advantage of Garrett's abilities and efforts. The latter worked hard and laboriously. He collected amid the most trying and dangerous conditions. He scrupulously described and drew pictures of many of the specimens gathered, particularly the fishes. In the case of fishes and shells he suggested the scientific names. But despite all this, he lived in the shadow of Pease while the more articulate writer and more assertive man earned the glory.

Perhaps Thomas was influenced by the words of Damon (1863: 57) who wrote that:

> True genius is modest. Most emphatically is this true of Mr. Garrett. Unless we are much mistaken, he is doing the work and others are reaping the glory! He has never published any work, and yet has furnished a vast amount of useful materials for others to embody in their publications. He pursues these studies from his love of the work, and we could wish that he was deriving a pecuniary benefit at all adequate to the immense labor and toil which he has undergone. ... Mr. Garrett's modesty we know would object to our making the public statement, but we are bold to assert that there are but few men in the world whose labors are intrinsically of more value to the cause of natural history. Take for example, his late exploration of the Society Islands. It is undoubtedly more thorough and important than that of any English, French or American exploring expedition that ever visited those islands. Should he ever return

[73] Garrett to Barnard, dated Hilo, Hawaii, 29 April 1857 (MCZ Archives, bAg 363.10.2, no. 2).
[74] Garrett to Barnard, dated Kohala, Hawaii, 8 January 1858 (MCZ Archives, bAg 363.10.2, no. 10).
[75] Garrett to Barnard, dated Huahine, Society Islands, 12 January 1861 (MCZ Archives, bAg 363.10.2, no. 24).

> from the voyage upon which he is about to start, we hope the corporation of Cambridge [Harvard] University, or the Smithsonian Institute, or some other of our great National Institutions, will invite him to enjoy a portion of their income, and make him a pensioner for life. We are confident no explorer is more worthy of their notice, or has contributed more largely to widen the sphere of science and knowledge. We are afraid his modesty will prevent him from urging his claim, and some less deserving man will enjoy the bounty.

There is no indication, however, in all the documentation available to us, that Garrett felt unhappy with his treatment by Pease or by any other of his many correspondents. Instead, it is apparent that he was quite content to share his knowledge and specimens with others, expecting no more than a note of thanks.[76] Still, one has to wonder, had Garrett been more assertive, perhaps he would have been accepted on a more equal footing with the eminent scientists of his day, despite his lack of formal academic training.

Much more remains to be learned about Andrew Garrett. Surprisingly prolific despite an enormous amount of time spent in the field, not to mention the rigors of travel and loss from shipwreck, abundant archival resources remain to be analyzed. Nearly 500 pages of Garrett material, ranging from correspondence and detailed description to lists of taxa, as well as hundreds of unpublished drawings, are archived at the Museum of Comparative Zoology (of which about 106 pages document the 2 months that Garrett spent in the Kingsmills). A much larger collection of correspondence, notes, descriptions, and drawings, including a list of shells sent to various correspondents, a "Tabulated Catalogue of Polynesian Mollusca" (240 pages), and separate catalogs of land snails (328 pages) and of his personal shell collection (five notebooks, containing 8,532 entries), are present at the Bishop Museum in Honolulu. Finally, documents pertaining to Garrett in the surviving archives of the Godeffroy Museum (although much of the Godeffroy archives were destroyed during World War II, some material remains in the Hamburg State Archives) have been only marginally exploited. In short, much remains to be studied by historians, naturalists, and anthropologists, given Garrett's multifaceted life, and we hope that this article will stimulate further research from a variety of perspectives.

[76] In gratitude to Garrett, at least 39 species have been named in his honor: 29 molluscs (plus two genera and a subfamily), eight fishes, a crustacean, and a bird (catalogueoflife.org, 2020).

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APPENDIX: BIBLIOGRAPHY OF ANDREW GARRETT

To the best of our knowledge, this is the complete bibliography of Andrew Garrett. The various parts of Andrew Garrett's "Fische der Südsee," published in issues of the *Journal des Museum Godeffroy* (1873–1910), are generally attributed to Albert Günther (1830–1914), although much of the text is based on descriptions provided by Garrett (for a complete collation, see Dor, 1976: 192; Bieler and Petit, 2012: 23–24).

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