

Paper in:

Patrick N. Wyse Jackson & Mary E. Spencer Jones (eds) (2008) *Annals of Bryozoology 2: aspects of the history of research on bryozoans*. International Bryozoology Association, Dublin, pp. viii+442.

# Alice Robertson: educator and marine zoologist

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## 1. Introduction and early years

Many mysteries surround the life and career of Alice Robertson (1849–1922). Her scientific career was relatively brief but comparatively well documented. Between 1900 and 1921, Robertson published nine papers on ectoprocts and entoprocts, and one paper in the field of experimental psychology (Appendix 1). She described as new to science one genus, 42 species, and three subspecies of ectoprocts and one genus and two species of entoprocts (Appendix 2). She received her Ph.D. from the University of California in 1902, and served on the faculty of Wellesley College from 1906–1919. Her personal story and early years, however, are much less known; even her birth and death dates have been sources of confusion. This paper is a preliminary account of her life and work. We present biographical information and a timeline for her early years, but many questions still remain.

Alice Robertson was the daughter of Rev. James and Mrs Janet (Greaves) Robertson. Her father, a Baptist minister, was born in Glasgow, Scotland on 11 September 1811.<sup>1</sup> He first came to the United States in 1839, arriving in New York City on 23 July aboard the steamship *Great Western*.<sup>2</sup> His occupation on the passenger list was “merchant.” According to the *Harrisburg Telegraph*,<sup>3</sup> Robertson studied for the ministry and was ordained in the Baptist church in Baltimore, Maryland. Alice’s mother, Janet Greaves Robertson, was

born in Scotland on 6 March 1820.<sup>4</sup> It is possible that James returned to Scotland to marry; the place, date and circumstances of the marriage are unknown. The Robertson family first appears in the public record with their arrival in Philadelphia, Pennsylvania, in 1847. The passenger list for the ship *Alexander* sailing from Liverpool, England, and arriving in Philadelphia on 25 June 1847 includes James Robertson; his wife Jane [*sic*]; and daughters Elizabeth, Ellen, and Frances.<sup>5</sup> Frances did not appear in the 1850 census or in later documents, so we assume that she died in early childhood. Alice was born in Philadelphia, Pennsylvania,<sup>6</sup> and may have been the first of her family to be born in the U.S.A.

In the Philadelphia census information, we find Alice Robertson listed earlier than expected. Although several sources give her birth year as 1859,<sup>7</sup> Alice Robertson's age on the 1850 census (recorded 14 August 1850) in Philadelphia, Pennsylvania, is nine months.<sup>8</sup> While her exact birth date is unknown, this information supports her birth year as 1849. Her death certificate, while settling the disputed date of her death as 14 September 1922 (both 14 September 1922 and 22 September 1922 were published elsewhere), gave her birth year as "about 1852."<sup>9</sup> The records at Harrisburg Cemetery are consistent with the 1849 birth year, stating that she was 72 years of age when she died in 1922.<sup>10</sup>

Rev. James Robertson served Baptist congregations in Philadelphia, Pennsylvania, and Baltimore, Maryland, in the 1850s, then settled in Harrisburg, Pennsylvania, until his death in 1890. Alice's younger siblings Margaret, Sarah and John were born in Maryland in the 1850s.<sup>11</sup> On 24 February 1858, the Baltimore newspaper *The Sun* reported "Rev. James Robertson of Baltimore, preached in the Baptist church at Harrisburg Pa., on Sunday morning and evening." Rev. Robertson held the position of minister of the First Baptist Church in Harrisburg, located at 2nd and Pine Streets, for many years (approximately 1860–1880).<sup>12</sup>

The 1860 census for Dauphin County (Harrisburg), Pennsylvania,<sup>13</sup> presents the Robertson family as Alice's parents; older sisters Elizabeth (18) and Ellen (15); then Alice (8); her younger sisters Margaret (6) and Sarah (3); and her brother, John (8 months). The family lost two other children to illness in the 1860s: William, who died of cholera at 9 months of age on 24 August 1864; and Kate, who died of croup at three years of age on 4 November 1869.<sup>14</sup>

From 1871 to 1893, Alice Robertson taught in the Harrisburg public schools. No letters or personal accounts of these years are known, but local newspapers and directories provide some detail. In 1871–1872, Alice was a teacher at the Round House school, with an annual salary of \$400.<sup>15</sup> In 1872–1873, she relocated to the Seventh Street Building, a school at the corner of Seventh and Cumberland Streets.<sup>16</sup> She also taught at the Reily Street school in 1878.<sup>17</sup> In 1884–1885, she taught at the Chestnut Street Building, on Chestnut Street between 2nd and Front Streets.<sup>18</sup> In 1887–1888, she was at the Stevens Building school.<sup>19</sup> According to Mr Calobe Jackson, Jr., current chair of the Harrisburg School Board of Control, these were small, racially integrated, neighborhood schools.<sup>20</sup> Minutes of the Harrisburg School Committee, as communicated by Mr Jackson, add that Alice also taught at the Fager Building and Girls High School in Harrisburg, Pennsylvania.

RECORD  
OF  
Permanent Certificate.

No. 3160.

Name Alice Robertson.

P. O. \_\_\_\_\_

County Dauphin.

Date April. 18 82.

Page of Record Vol. 30. 408.

*Figure 1. Record of Permanent Teaching Certificate for Alice Robertson, 1882. (Applications for Teaching Certificates, series 22.98, Records of the Department of Education, Pennsylvania State Archives, Harrisburg, Pennsylvania)*

The latest record of her teaching is at Girls High School in 1892–1893.<sup>21</sup>

The 1880 census<sup>22</sup> indicates that both Alice and her sister Sarah had become school teachers in the Harrisburg area, but it is not known where they received their training. Alice was awarded her permanent Pennsylvania state teaching certificate in 1882 (Figure 1), which required a combination of experience and continuing education. This



Figure 2. Photograph “Staff of the Marine Biological Association of San Diego in the Boathouse of the Hotel del Coronado: Front row, left to right: J.F. Bovard, Effie Rigden (Mrs. Michener), Alice Robertson, Calvin O. Esterly; Back row, left to right: Robert Day Williams, B.D. Billingshurst, William E. Ritter, Loye Holmes Miller, Charles A. Kofoid, Harry B. Torrey, May 6, 1904.” (see Appendix 6)

accomplishment was published in the *Pennsylvania School Journal*<sup>23</sup> as well as recorded in the Pennsylvania state archives. The document pictured in Figure 1 is not the teaching certificate itself, but the official archival record of it. According to Pennsylvania State Archives staff, the original certificates from before 1930 were not retained.<sup>24</sup>

The 1880 census also gives the last presentation of the Robertson family living together in Harrisburg – her parents, together with Alice, Margaret, Sarah and John. Alice’s mother died of stomach disease on 14 February 1882, and her father on 14 October 1890, due to chronic cystitis.<sup>25</sup> By the time of Rev. Robertson’s death, Alice’s other siblings had married, and her sister Sarah (Mrs. Clarence Dewhurst) had moved to Seattle, Washington.<sup>26</sup>

Late in 1893 or 1894, Alice left Harrisburg to join her sister, Sarah, brother-in-law, Clarence, and their children in Seattle. She entered the University of California at Berkeley in 1894, in her mid-forties, giving Seattle as her home address. Throughout the remainder of her life, as seen in her letters from 1906–1922, Alice regarded Seattle as home.

Little is known about Alice’s student days at the University of California beyond her

publications, discussed later in this paper. She earned a B.S. in Natural Sciences in 1898, a M.S. in 1899, and a Ph.D. in 1902.<sup>27</sup> She did participate with students and faculty from Berkeley in summer field studies in southern California at several temporary marine camps (e.g., Figure 2). William E. Ritter, her doctoral supervisor, was in the process of selecting a permanent site to establish a marine biological laboratory in southern California. La Jolla was ultimately chosen for the station that is today the Scripps Institution of Oceanography. Mary Bennett Ritter (Mrs William E. Ritter) remembered her fondly from summer field work in the 1890s.<sup>28</sup> In William Ritter's report for the summer of 1901, he mentions Robertson as "Alice Robertson, M.S., Le Conte Fellow in Zoology. In charge of the collections."<sup>29</sup> Francis B. Sumner credits Robertson with identification of bryozoan species which had been dredged from the Woods Hole area of Massachusetts in summer 1903, the identification having taken place in the winter of 1903–1904.<sup>30</sup>

After graduation, Robertson was employed by the University of California as an Assistant in Hygiene for Women (1902–1904).<sup>31</sup> Her path from school teacher to university student to teaching Hygiene for Women is remarkably similar to the story of her friend Mary Bennett Ritter, a medical doctor. According to Mary Bennett Ritter,<sup>32</sup> who was one of the first instructors of Hygiene for Women at the University of California, the courses included rudiments of physiology and reproduction, as well as instruction about nutrition and sanitary practices in housekeeping.

From 1904–1906, Robertson was an Assistant in Zoology,<sup>33</sup> but she did not see a future on the faculty at Berkeley. In February 1906, she tendered her resignation to President Benjamin Wheeler,<sup>34</sup> informing him of her new position as instructor at Wellesley College, and regretting the comparative lack of opportunity at Berkeley. His reply<sup>35</sup> warmly wished her well, and indicated that she would be welcome to return. As her career developed, Robertson did not return to work at Berkeley until she was hired by Professor Charles A. Kofoid in 1921, within a year of her death in 1922.

## 2. The Wellesley College Years

Alice Robertson served on the faculty of Wellesley College from 1906–1919, chairing the Department of Zoology from 1909–1918. Wellesley College is a small liberal arts college for women in Wellesley, Massachusetts, about 16 miles west of Boston. Founded in 1870, it opened in 1875 as an institution dedicated to "giving to young women opportunities equivalent to those usually provided in colleges for young men."<sup>36</sup> Alice was appointed by President Caroline Hazard during a period of expansion for the college (1900–1910), where increased emphasis on high standards of scholarship as well as personal leadership and teaching were expected from the faculty.<sup>37</sup>

In 1906, Robertson's colleagues in the Department of Zoology included malacologist Dr Mary Alice Willcox (1856–1953), entomologist Dr Caroline Burling Thompson (1869–1921), and Miss Marian Hubbard, a biologist and suffragette who taught in the Zoology Department from 1894–1937. Men did not ordinarily serve on the teaching



Figure 3. College Hall, Wellesley College prior to the fire of 17 March 1914. (Courtesy of Wellesley College Archives)

faculty in that era, but Albert Pitts Morse (1863–1936) was on the staff as Assistant in Zoology and Curator of the Zoology Museum.<sup>38</sup> Robertson was appointed to replace Alice Wilson Wilcox who relocated to Rhode Island for family reasons. Perhaps coincidentally, Wilcox had also studied Bryozoa, publishing on the phylactolaemate *Pectinatella magnifica*.<sup>39</sup> It is also conceivable that Robertson was recommended for the position by Marian Hubbard who had studied at the University of California in 1903 and overlapped there with Alice.

The Zoology Department was located on the fourth and fifth floors of College Hall, an imposing and elegant building approximately 150 meters long (Figure 3), overlooking Lake Waban. In 1906, College Hall held several academic departments, three dining rooms, an infirmary, and 230 residents, both students and staff. The zoology facilities included four laboratories and a museum containing specimens of birds, fish, insects, mollusks, and the like, as well as glass and wax models by Auzoux, Blaschka, Deyrolle, and Ziegler.

According to the annual *Wellesley College Calendars* from 1906 though 1919, Alice taught several courses, including the Biology of Animals, Physiology (both animal and human, in different years), Advanced Invertebrate Zoology, and Philosophical Zoology, which included topics such as evolution, variation and heredity. The *Wellesley College Annual Report* published each of those years provides additional detail. Robertson taught

all levels of students, from freshmen to graduate (master's) level. (No master's degrees were granted in Zoology between 1906-1919, but graduate students in other disciplines did take Zoology courses.)<sup>40</sup> Her usual teaching load consisted of shared responsibility for Zoology 1, The Biology of Animals, a large introductory level course, and sole responsibility for the advanced level Zoology 10, Animal Physiology (1906–1911) which shifted focus to become Physiology (1911–1918). Both Zoology 1 and 10 were full-year courses. Beginning in 1908, she taught other courses such as Zoology 5, Advanced Invertebrate Zoology. A summary of all courses she taught is presented in Appendix 3.

Although never married, Alice was not a dour spinster devoted solely to her studies. Beginning when she moved east to teach at Wellesley, she had a warm collegial relationship with Professor Edward Laurens Mark (Director of the Zoological Laboratory at Harvard University, who had been William Ritter's thesis advisor), as shown by a small collection of vivid letters in the Harvard University Archives. She maintained correspondence throughout her career with William and Mary Ritter as well as with Carrie (Mrs Charles A.) Kofoid. The tone and content of her letters confirm the praise that was given in memorial notices: she was a broad thinker, a witty, literate colleague, and a devoted friend.

A glimpse of Robertson's social life is revealed in her letter to Carrie Kofoid in 1907.<sup>41</sup> She wrote of a visit to a college friend in New York over the Christmas holidays, which coincided with a scientific conference at Columbia University: "As a matter of fact, however, I did not devote my energies to the meetings although I registered and went to some meetings. I went to the reception given by President Butler and had a beautiful time chiefly because Professor Mark made himself so altogether charming. The next morning I met Mr. Esterly and Mr. Davis who marshalled me to the Zoological Section". Alice goes on to describe the beauty of the Wellesley campus in winter, and reminisce about life during summer field work in San Pedro, California.

Another of Robertson's letters to Carrie Kofoid illustrates a challenge she faced in connection with the teaching of Physiology. The use of animals in laboratory research was a controversial topic, then as now. In March of 1911, Alice commented that she had been "lashed not with cat-o-nine tails, but with cats of a thousand tails."<sup>42</sup> In the letter, she related a simple story of how a college employee had been sent to "get a cat which was offered to us, picked up a second cat which he was told was a stray." The other cat was unfortunately the pet of Mrs Clara Bent of the neighboring town of Natick, Massachusetts. This story was embellished in the popular media into the kidnapping of a prize angora worth \$500.<sup>43</sup> Newspapers across the United States ran stories claiming that Wellesley was paying school children to round up stray cats.<sup>44</sup> Robertson's letter does not mention the rumor concerning the children.

On Sunday, 26 February 1911, the *Boston Daily Globe* carried the cat story on the front page, giving copious "details" about the sinister John Squires (the Wellesley employee) who went about in a red sleigh gathering cats, and Mrs. Bent's tearful discovery of her cat's body at the college, "ready for the dissecting tables".<sup>45</sup> The *Philadelphia Inquirer* also covered the story on the front page that day, with the headline "Professor Accused of

Dissecting Pet Cats”.<sup>46</sup> The basic facts, woven into the *Globe* article, were that on 25 February 1911 John Squires did plead guilty to larceny of one cat, and was fined \$15.

The *Dallas Morning News* printed scathing accusations by actress Minnie Maddern Fiske, concerning the exploitation of children and animals, as well as a dignified rebuttal from Alice Robertson that “All animals obtained are secured in a legitimate manner and subjected to humane treatment”.<sup>47</sup> Ellen Fitz Pendleton, then Dean of the College, as well as Robertson, firmly denied Wellesley College’s involvement in any misconduct regarding children or cats, and by the end of March 1911, the publicity had subsided. On 2 March 1911, the *Boston Daily Globe* reported that the officers of the Massachusetts Society for the Prevention of Cruelty to Animals had completed their investigation, and found that only humane methods were used at Wellesley College. There was one more burst of publicity with the news that Wellesley College planned to breed cats at an on-campus facility, headed by Albert Pitts Morse, to supply the needs of the academic laboratories.<sup>48</sup>

The “scandal” did not seem to disrupt life within the Wellesley community. In her letter of 5 March 1911 to Mrs. Kofoid, Robertson wrote “The students were with us, anyway”. The only related item in the official college press was a report of the Meeting of the Science Club.<sup>49</sup> The Science Club held an open meeting for students and staff on 28 February 1911, where President Charles W. Eliot of Harvard University and Dr Walter B. Cannon of Harvard Medical School spoke on “The Importance of Animal Experimentation in Medical Research”. In her letter, Robertson gave Kofoid an enthusiastic report of the meeting.

It is interesting to note the increased enrollment in Zoology 1 in 1911–1912. In a letter to William Ritter, 27 September 1911, Robertson mentioned the unexpected increase of students so that the Zoology staff needed to add a seventh section of Zoology 1. She reported: “The whole plant – zoological plant, if you can imagine such an organism – is running to its fullest capacity, both as to space and time, *i.e.*, time that may be required of the present staff – and that pleases my thrifty Scotch sense of economy...”<sup>50</sup>

Alice’s annual reports of the Department of Zoology during the years of her chairmanship give considerable detail concerning the teaching and research of her colleagues, and indicate a great affection for the students and staff. Unfortunately, very few department records survived the fire of College Hall that occurred in the pre-dawn hours of 17 March 1914 (Figure 4). In her Annual Report for 1913–1914,<sup>51</sup> she related that the department had been in particularly fine condition at the beginning of second semester, early in 1914. Student enrollment was strong, the laboratory and museum facilities were well-appointed, and the departmental library had just moved into improved quarters. Robertson was planning more improvements and working on two research papers when the fire destroyed College Hall and all of its contents.

In 1914, Alice Robertson lived in room 430 of College Hall, and observed the flames in the laboratories before escaping the building. An unsigned letter, likely written by Professor of Art Myrtila Avery (resident of room 431), gave a personal account of that night:



*Figure 4. Photographs of College Hall after fire of 17 March 1914. A. Exterior view (Courtesy of Wellesley College Archives, photograph by H.W. Taylor). B. Interior view (Courtesy of Wellesley College Archives)*

“I went out in the corridor and heard the flames crackling around the corner. I saw that it was dark in Miss Robertson’s room so went there and pounded on her door. She came out and said ‘It’s a real fire.’ She began wringing her hands and looking towards her laboratories and moaning ‘All those things!’”<sup>52</sup>

Although the cause of the fire is unknown, there is speculation that the fire started in the zoology laboratories, since the fire was first observed by residents on the fourth floor, across the hall from the labs.<sup>53</sup> College employee Edwin Monaghan was convinced that the cause was faulty electrical equipment in growth chambers used in the propagation of beetles but college officials never officially responded to his statements.<sup>54</sup> Combustion of chemicals stored in the Zoology Laboratory was another common speculation.<sup>55</sup>

President Ellen Fitz Pendleton set a steady and determined tone in recovering from the fire. The college community gathered for its customary Chapel service at 8:30am on 17 March, some in borrowed clothing. Afterwards, the students were dismissed to their homes.<sup>56</sup> Classes reconvened only three weeks later, on April 7, after the scheduled Easter holiday. By that time, Robertson and her colleagues had moved the Department of Zoology into Stone Hall, sharing quarters with the Department of Botany. Robertson had high praise for the help provided by the chair of Botany, Margaret Clay Ferguson, under such desperate circumstances. By the fall of 1914, Zoology had a temporary wooden building with three laboratories, and had started rebuilding the museum from many donated collections.<sup>57</sup>

The papers that Robertson had been writing at the time of the fire were never revived. We know that one paper was on the ctenostomatous bryozoans of the Pacific Coast (see below). It is likely that the other paper she was writing was about specimens from the 1906 expedition of the U.S. Fish Commission Steamer *Albatross* to the North Pacific.<sup>58</sup> Several news reports, including the *Chicago Tribune*, *Philadelphia Inquirer* and *Terre Haute Star*, mention only the *Albatross* in connection with Robertson.<sup>59</sup> It was suggested that the second paper was a report on specimens from dredging expeditions of the Prince of Monaco,<sup>60</sup> but the Monaco archives do not have documentation to support this claim.<sup>61</sup> The Prince of Monaco was mentioned in the popular press, connected with the Wellesley fire, but not in any official Wellesley College report. The *Kansas City Star* includes a statement that “collections sent to [Robertson] for identification by the dredging expedition of the Prince of Monaco have all been lost...”<sup>62</sup> The *Boston Transcript* newspaper reported a somewhat garbled version of Robertson’s losses that combined these ideas: “bryozoa, rare deep-sea forms dredged from the seven seas by the famous *Albatross* expedition headed by the Prince of Monaco, and sent to her for identification”.<sup>63</sup> No scientific connections between Alice Robertson and the Prince of Monaco’s expeditions have been found.

While at Wellesley, Alice balanced teaching with research, spending summers and other available moments on identification and writing about bryozoans. Although we do not have a complete timeline for her research during those years, we know that she spent the summer of 1908 at the Biological Laboratory of the Bureau of Fisheries at Woods Hole, Massachusetts, working on identification and classification of bryozoan specimens

from the *Albatross* 1906 expedition to the north Pacific.<sup>64</sup> Alice published two articles on the bryozoans of the west coast of North America (see below). For the specialized literature needed in her research, she used the library of the Museum of Comparative Zoology at Harvard University, and also the library of the Boston Society of Natural History.<sup>65</sup> She was associated with several scholarly societies. She was a fellow of the American Academy of Arts and Sciences and a member of the Boston Society of Natural History, Phi Beta Kappa, the American Society of Naturalists and the American Society of Zoologists.

Robertson was respected and admired by her students as a generous, patient teacher, always willing to take extra time when needed. She stressed the skills of observation and logical thinking in addition to the biological content of the course at hand. She was likewise held in high esteem by her colleagues. In the departmental report for 1918–1919,<sup>66</sup> then chair Marian Hubbard noted, “In the absence of Prof. Robertson, the Department misses the counsel of one of the most scholarly members of its staff.” In the *Wellesley College Annual Report* for 1918–1919, President Pendleton marked Robertson’s resignation thus:

“Dr. Alice Robertson, Professor of Zoology, who has been on Sabbatical leave during the year, has resigned because of ill health. Dr. Robertson served the College as instructor from 1906–09, as associate professor from 1909 to her appointment as full professor in 1912. In spite of waning physical vigor, she still carried her work successfully, with all her wonted devotion and abounding cheerfulness”.<sup>67</sup>

### 3. Alice Robertson the scientist

#### A. A publication in the field of experimental psychology

In 1902, one year before Robertson’s dissertation was published, a paper appeared bearing her name as sole author from the Psychology Laboratory of the University of California.<sup>68</sup> This laboratory was directed at the time by George M. Stratton, a strongly influential late 19th and early 20th century experimental psychologist.<sup>69</sup> Robertson’s paper treated in an empirical fashion the sense of touch alone of certain optical illusions generated by geometrical features. The responses of three male subjects with eyes closed were recorded and analyzed in simple quantitative fashion. The first category tested

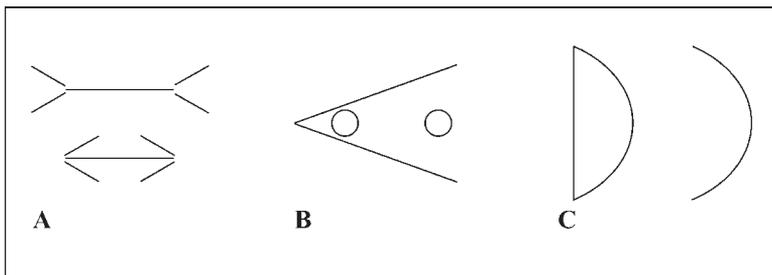


Figure 5. Three of the illusions of geometrical shape studied by Robertson. A. Müller-Lyer Illusion. B. Illusion of convergent lines. C. Illusion of contour.

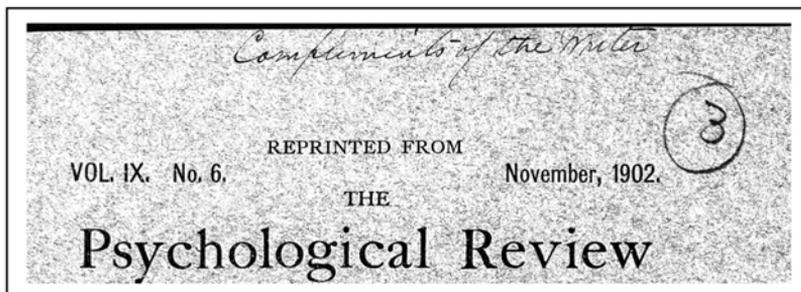


Figure 6. Reprint cover of psychology article signed in Robertson's handwriting (see Appendix 1).

consisted of five common illusions in the field of sight (Figure 5). The second class involved comparing lines of standard length (10 cm) where one set possessed varying numbers of interruptions and the other set was composed of lines without interruptions.

Such studies have a direct bearing on imagery by sighted and unsighted people. Professor Susan Lederman, a specialist in this field at Queen's University in Canada, comments about the setting of this work.

"It appears she was way ahead of her time in discussing haptic geometric illusions.... I can tell you that I found only this single reference to Alice Robertson in the 15 or so papers I have checked that deal with a tactual Müller-Lyer Illusion ... I am guessing that her paper was simply buried over time."<sup>70</sup>

Were there two Alice Robertsons at Berkeley at the time, one a marine zoologist and the second an experimental psychologist? We know from Mary Bennett Ritter<sup>71</sup> that William Ritter and George Stratton were close friends and even shared a family camping trip to Yosemite. This bridge between the two professors might have played a role in nesting Alice Robertson in both fields. The 1902 commencement program lists Robertson's Ph.D. as in Zoology, Psychology, and Paleontology.<sup>72</sup> But more concrete evidence that "our" Alice Robertson authored this paper derives from a series of bound reprints "Papers on Bryozoa" found in the Bioscience Library of the University of California at Berkeley.<sup>73</sup> Though the set is incomplete, it does contain a series of reprints including the paper on illusions of touch and each is signed on the front cover in Alice's handwriting (Figure 6). To whom Robertson gave these reprints is unknown, but apparently it was to a valued friend as the reprint of her paper on entoprocts is signed "With the best love of the author". The paper in *Psychological Review* is signed "Compliments of the writer".

Robertson's first appointment at Berkeley after completing the Ph.D. was as Assistant in Hygiene for Women. At Wellesley, she taught among others a course focused on human physiology. A background in experimental psychology and physiology would be consistent and helpful with the expectations of such teaching.

### ***B. Studies on Bryozoa of the West Coast of North America***

Robertson published six studies on entoprocts and ectoprocts of the west coast of North America.

The first of these reports was based on material collected by William Ritter during June and July of 1899 as part of the Harriman Alaska Expedition. Robertson described 25 species of cheilostomes including three new species and one new subspecies; 6 species of ctenostomes including one new; three species of cyclostomes including one new; one species of phylactolaemate; and one species of entoproct. This study was originally published in 1900 in the *Proceedings of the Washington Academy of Sciences*.<sup>74</sup> The paper was reprinted, however, in 1910 from the original electrotype plates used in the Washington Academy's article with only the title changed, a headpiece added, and new plate numbers included along with designation of the original plate numbers.<sup>75</sup>

In the summer of 1901, Ritter and his students studied at a temporary field camp in San Pedro, California. While dredging off Santa Catalina Island, specimens of the ctenostome *Ascorhiza occidentalis* were recovered. This species was originally described by J. Walter Fewkes<sup>76</sup> from dredge hauls taken in the nearby channel between Santa Barbara and Santa Cruz islands. Intact colonies possessed a head, flexible stalk, and base. Fewkes placed the species near the ctenostome genus *Alcyonidium*. Owing to the presence of a flexible stalk, Fewkes thought the species might be a link between entoprocts and ectoprocts and he considered it an important discovery bearing on the long debated question of phylogenetic relationships of the two groups. He was unable, however, to discern the relative position of the anus with regard to the mouth and surrounding tentacles. In a brief paper, Robertson<sup>77</sup> examined the anatomical evidence underlying Fewkes' hypothesis and concluded the stalk of this species is not a unique feature in the Alcyonidiidae and, secondly, that the anus lies outside the tentacular feeding apparatus. As such, Robertson concluded that this species does not represent a transitional form between the entoprocts and ectoprocts. In addition to the report on *Ascorhiza occidentalis*, a new species, *Alcyonidium pedunculatum*, is also described.

Probably the most cited of all of Robertson's publications are four papers on ectoprocts and entoprocts of the west coast of North America. In crucial ways, Robertson was the most productive of the pioneering bryozoan taxonomists studying this region. In sum, these papers record the presence of five species of entoprocts, two new;<sup>78</sup> 33 species of erect cheilostomes, 13 new and one new subspecies;<sup>79</sup> 47 species of incrusting cheilostomes, six new and three subspecies, one new;<sup>80</sup> and 21 species of cyclostomes, eight new.<sup>81</sup>

It is curious that Robertson failed to publish a comparable paper on ctenostomes, an obvious glaring omission given the otherwise comprehensive nature of this body of work. Correspondence between Robertson and Dr Samuel Henshaw, director of the Museum of Comparative Zoology at Harvard College, provides an answer to this intriguing puzzle. Robertson borrowed reference material for her researches from the library of the Museum on numerous occasions during her time at Wellesley and, in this context, she writes to Henshaw as follows.

“It is with deep regret that I have to tell you that the book I borrowed...has been destroyed in the fire which destroyed College Hall. I was at work on writing up the Ctenostomatous Bryozoa of the Pacific Coast... It with all my notes, slides, and collections were destroyed... It may be possible to find this reprint in some collection of old books and I will endeavor to do so or I will pay whatever you consider its money value, if such value is within my limited means.”<sup>82</sup>

The location and even existence of most of the material from these studies is by and large problematical. Robertson states in a letter to William Ritter,<sup>83</sup> written as she was preparing to move from Berkeley to Wellesley, that she had labeled and catalogued the cheilostomes from her Pacific Coast studies and that she arranged them in a small case in “room 17”. She packed the cyclostomes and ctenostomes in a box for shipment to Wellesley. The deposition of her cyclostome specimens remains a mystery, but we now know the circumstances surrounding the ctenostomes. The cheilostomes were retained in the collections of the Department of Zoology at Berkeley for some years until they were transferred to the California Academy of Sciences in the late 1970s. Soule<sup>84</sup> and Soule and Soule<sup>85</sup> claim that the type material was lost or rendered unidentifiable by being transferred to common containers for each species regardless of site and date of collection. Robert Van Syoc, Senior Collection Manager of Invertebrates at the California Academy, reports, however, that these assertions are at least in part inaccurate. The Academy possesses at least some type material including one holotype, 26 syntypes, and one voucher specimen of Alice Robertson’s cheilostomes<sup>86</sup> and that “each individual catalogue number refers to a single specimen lot in its own container with a separate label”<sup>87</sup> (see Appendix 4). Though Robertson apparently did not identify on labels what material she considered a type, subsequent workers have made assignments in certain cases based on the information contained on the labels and descriptions in her two papers on cheilostomes. Unfortunately, the deposition of the remaining cheilostome types and types from her other studies remain unknown at the present time.

### *C. Bryozoa of the Woods Hole Region and Francis B. Sumner*

Between 1903 and 1909, the United States Bureau of Fisheries laboratory at Woods Hole, Massachusetts, under the directorship of Francis Bertody Sumner undertook a biological survey of the waters off Woods Hole and neighboring regions. The resulting census lists over 1,600 species.<sup>88</sup> Raymond C. Osburn published on the bryozoans from this survey.<sup>89</sup> Alice is not acknowledged as a participant in this project in either of the general accounts of the survey or in Osburn’s monograph. Yet correspondence from Robertson to Ritter regarding her relocation from Berkeley to Wellesley in 1906 documents that Alice was asked by Sumner to identify bryozoans from Woods Hole, she agreed to undertake the project, and she had specimens in her possession.

“The Woods Hole people are getting after me, however, and very much desire an identified list of their material. I have promised to try to give them that since I thought it would be good pickup work”.... “I have four boxes of Woods Hole material packed and ready to send, and have requested Dr. Sumner to furnish me with Fisheries labels so that they can be sent free of charge.”<sup>90</sup>

There is neither further mention of the material nor explanation from Robertson for what happened with her involvement in the Fisheries survey. Even the fate of these specimens remains unknown. The bryozoan component of the Woods Hole Survey was completed by Raymond C. Osburn. Details, however, of how this change came about are vague. There exists a letter from Sumner to Osburn dated 19 November 1909 in which Sumner invites Osburn to take up the Bryozoa for the Report. Sumner writes that this invitation is conditional on “If Miss Robertson withdraws her claim” and Sumner continues by suggesting that Osburn write to Robertson about her intentions to complete the report.<sup>91</sup> At this point, the record abruptly ends. We could not find correspondence from Robertson to Osburn or Sumner and, of course, any correspondence from Osburn or Sumner to Robertson at the time would have been sent to Wellesley. The fire of 1914 at Wellesley destroyed all of Robertson’s scientific belongings, presumably including her correspondence.

Yet, this episode did not mark the last mention of Francis Sumner by Robertson. In 1911, Sumner relocated to California to undertake a similar regional study of San Francisco Bay using the *Albatross*, now no longer suitable for open ocean exploration. Sumner felt his time wasted on such surveys.

“I must rank it, as I did the Woods Hole report, as distinctly low-grade ore...”<sup>92</sup>

Sumner’s true interests lay in exploring the effects of the environment on genetic structure and, hence, evolutionary change. Sumner moved to Scripps in 1913 and began this new research program focusing on populations of field mice as experimental subjects. Though Sumner and Robertson certainly overlapped at Scripps during visits by Robertson in later years, we do not know if the two individuals were in social contact. We suspect, however, such would be minimal. At the time of his retirement from the directorship, Ritter attempted to lure Henry Bryant Bigelow away from Harvard to take over leadership of Scripps, but Bigelow declined.<sup>93</sup> Francis Sumner was viewed by some as a possible alternative candidate, but certainly not in the eyes of Alice Robertson (Figure 7).

“And, you know, I wouldn’t like to see the place left to Mr. Sumner. He’s not a big enough man.”<sup>94</sup>

#### ***D. Study of bryozoans of India***

Robertson’s final publication is an account of bryozoans from the Bay of Bengal and neighboring seas.<sup>95</sup> Thomas Nelson Annandale, superintendent of the Museum at Calcutta and director of the Zoological Survey of India, provided the material. Details of how Robertson came to be invited to undertake this project are unknown. The Bay of Bengal project was begun near the end of her career. There is evidence, however, that Robertson and Annandale interacted nearly a decade earlier. In a letter to Ritter written in 1911, Robertson reports receiving entoproct material from Annandale in Calcutta for identification.<sup>96</sup> Regrettably, we are unable to locate further information regarding any

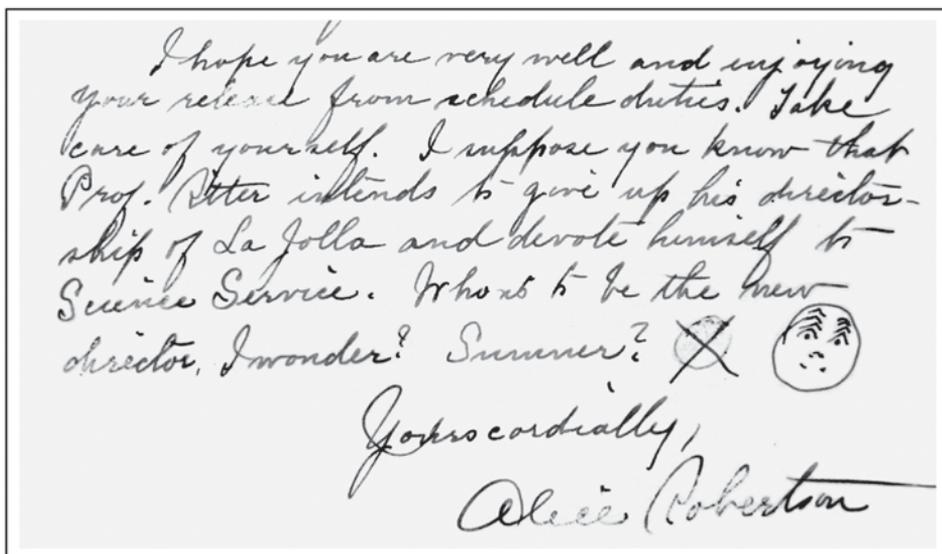


Figure 7. Excerpt from letter, with only known drawing in Robertson's correspondence. (A. Robertson to E.L. Mark, 21 January 1922, Papers of Edward Laurens Mark, 1868-1944, Correspondence 1918-1944, Courtesy of Harvard University Archives)

association with Annandale until the Bay of Bengal study. Nonetheless, the resulting 1921 report is part of the Zoological Survey of India, a large undertaking begun in 1916 and still ongoing. Robertson's project was conducted in Seattle after her retirement for medical reasons from Wellesley. In a letter to Mary Bennett Ritter,<sup>97</sup> Alice writes that she remained ill and was using a brace ("support"), but that she'd stopped needing a cane and other supports. She was traveling out to the University two or three times a week in order to work "with interest and joy on my Bengal things", but that she needed literature not available in Seattle and would like to be able to return to Boston later in the spring to consult library materials or ask to have some volumes sent to her in Seattle. In the final paper, Robertson comments also on the difficulty of the task due to problems of securing specimens for comparison. She gratefully acknowledges, however, Professor Trevor Kincaid for providing facilities in the Department of Zoology and access to the library of the University of Washington.<sup>98</sup>

The collection consisted of 45 genera and 95 species, nine of which were described as new. This paper is likely most noteworthy for its discussion of brackish water species of *Membranipora* and, secondly, for the description of *Kinetoskias arabianensis*, sp. nov., with a detailed discussion of its reproductive biology based apparently on a single specimen collected from 931 fathoms in the Arabian Sea. Robertson recognized the close affinity, if not identical nature of her single specimen, with *Euplozoum cirratum* (as *Cellularia cirrata* Busk 1884). Indeed, only several years later *K. arabianensis* was synonymized under *E. cirratum* by Harmer.<sup>99</sup>

### ***E. Location of specimens studied by Robertson***

We reported earlier on the Pacific Coast cheilostome material identified by Alice that resides in collections of the California Academy of Sciences. The whereabouts of what must be many more of her University of California specimens supposedly transferred to the Academy are unknown. And we now know that the Pacific Coast ctenostome collections were destroyed by fire at Wellesley College in 1914 and, hence, were lost forever. Robertson made it clear that in the Pacific Coast studies two depositories for specimens existed, the Department of Zoology at the University of California and the Department of Zoology at the University of Washington.<sup>100</sup> The ultimate fate of the Washington specimens used in her papers is unknown. Professor Alan Kohn (University of Washington)<sup>101</sup> writes that Kincaid's mounted slide material was given to the Smithsonian Institution around 1980, but he was unsure if this gift included any of Robertson's specimens. Staff at the Smithsonian's Department of Invertebrate Zoology are unable to locate the Kincaid material though specimens may exist, but are yet uncatalogued.<sup>102</sup>

As of this writing, specimens of *Adeonella marginata* and *Membranipora devinensis*, two new species described by Robertson in the Bay of Bengal study, have been located in the repository of the Zoological Society of India.<sup>103</sup> Both are reported to be type specimens and to be preserved in good condition. The possibility of additional Robertson material at the repository is under investigation at this time.

The Department of Paleobiology at the Smithsonian possesses a small collection of 10 dry bryozoan lots listed as identified by A. Robertson and collected and donated by A. Foster.<sup>104</sup> None of these specimens are included in Robertson's papers on non-incrusting cheilostomes or cyclostomes of the Pacific Coast, as the regions they were collected in (Point Granville and Copalis Rocks) are not those cited by Robertson or the dates are inappropriate. Hence, what Robertson material there is in the Smithsonian does not contain specimens that she examined for her Pacific Coast series of papers. This conclusion is reinforced by the content of some labels that we have determined to be in Alice's handwriting by comparison with samples in Alice's correspondence (Figure 8a).

The invertebrate collections at the Scripps Institution of Oceanography, La Jolla, California, contains one known specimen of *Schizoporella hyaline* [*sic*]<sup>105</sup> apparently identified by Robertson. But it is obvious when comparing handwriting on the label with known samples of Robertson's handwriting that the label was not written by Alice (Figure 8b).

The Museum of Comparative Zoology at Harvard College has two bryozoan specimens identified by Robertson that derive from the collection of H. P. Johnson<sup>106</sup> (Figures 8c and 8d). Though his dissertation was on the biology of *Stentor*,<sup>107</sup> Johnson had wide-ranging interests that also included polychaete systematics and general biology. He was a protégé of Ritter and part of the Berkeley group studying Pacific Coast marine fauna. In 1899, Johnson wrote to Dr William McMichael Woodworth who at the time was Keeper of the Museum of Comparative Zoology, asking to place type specimens of polychaetes he described from the Pacific Northwest region in the MCZ collections and with a promise to add more annelid material from the *Albatross* south sea cruise when study of that

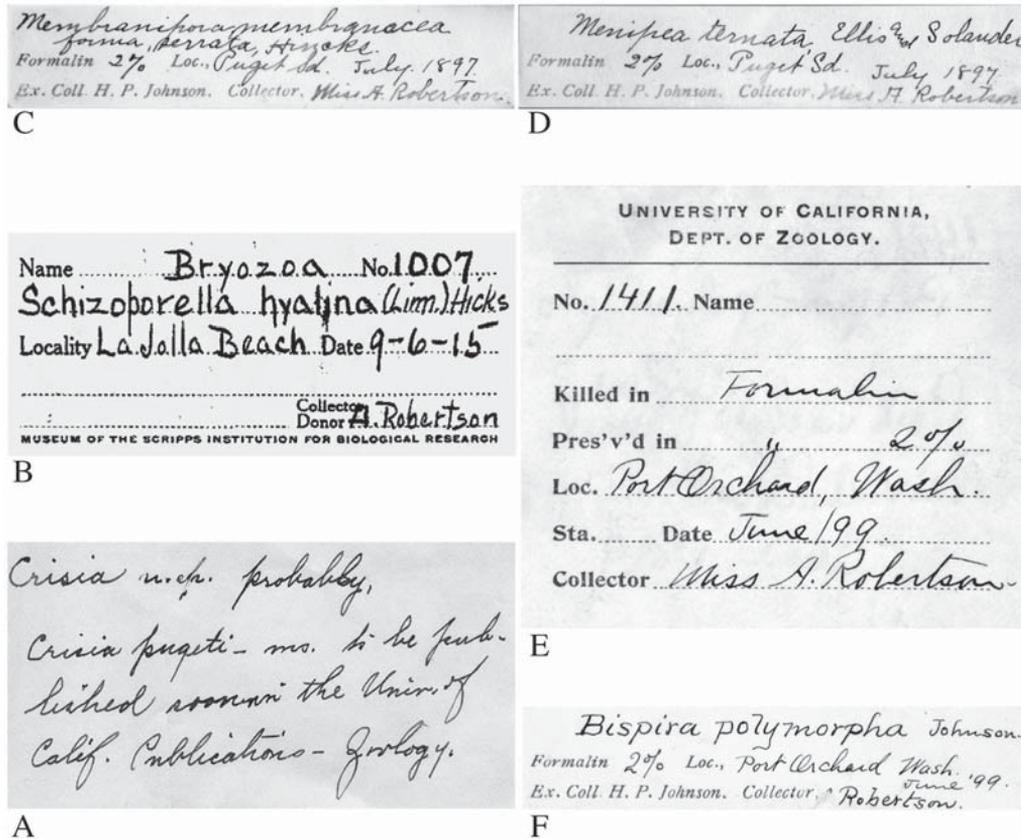


Figure 8. Labels of selected specimens associated with Alice Robertson. A. Annotation in Robertson's handwriting accompanying specimen in Museum of Natural History, Smithsonian Institution. B. Annotation on label not in Robertson's handwriting, but of specimen credited to Robertson as either collector or donor from Scripps Institution of Oceanography, La Jolla, California. C. Specimen of bryozoan *Membranipora membranacea* ex-collection of Herbert P. Johnson collected by Robertson and deposited in Museum of Comparative Zoology, Harvard University. D. Specimen of bryozoan *Menipea ternata* ex-collection of Herbert P. Johnson collected by Robertson and deposited in Museum of Comparative Zoology, Harvard University. E. Label of University of California, Department of Zoology in Robertson's handwriting of specimen collected by Robertson in same bottle with Fig. 8.F. F. Type specimen identification label ex-Johnson of polychaete *Bispira polymorpha* collected by Robertson.

material was completed.<sup>108</sup> As a consequence, the MCZ has 13 type specimens of polychaetes from the Pacific Northwest given by Johnson. These specimens were collected by Robertson and apparently transferred to Johnson for his study.<sup>109</sup> In certain of these specimens, contents of the vial include a University of California label in Alice's handwriting, and a second label ex-collection Johnson (Figures 8e and 8f).

Finally, inquiries to the Natural History Museum, London, U.K.; Santa Barbara Museum of Natural History in Santa Barbara, California (which now houses the “Osburn Collection of Bryozoa” from the Allan Hancock Foundation, University of Southern California, Los Angeles, California); Peabody Museum at Yale University, New Haven, Connecticut (which now houses the Gray Museum formerly at the Marine Biological Laboratory in Woods Hole, Massachusetts); and Peabody Essex Museum of Salem, Massachusetts, failed to produce additional specimens.

What bryozoan specimens, if any, formally deposited by Robertson in the Zoology Museum at Wellesley College were lost in the fire of 1914. She did donate \$50 in 1914 for “equipment”, a generous sum from someone who had lost her own possessions in the College Hall fire.<sup>110</sup> The existing accession records of the Museum, which cover donations and purchases from 1914 to 1957, do not reveal any specimens collected or donated by Robertson. The museum that had been reestablished at Wellesley was later dismantled, and most of its collections de-accessioned, in 1977,<sup>111</sup> with only approximately 150 specimens of birds and mammals now remaining in the College’s Science Center.

### ***E. Robertson’s observations on general biology***

While the primary focus of Robertson’s research resided in the description on a regional basis of bryozoan faunas, it would be an error to think the contents of her publications were limited exclusively to taxonomy. Her writings commonly contain insightful observations about general aspects of bryozoology as well as some relevant to more broad-based issues in biology.

In her first publication, Robertson<sup>112</sup> states that she based the classification system to be used in her papers on that of Hincks (1880), but she does not provide her rationale for this decision at this point. It is not until the non-incrusting cheilostome paper in 1905 that Robertson justifies the use of Hincks’ system as this study “...is the most complete and exhaustive of any recent work, and its method is generally followed by other workers...”.<sup>113</sup> Yet, when compared side-by-side, Robertson’s system shows distinct departures from that of Hincks (Appendix 5).

First, Robertson uses the phylum name Molluscoidea whereas Hincks rejects this grouping as “superfluous” and goes on to state the following:

“The Polyzoa, in spite of adaptive changes, are, like the Brachiopoda, to which they are most nearly related, of the true Molluscan race.”<sup>114</sup>

Alternatively, Hincks unites Polyzoa with other groups in a Subkingdom, the Mollusca. Between the categories of Subkingdom and Class, Hincks has no Phylum, but does use the rank of Branch Acephala that includes the Class Polyzoa. Both authors have Polyzoa (Bryozoa) in the rank of Class, but Hincks attributes it to Thompson and Robertson to Nitsche. Third, the Ectoprocta is a Group in Hincks and a Subclass in Robertson. The two are concordant in having Gymnolaemata as an Order and Cheilostomata, Cyclostomata, and Ctenostomata as Suborders. In Hincks, the Entoprocta become a Group, whereas

Robertson's 1900 paper on Entoprocta makes no mention of the rank of this taxon. In subsequent publications, she sometimes mentions Hincks (1880) (*e.g.*, Robertson, 1908) but in others proceeds without defining rank (*e.g.*, Robertson, 1921b). One comes away from these studies with the thought that Robertson was not particularly concerned with higher order systems of entoproct or ectoproct classification.

While the particulars of any given system may not have been of prime concern to her, Robertson was indeed knowledgeable and interested in the foundations that underlie approaches to bryozoan classification. In 1921 she published in *American Naturalist*<sup>115</sup> a review of *North American Early Tertiary Bryozoa* by Ferdinand Canu and Ray Bassler.<sup>116</sup> In this exposition, she demonstrates a firm understanding of the various approaches to classification that were in vogue at the time while simultaneously displaying her tact and command at encouraging exploration of new pathways.

In considering principles of classification of the cheilostomes, Canu and Bassler stated:

“In the bryozoa, as in other living beings, the form is only the result of functions; therefore in the study of the morphological variations of the organs we now substitute that of their physiological functions. Our studies are therefore always directed toward the discovery of function which modify the skeletal form.”<sup>117</sup>

These principles stood in stark contrast to the commonly held tenet in Western European and American scientific communities of the time that function follows form. In doing so, Canu and Bassler forwarded a view considered by many scientists, including Robertson, to be Lamarckian. But rather than engage in debate over these opposing schools of thought, Robertson simply stated that the currently employed method of focusing on form determining function

“is so unsatisfactory that this attempt [that of Canu and Bassler] to apply a unitary principle which promises so to simplify classification and to lift it out of chaos, should be heartily welcome”.<sup>118</sup>

Robertson, however, cautiously reminds the reader that applying the approach of Canu and Bassler carries severe limitations. For example, the use of larval structure that Canu and Bassler give importance to in diagnoses of families is impractical in the case of fossil material. Additionally, implementing Canu and Bassler's new system would severely juggle present alignments. Regardless, Robertson invites colleagues to step up to this challenge. In doing so, she calmly encourages change and exploration rather than sparking only heated debate.

Another example of her broad interest is seen in the paper on ‘incrusting cheilostomes’.<sup>119</sup> In this study, Alice recognized a new form of cyphonautes larva, *Cyphonautes occidentalis*, from La Jolla. She carried this study one step further, however, by examining metamorphosis and early stages of astogeny of specimens growing on kelp and, thereby, linked this cyphonautes to the larva of *Membranipora villosa*.

Likely the most striking example of her synthetic interests in biology resides in her

dissertation on polyembryony in cyclostomes, especially species of *Crisia*.<sup>120</sup> Embryonic fission, or polyembryony, was first observed in cyclostomes by Harmer.<sup>121</sup> Polyembryony is an asexual mode of reproduction that appears sporadically within animal and plant taxa. Identical (monozygotic) twinning in humans is an extreme example of embryonic fission that occurs at low, but nearly constant levels, across human populations and likely is the result of a randomly occurring event in early development. In contrast, the occurrence of polyembryony in crown taxa of cyclostomes is apparently the norm rather than the exception and, furthermore, embryonic fission may have a deep-rooted history in stenolaemate evolution in general.<sup>122</sup> Early studies of this phenomenon, including that of Robertson, were of necessity restricted to anatomical observations. Such studies could only infer, but more recent work by Hughes and colleagues<sup>123</sup> using microsatellite genotyping now provides concrete evidence for the occurrence of embryonic fission in at least one species of extant cyclostome.

How Robertson came to select this topic for her dissertation is unknown given her general focus on systematics. In the introduction, she states only that the project was conceived as a consequence of interest developed from Harmer's findings that made further investigation and corroboration of his results desirable. Robertson confirms Harmer's observations on fission and then examines in detail the origin of male and female gametes. In addition to the asexual process of polyembryony, Robertson suggests that a second asexual event, parthenogenesis, is likely as well. Subsequent workers have to a degree cast doubt on some of Robertson's observations and interpretations. For example, the genetic analyses by Hughes and co-workers establish the occurrence of outcrossing, a finding that is inconsistent with Robertson's suggestion of parthenogenesis. Borg<sup>124</sup> in a detailed histological study of various cyclostomes including *Crisia* found support and contradiction with Robertson on various points. For example, Borg confirmed Robertson's observation that male and female gonads arise from the somatic peritoneum rather than the splanchnic as reported by Harmer.<sup>125</sup> Alternatively, Borg was unable to substantiate the claim by Robertson that secondary embryos in *Crisia* spp divide and give rise to tertiary ones. Regardless of the points of agreement or divergence between these workers, our knowledge of the developmental mechanics in cyclostomes remains today very much at the level obtained approximately a century ago. A critical assessment of early events in cyclostome embryogenesis and their underlying mechanisms at the cellular and molecular levels seems long overdue.

Robertson's study of *Kinetoskias arabianensis*<sup>126</sup> provides the final example discussed here of her continuing attention to broad biological problems. She reported that, while testis material was common, ovaries were not, eggs were small in number, and that there was but a single large brood chamber. These observations suggested to her parallels with reproduction in cyclostomes and she went as far as to speculate "that embryonic fission may occur here is not improbable".<sup>127</sup> While we are unaware of subsequent exploration of this hypothesis, polyembryony would seem unlikely based on what is known about reproduction of cheilostomes in general.

Regardless, the overarching point here is Robertson's recognition of a more general

problem concerning persistence in cases where a species possesses but limited capability for sexual reproduction. Polyembryony would be one mechanism whereby greater reproductive output could be achieved. The fact that this strategy incurs theoretically a concomitant cost in reduced genetic variation would likely not be appreciated in 1903.

New excitement is emerging around questions of the evolutionary and ecological contexts in which polyembryony arises and is maintained. Contrasting scenarios, such as those advanced by Craig *et al.*<sup>128</sup> and Ryland,<sup>129</sup> are appearing in the literature. The pioneering work of Hughes *et al.* cited previously<sup>130</sup> firmly established, using genetic analysis, the existence of polyembryony in the cyclostome *Crisia denticulata*. Based on this essential platform, empirical studies are now beginning to address these more fundamental questions directly<sup>131</sup> and certain previous investigations are now being evaluated in a new light.<sup>132</sup> Future research might profitably focus on comparisons of cheilostomes (lacking polyembryony) and cyclostomes (possessing polyembryony) utilizing species that have similar colony forms, life history traits, and dispersal capabilities. Such effort and progress would no doubt please Alice.

#### 4. The Final Years

Alice returned to the west coast in 1918, on sabbatical leave from Wellesley, but she was in poor health. She subsequently resigned her teaching position in 1919, due to an unanticipated prolonged convalescence (the nature of her illness is unknown). Only a few details related to the last years of Alice's life have emerged. She never returned to teaching, but devoted her efforts to continued research and writing. Several sources report that she was given access to laboratory and library facilities at the University of Washington in Seattle in 1920.<sup>133</sup> She published two articles in 1921, a review of Canu and Bassler's *North American Early Tertiary Bryozoa* and a paper on the bryozoans of Bengal Bay (both discussed above). Also in 1921 she was asked by Charles A. Kofoid of the University of California at Berkeley to assist in a study of dinoflagellates, but the details of this arrangement are unknown. Kofoid does acknowledge her, however, in his 1928 work, "The Dinoflagellata: The Dinophysoidae" (with co-author Tage Skogsberg): "We are indebted to the late Dr. Alice Robertson for assistance in organizing the multitudinous details of several of the genera."<sup>134</sup>

Four letters have been found that Robertson wrote in 1922, one to Edward L. Mark and three to Mary Bennett Ritter. On 21 January 1922, she wrote to Edward L. Mark<sup>135</sup> accepting an invitation to survey the bryozoans of Bermuda, a project never completed. She explained that she had agreed to work on the dinoflagellates through the end of June, and hoped to start the Bermuda work during the summer of 1922 "either here or in Seattle". She remarked that she did not want to attempt both projects simultaneously, and also that she had left her bryozoan literature in Seattle. Alice expressed to Mark her relief at no longer having teaching responsibilities: "I have grown fearfully careless since I gave up teaching. It is pleasant not to care a —————". Finally, Alice mourns the passing of her Wellesley colleague Caroline Burling Thompson, who had died after surgery in 1921.

**STATE OF CALIFORNIA**  
**CERTIFICATION OF VITAL RECORD**

OFFICE OF RECORDER  
**COUNTY OF ALAMEDA**  
OAKLAND, CALIFORNIA

PLACE OF DEATH, DIST. No. 104 California State Board of Health 22-037447 1385  
County of Alameda BUREAU OF VITAL STATISTICS State Index No. 1385  
City or Town of Oakland STANDARD CERTIFICATE OF DEATH Local Registered No. 1081  
or Rural Home (Name District) (No. East Bay Hospital St.; ---Ward) (If death occurred in a hospital or institution, give its NAME instead of street and number and fill out Nos. 18a and 18b.)

**FULL NAME** Alice Robertson

**PERSONAL AND STATISTICAL PARTICULARS**

SEX Female COLOR OR RACE White SINGLE, MARRIED, WIDOWED, OR DIVORCED (Write the word) Single

DATE OF DEATH Sept 14 1932

IF MARRIED, WIDOWED, OR DIVORCED HUSBAND of (or) WIFE of \_\_\_\_\_

DATE OF BIRTH \_\_\_\_\_

AGE about 10 years \_\_\_\_\_ months \_\_\_\_\_ days or \_\_\_\_\_ years \_\_\_\_\_ months \_\_\_\_\_ days or \_\_\_\_\_ years \_\_\_\_\_ months \_\_\_\_\_ days

OCCUPATION (a) Trade, profession, or particular kind of work \_\_\_\_\_ (b) General nature of business, profession, or establishment in which employed (or employer) \_\_\_\_\_ (c) Name of employer \_\_\_\_\_

BIRTHPLACE (State or country, city or town) Green (Duration) \_\_\_\_\_ years \_\_\_\_\_ months \_\_\_\_\_ days

NAME OF FATHER James Robertson (Duration) \_\_\_\_\_ years \_\_\_\_\_ months \_\_\_\_\_ days

BIRTHPLACE OF FATHER (city or town) Seattle, Wash.

MAIDEN NAME OF MOTHER Heard

BIRTHPLACE OF MOTHER (city or town) Oakland

LENGTH OF RESIDENCE At Place of Death \_\_\_\_\_ years \_\_\_\_\_ months \_\_\_\_\_ days (If temporary registration (State or State) (If nonresident, give city or town and state) Seattle, Wash.

In California \_\_\_\_\_ years \_\_\_\_\_ months \_\_\_\_\_ days How long in U.S., if of foreign birth) \_\_\_\_\_ years \_\_\_\_\_ months \_\_\_\_\_ days

THE ABOVE IS TRUE TO THE BEST OF MY KNOWLEDGE (Informant) W. B. Heard (Address) 2201 Bancroft Way Berkeley

Filed \_\_\_\_\_ 19\_\_\_\_ Registered \_\_\_\_\_

FILED 9/16 1932 W. B. Heard Registrar

**MEDICAL CERTIFICATE OF DEATH**

I HEREBY CERTIFY, That I attended deceased from Sept 11 1932 to Sept 14 1932 that I last saw her alive on Sept 14 1932 and that death occurred on the date stated above at 5 p.m. The CAUSE OF DEATH\* was as follows:

*Peritonitis*

Contributor Obstruction of sigmoid (Duration) \_\_\_\_\_ years \_\_\_\_\_ months \_\_\_\_\_ days

Where was disease contracted? \_\_\_\_\_ If not at place of death? \_\_\_\_\_

Did an operation precede death? yes Date of Sept 12 32

Was there an autopsy? yes

What (or) control diagnosis? Frank M. Johnson, M.D. (Physician) Sept 12 1932 (Address) Berkeley, Cal.

\*Use the following: (a) VIOLENT DEATH, or, in death from VIOLENT CAUSE, state (1) MECHANISM OF INJURY and (2) weapons (specify and describe), (3) FATAL or NON-FATAL. (Give reason also for additional cause.)

PLACE OF BURIAL OR REMOVAL California Crematorium DATE OF BURIAL Sept 18 1932

UNDER TAKEN BY W. B. Heard EXEMPTION LICENSE No. 1463

ADDRESS 2201 Bancroft Berkeley

001759590 CERTIFIED COPY OF VITAL RECORDS STATE OF CALIFORNIA, COUNTY OF ALAMEDA  
This is a true and exact reproduction of the document officially registered and placed on file in the office of the Alameda County Recorder.  
DATE ISSUED MAR 30 2007  
This copy is not valid unless prepared on an engraved border displaying the date, seal and signature of the Recorder.

Patricia O'Connell  
PATRICK O'CONNELL  
ALAMEDA COUNTY RECORDER

ANY ALTERATION OR ERASURE VOID THIS CERTIFICATE

Figure 9. Death Certificate of Alice Robertson. (Office of Recorder, County of Alameda, Oakland, California)



*Figure 10. Photograph of tombstone. Engraved with names of James and Janet Robertson (parents of Alice Robertson), including their respective dates of birth and death, and on the front panel the name Alice Robertson with her date of death. Harrisburg Cemetery, Harrisburg, Pennsylvania. (Photograph by William Sears, 5 August 2007)*

Robertson was to pass away, herself, several months later under similar circumstances.

In Robertson's letters to Mary Bennett Ritter, we learn more about what was to be her last year. Alice had relocated to Berkeley, California, late in 1921 or early in 1922, to work on the dinoflagellates. On 9 January 1922, she wrote to Mary Bennett Ritter,<sup>136</sup> informing

her of the move. Robertson's health was improving, and she was happy to be back "in beautiful Berkeley, and at a desk in East Hall almost as if I had never left it." In her next letter, dated 18 May 1922,<sup>137</sup> Robertson reminisced about mutual friends and speculated about who would lead the Scripps Institution of Oceanography in the future. Robertson's last known letter is dated 16 August 1922,<sup>138</sup> only a few weeks before her death. Mary Ritter had been in a serious automobile accident, so much of the letter was encouragement and consolation. Alice shared her own news, however, that "fire was pursuing me as accident pursues you." There had been a fire on the University campus, which had also ignited Alice's home. This time, unlike her experience in 1914, the fire was extinguished. Alice was unharmed, though she did relocate to new lodgings. She didn't discuss her scientific work in the letter, but implied that she was continuing her project with their mutual friend, Charles A. Kofoid.

Alice's death certificate (Figure 9) documents that she died on 14 September 1922 at East Bay Hospital in Oakland, California, from peritonitis, following surgery for an obstructed sigmoid colon. A memorial service was held in Berkeley, California, on 17 September 1922.<sup>139</sup> Her remains were cremated and shipped from California to George Sourbier, a funeral director in Harrisburg, Pennsylvania.<sup>140</sup> Interment took place on 14 November 1922 at Harrisburg Cemetery, Harrisburg, Pennsylvania, in the Robertson family plot (Figure 10).<sup>141</sup>

Robertson's scientific legacy is assured by her publications. The legacy of her teaching is more ephemeral, but still significant. The number of school children and college students she influenced is unknown, but it is clear that she was a superlative educator. Her former Wellesley student, Helen Goss Thomas, wrote that Alice was

"a great personality [with] the enduring passion for scientific truth" but that she "was, first of all, a true teacher. Her complete mastery of her subject made possible the full, spontaneous class discussion of each day's problems... [She] bequeathed to her students the training in patience, accuracy, clear thinking, and devotion to purpose, and above all the inspiration to strive in every task not for the mediocre, but for the best".<sup>142</sup>

## 5. Acknowledgements

We thank co-editors of the volume Patrick Wyse Jackson (Trinity College, Dublin, Ireland) and Mary Spencer Jones (Natural History Museum, London, UK) for inviting us to contribute this chapter. Their encouraging comments and critical editing are appreciated.

Many colleagues helped with background research and/or access to documents used in the development of this study. We are especially grateful to John Bry (Harrisburg Cemetery, Harrisburg, Pennsylvania), Emily Buchholtz (Wellesley College, Wellesley, Massachusetts), Jacqueline Carpine-Lancre (Prince's Palace of Monaco, Monaco), Harim Cha (Scripps Institution of Oceanography, La Jolla, California), Henry Chaney (Santa Barbara Natural History Museum, Santa Barbara, California), Deborah Day (Scripps Institution of Oceanography, La Jolla, California), Lisa DeCesare (Harvard

University, Cambridge, Massachusetts), Timothy Driscoll (Harvard University, Cambridge, Massachusetts), Dana Fisher (Harvard University, Cambridge, Massachusetts), Michelle Gachette (Harvard University, Cambridge, Massachusetts), Dennis Gordon (National Institute of Water & Atmospheric Research, Wellington, New Zealand), Ian Graham (Wellesley College, Wellesley, Massachusetts), Kevlin Haire (The Ohio State University, Columbus, Ohio), Carole Hickman (University of California, Berkeley, California), Calobe Jackson Jr. (Harrisburg School District, Board of Control, Harrisburg, Pennsylvania), Ardis Johnston (Harvard University, Cambridge, Massachusetts), Richard Kacmar (Scripps Institution of Oceanography, La Jolla, California), William Keel (National Museum of Natural History, Smithsonian Institution, Washington, DC), Monica Kelsey (Chapel of the Chimes, Oakland, California), Carolyn Kirdahy (Museum of Science, Boston, Massachusetts), Alan Kohn (University of Washington, Seattle, Washington), Susan Lederman (Queen's University, Kingston, Ontario, Canada), Edward Lyke (California State University, Hayward, California), Cathy Norton (Marine Biological Laboratory, Woods Hole, Massachusetts), Midori Oka (Peabody Essex Museum, Salem, Massachusetts), Tarun K. Pal (Zoological Survey of India, Kolkata, India), Donald Pfister (Harvard University, Cambridge, Massachusetts), Jo Ann Sanner (National Museum of Natural History, Smithsonian Institution, Washington, DC), William Sears (Lexington, Massachusetts), Wilma Slight (Wellesley College, Wellesley, Massachusetts), Susan Snyder (University of California, Berkeley, California), Jonathan Stayer (Pennsylvania State Archives, Harrisburg, Pennsylvania), and Robert Van Syoc (California Academy of Sciences, San Francisco, California).

We would like to thank Constance Rinaldo, Librarian, and the Ernst Mayr Library of the Museum of Comparative Zoology (Harvard University, Cambridge, Massachusetts) for partial financial support of this project.

Finally, digital formats of the figures were created by Collin Johnson and the manuscript edited and its overall production coordinated by Helene Ferranti, both of Harvard University, Cambridge, Massachusetts. Their friendship, cheerfulness and skilled accomplishments were of immense value throughout our endeavor.

### Appendix 1. Publications of Alice Robertson

- A. Robertson, 1900a. 'Papers from the Harriman Alaska Expedition. VI. The Bryozoa', *Proceedings of the Washington Academy of Sciences*, 2, 315-340, Pls. XIX-XXI.
- A. Robertson, 1900b. 'Studies in Pacific Coast Entoprocta', *Proceedings of the California Academy of Science*, Ser. 3 2(4), 323-348, Pl. XVI.
- A. Robertson, 1902a. 'Some observations on *Ascorhiza occidentalis* Fewkes, and related Alcyonidia', *Proceedings of the California Academy of Sciences*, Ser 3 3(3), 99-108, Pl. XIV.
- A. Robertson, 1902b. 'Studies from the Psychological Laboratory of the University of California. Communicated by Professor George M. Stratton. VI. 'Geometric-optical' illusions in touch', *Psychological Review* 9(6), 549-569.
- A. Robertson, 1902c. 'The Embryology and Embryonic Fission in Cyclostomatous Bryozoa', *Proquest Dissertations and Theses 1902. Section 0028, Part 0472 [Ph.D. dissertation] United States-California: University of California, Berkeley; 1902 Publication Number: AAT.*
- A. Robertson, 1903. 'Embryology and embryonic fission in the genus *Crisia*', *University of California Publications in Zoology*, 1(3), 115-156, Pls. XII-XV.
- A. Robertson, 1905. 'Non-incrusting chilostomatous Bryozoa of the west coast of North America', *University of California Publications in Zoology*, 2(5), 235-322, Pls. IV-XVI.
- A. Robertson, 1908. 'The incrusting chilostomatous Bryozoa of the west coast of North America', *University of California Publications in Zoology*, 4(5), 253-344, Pls. 14-24.
- A. Robertson, 1910a. 'The Bryozoa of the Expedition', in *Harriman Alaska series. XI. Nemerteans by Wesley R. Coe. Bryozoans by Alice Robertson*, edited by C. H. Merriam (City of Washington, Smithsonian Institution), 221-241, Pls. XXIII-XXV. Reprinted version of Robertson (1900a).
- A. Robertson, 1910b. 'The cyclostomatous Bryozoa of the west coast of North America', *University of California Publications in Zoology*, 6(12), 225-284, Pls. 18-25.
- A. Robertson, 1921a. [Review] 'North American Early Tertiary Bryozoa. By Ferdinand Canu and Ray S. Bassler. Smithsonian Institution, United States National Museum, Bulletin 106, (1920) 879 pages, 279 text figures and 162 plates]', *American Naturalist* 55(636), 69-72.
- A. Robertson, 1921b. 'VIII. Report on a collection of Bryozoa from the Bay of Bengal and other eastern seas', *Records of the Indian Museum, Calcutta*, 22(1), 33-65.

**Appendix 2. Genera, species, and subspecies described by Alice Robertson segregated by publication**

<b>Genera of Ectoprocta</b>		<i>Crisia franciscana</i>	1910b
<i>Crisulipora</i>	1910b	<i>Crisia maxima</i>	1910b
		<i>Crisia operculata</i>	1910b
<b>Species of Ectoprocta</b>		<i>Crisia pacifica</i>	1910b
<i>Alcyonidium cervicornis</i>	1900a	<i>Crisia pugeti</i>	1910b
<i>Entalophora capitata</i>	1900a	<i>Crisulipora occidentalis</i>	1910b
<i>Flustra lichenoides</i>	1900a	<i>Tubulipora occidentalis</i>	1910b
<i>Membranipora sandalia</i>	1900a	<i>Tubulipora pacifica</i>	1910b
<i>Menipea erecta</i>	1900a		
		<i>Adeonella marginata</i>	1921
<i>Alcyonidium pedunculatum</i>	1902a	<i>Beania ostia</i>	1921
		<i>Farciminaria andamanensis</i>	1921
<i>Beania longispinosa</i>	1905	<i>Kinetoskias arabianensis</i>	1921
<i>Bugula californica</i>	1905	<i>Membranipora amoyensis</i>	1921
<i>Bugula curvirostrata</i>	1905	<i>Membranipora devinensis</i>	1921
<i>Bugula laxa</i>	1905	<i>Membranipora hugliensis</i>	1921
<i>Bugula longirostrata</i>	1905	<i>Membranipora spinostoma</i>	1921
<i>Bugula pacifica</i>	1905	<i>Petralia laccadivensis</i>	1921
<i>Bugula pugeti</i>	1905		
<i>Cellaria diffusa</i>	1905	<b>Subspecies of Ectoprocta</b>	
<i>Corynosporella spinosa</i>	1905	<i>Menipea occidentalis catalinensis</i>	1905
<i>Menipea pribilofi</i>	1905	<i>Retepora pacifica catalinensis</i>	1908
<i>Scrupocellaria diegensis</i>	1905	<i>Schizoporella dutertrei foliacea</i>	1921
<i>Stirparia californica</i>	1905		
<i>Stirparia ciliata</i>	1905	<b>Genera of Entoprocta</b>	
<i>Stirparia occidentalis</i>	1905	<i>Myosoma</i>	1900b
<i>Membranipora occultata</i>	1908	<b>Species of Entoprocta</b>	
<i>Mucronella californica</i>	1908	<i>Gonypodaria ramosa</i>	1900b
<i>Retepora pacifica</i>	1908	<i>Myosoma spinosa</i>	1900b
<i>Schizoporella oligopus</i>	1908		
<i>Smittina californiensis</i>	1908		
<i>Smittina collifera</i>	1908		

**Appendix 3. Courses taught at Wellesley College by Alice Robertson**

Academic Year	Course Number	Course Title	Enrollment
1906-07	Zoology 1*	The Biology of Animals	95
	Zoology 10	Animal Physiology	7
1907-08	Zoology 1*	The Biology of Animals	110
	Zoology 10	Animal Physiology	8
1908-09	Zoology 1*	The Biology of Animals	97
	Zoology 5**	Advanced Invertebrate Zoology	5
	Zoology 10	Animal Physiology	8
1909-10	Zoology 1*	The Biology of Animals	113
	Zoology 10	Animal Physiology	17
1910-11	Zoology 1*	The Biology of Animals	98
	Zoology 5**	Advanced Invertebrate Zoology	7
	Zoology 10	Animal Physiology	8
1911-12	Zoology 1*	The Biology of Animals	148
	Zoology 6	Philosophical Zoology	8
	Zoology 10***	Physiology	18
1912-13	Zoology 1*	The Biology of Animals	156
	Zoology 5****	Natural History of Animals	10
	Zoology 10	Physiology	10
1913-14	Zoology 6	Philosophical Zoology	17
	Zoology 10	Physiology	7
1914-15	Zoology 6	Philosophical Zoology	10
	Zoology 10	Physiology	10
1915-16	Zoology 1*	The Biology of Animals	127
	Zoology 5	Natural History of Animals	5
	Zoology 10	Physiology	7
1916-17	Zoology 1*	The Biology of Animals	126
	Zoology 6	Philosophical Zoology	5
	Zoology 10	Physiology	6
1917-18	Zoology 1*	The Biology of Animals	146
	Zoology 10	Physiology	10
1918-19	Robertson is on sabbatical leave during this academic year and resigns because of ill health		

\* Course was offered in team taught format.

\*\* One semester course. All others full-year courses.

\*\*\* Course changed name and description. Now focused on human physiology.

\*\*\*\* Course changed name, but retained same description as Advanced Invertebrate Zoology

Data compiled from Wellesley College Annual Reports (Wellesley College, Wellesley MA, 1906–1919).

**Appendix 4. Robertson specimens in collections of the California Academy of Sciences (data provided 23 April 2007 by Robert Van Syoc, Ph.D., Senior Collection Manager, Department of Invertebrate Zoology and Geology, California Academy of Sciences)**

Cat. No.	Name	Locality	Date; Collector if known
21951	<i>Bugula californica</i>	Dillon Beach, California	Aug 1898
21952	<i>B. californica</i>	Pacific Grove, California	23 Dec 1897
21953	<i>B. californica</i>	Dillon Beach, California	25 Nov 1898
21955	<i>B. curvirostrata</i>	Santa Catalina Island, California	20 June 1901; Scripps Inst. Oc.
21957	<i>B. laxa</i>	Puget Sound, Washington	Jul 1898
21956	<i>B. longirostrata</i>	La Jolla, California	31 Jul 1901; Scripps Inst. Oc.
21947	<i>B. pacifica</i>	Prince William Sound, Orca, Alaska	26 Jun 1899; Ritter/Harriman Expd.
21948	<i>B. pacifica</i>	Puget Sound, Washington	Jul 1897
21954	<i>B. pugeti</i>	Alexander Archipelago, Alaska Ritter/Harriman Expd. [?]	15 Jun 1899
87198	<i>B. purpurotincta</i>	Sitka, Yakutat, Gulf of Alaska, Alaska	21-22 Jun 1899; Ritter/Harriman Expd. [?]
87198	<i>B. purpurotincta</i>	Yakutat, Gulf of Alaska, Alaska	21-22 Jun 1899; Ritter/Harriman Expd. [?]
21964	<i>B. californica</i>	Ballast Point, San Diego, California	29 Jun 1903
21958	<i>Stirparia ciliata</i>	Dillon Beach, California	no date
21958	<i>S. ciliata</i>	Lime Point, San Francisco Bay, California	1894
21960	<i>S. ciliata</i>	Fort Point, San Francisco Bay, California	Nov 1900; O'Donoghue
21961	<i>S. ciliata</i>	Land's End, San Francisco Bay, California	no date; O'Donoghue
21962	<i>S. occidentalis</i>	Channel Rocks, Puget Sound, Washington	1898?
21963	<i>S. occidentalis</i>	Santa Cruz Light House, Monterey Bay, California	19[?]; USFCS <i>Albatross</i>
21965	<i>Cellaria diffusa</i>	San Diego, California	1901; O'Donoghue?
21966	<i>C. diffusa</i>	San Diego, California	1901
21967	<i>C. diffusa</i>	Puget Sound, Washington	Jun 1896; O'Donoghue?
21968	<i>C. diffusa</i>	Puget Sound, Washington	Jun 1896; O'Donoghue?
18827	<i>Flustra lichenoides</i>	Puget Sound, Washington	1898
18828	<i>F. lichenoides</i>	Puget Sound, Washington	1898
21945	<i>Retepora pacifica catalinensis</i>	West of Santa Catalina Island, California	28 Jun 1901; Scripps Inst. Oc.
21946	<i>Menipea erecta</i>	Sitka, Alaska	15 Jun 1897
21949	<i>M. pribilofi</i>	Pribilof Islands, Bering Sea, Alaska	no date; David Starr Jordan
21950	<i>M. pribilofi</i>	Yukutat, Gulf of Alaska, Alaska	no date

### Appendix 5. Classification systems of Hincks and Robertson

ROBERTSON (1900, 1905, 1921)

Phylum: Molluscoidea, Milne-Edwards

Class: Bryozoa, Ehrenberg

Subclass: Ectoprocta, Nitsche

Order: Gymnolaemata, Allman

Suborder: Chilostomata or Cheilostomata Busk

Suborder: Cyclostomata, Busk

Suborder: Ctenostomata, Busk

Suborder: Phylactolaemata, Busk

HINCKS (1880)

Subkingdom: Mollusca

Branch: Acephala

Class: Bryozoa, Thompson

Subclass: Holobranchia, Lankester

Group a: Ectoprocta, Nitsche

Order: Gymnolaemata, Allman

Suborder I: Cheilostomata, Busk

Suborder II: Cyclostomata, Busk

Suborder III: Ctenostomata, Busk

Group b: Entoprocta, Nitsche

## Appendix 6. Annotated Bibliography for Alice Robertson

- “Robertson, Prof. Alice,” *American Men of Science: A Biographical Directory*, J.McK. Cattell ed., 2<sup>nd</sup> ed., Science Press, New York, 1910, 397.  
Includes birthplace, parents’ names, zoological employment and publications; address listed as Wellesley College, Wellesley, Massachusetts.
- “Robertson, Prof. Alice,” *American Men of Science: A Biographical Directory*, J.McK. Cattell ed., 3<sup>rd</sup> ed., Science Press, Garrison, New York, 1921, 579.  
Includes information from 2<sup>nd</sup> edition plus publication “Bryozoa of the Bay of Bengal”; address listed as 334 17<sup>th</sup> Ave., Seattle, Washington.
- “Funeral Service for Dr. Robertson,” newspaper clipping [no author, no source], 16 September 1922. William E. Ritter Papers, 1879-1944, Collection no. BANC MSS 71/3 c, Bancroft Library, University of California, Berkeley, California.  
*Includes details of memorial service, and identifies Robertson’s sister as Mrs. Sara S. Dewhurst of Seattle.*
- Hart, S.C., “In Memoriam,” *Wellesley College News*, 28 September 1922, 8.  
Remembrance of Robertson as a teacher, scholar and member of the Wellesley community.
- “Scientific Notes and News,” *Science* 56 (1449), 6 October 1922, 385.  
Brief notice of her death and summary of her scientific work.
- Thomas, H. G., “Dr. Alice Robertson – The Teacher,” *Wellesley Alumnae Quarterly* 7 (1), November 1922, 23.  
Memorial notice written by a former student, focusing on aspects of Robertson’s teaching, both in the classroom and the laboratory.
- “Proceedings of the American Society of Zoologists, Twentieth Session. Business meeting,” *Anatomical Record* 24 (6), 1923, 354.  
Memorial notice, appreciation of her work and character, no dates included. Immediately follows the memorial notice for Caroline Burling Thompson.
- “Robertson, Alice, zoologist,” *Who Was Who in America, A component volume of Who’s Who in American History. Vol. 1, 1897-1942*, Marquis, Chicago, 1943, 1041.  
Includes birthplace, parents’ names, summary of degrees and positions held. Home address listed as Seattle, Washington. Gives incorrect death date of 22 September 1922, no birth year.

Creese, M.R.S., "Museum Taxonomists to Morphologists and Embryologists," in *Ladies in the Laboratory? American and British Women in Science 1800-1900*, Scarecrow Press, Lanham, Maryland, 1998, 93.

Account of her zoological work and publications. Gives incorrect birth year of 1859 and incorrect death date of 22 September 1922.

Soule, D.F.. "North-Eastern Pacific Bryozoology and the American Bryozoologists," in Wyse Jackson, P.N. and Spencer Jones, M.E. (eds.) *Annals of Bryozoology: Aspects of the History of Research on Bryozoans*, International Bryozoology Association, Dublin, 2002, 258-289.

Account of her zoological work and publications. Gives incorrect birth year of 1859; includes mention of Robertson's specimens and their handling at California Academy of Sciences that is disputed by R. Van Syoc, Senior Collections Manager. Includes an unattributed photograph of Robertson identical to one held by the Bassler Photo Collection, Department of Paleobiology, Smithsonian Institution, Washington, D.C.

### ***Known images of Alice Robertson:***

1. Group photograph titled "Staff of the Marine Biological Association of San Diego in the Boathouse of the Hotel del Coronado: Front row, left to right: J.F. Bovard, Effie Rigden (Mrs. Michener), Alice Robertson, Calvin O. Esterly; Back row, left to right: Robert Day Williams, B.D. Billinghurst, William E. Ritter, Loye Holmes Miller, Charles A. Kofoid, Harry B. Torrey, May 6, 1904," photographer unknown, Tillie Genter Papers, 1901-1955, Scripps Institution of Oceanography Archives, University of California San Diego.
2. Photograph of Alice Robertson, undated, photographer unknown, Bassler Photo Collection, Department of Paleobiology, Smithsonian Institution, Washington, D.C.

### **Notes**

- 1 'A Good Man Gone', *Harrisburg Morning Call*, Harrisburg, Pennsylvania, 21 October 1890.
- 2 *Passenger Lists of Vessels Arriving at New York, 1820-1897*, National Archives Microfilm Publication M237, roll 39, list no. 522; Records of the U.S. Customs Service, Record Group 36; National Archives, Washington, D.C.
- 3 'Obituary: Rev. James Robertson', *Harrisburg Telegraph*, Harrisburg, Pennsylvania, 20 October 1890.
- 4 Birth date from text on grave stone, Harrisburg Cemetery, Harrisburg, Pennsylvania; country of origin from ship's passenger list (see Note 5).
- 5 *Passenger Lists of Vessels arriving at Philadelphia, Pennsylvania 1800-1882*. Micropublication M425. RG036. National Archives, Washington, DC.
- 6 'Robertson, Prof. Alice', *American Men of Science*, J. M. Catell (ed.), 2<sup>nd</sup> ed. (1910), 397.

- 7 United States of America, Bureau of the Census. *Twelfth Census of the United States, 1900*. National Archives and Records Administration, 1900. Census Place: Berkeley Ward 2, Alameda, California. Micropublication T623, roll 83, enumeration district 397. Also see in Appendix 6: Creese, 1998 and Soule, 2002.
- 8 United States of America, Bureau of the Census. *Seventh Census of the United States, 1850*. Washington, D.C.: National Archives and Records Administration, 1850. Census Place: Moyamensing Ward 2, Philadelphia, Pennsylvania. Micropublication 432, Roll 809, Page: 306; Image: 293.
- 9 Death Certificate of Alice Robertson, Office of Recorder, County of Alameda, Oakland, California.
- 10 Records of Harrisburg Cemetery, Harrisburg, Pennsylvania, Section S, James Robertson, Lot no. 66.
- 11 United States of America, Bureau of the Census. *Eighth Census of the United States, 1860*. Washington, D.C.: National Archives and Records Administration, 1860. Census Place: Harrisburg, Dauphin, Pennsylvania. Micropublication 653 roll 1104; Page: 645; Image: 37.
- 12 *Harrisburg Telegraph*, note 3.
- 13 United States of America, Bureau of the Census, Note 11.
- 14 Records of Harrisburg Cemetery, Note 10.
- 15 ‘Board of Control’, *Harrisburg Patriot*, Harrisburg, Pennsylvania, 26 July 1871. A report of the minutes of the school Board of Control, with plans for the 1871-72 school year.
- 16 ‘School Department: Schools and Teachers’, *Harrisburg City Directory*, Harrisburg, Pennsylvania (1872), 68.
- 17 *Harrisburg Telegraph*, 3 July 1878.
- 18 ‘School Department: Schools and Supervisory Principals’, *Harrisburg City Directory*, Harrisburg, Pennsylvania (1884), 39.
- 19 *Harrisburg City Directory*, Harrisburg, Pennsylvania (1887), on website <http://www.afrolumens.org/letters/070123.htm>, viewed 12 April 2007.
- 20 Calobe Jackson, Jr., personal communication, 30 April 2007.
- 21 Calobe Jackson, Jr. personal communication, 27 April 2007 and 31 May 2007.
- 22 United States of America, Bureau of the Census. *Tenth Census of the United States, 1880*. Washington, D.C.: National Archives and Records Administration, 1880. Census Place: Harrisburg, Dauphin, Pennsylvania. Micropublication T9, roll 1123, Family History Film: 1255123; Page: 264.4000; Enumeration District: 90; Image: 0533.
- 23 *Pennsylvania School Journal*, 30(10) (1882), 408.
- 24 Jonathan R. Stayer, Pennsylvania State Archives, personal communication, 24 August 2007.
- 25 Records of Harrisburg Cemetery, note 10.
- 26 *Harrisburg Telegraph*, note 3. The obituary lists the surviving children and their locations in 1890: “Mrs. William C. Kurtz, Harrisburg; Mrs. Rev. E. Dewhurst, of Volluntown [*sic*], Conn.; Miss Alice Robertson and Mrs. T.F. Evans, Harrisburg; Mrs. Clarence Dewhurst, Seattle; and Mr. John Dewhurst, well known in Harrisburg newspaper circles.” It is obvious that all of Alice’s sisters had married by that time. The 1900 census, ten years later, confirmed the married names and locations given: Alice’s oldest sister Elizabeth married William C. Kurtz ca. 1866, and resided in Harrisburg. The next sister, Ellen, married Rev. Eli Dewhurst ca. 1876 and resided in Voluntown, Connecticut with their son. Information on Margaret Robertson (Mrs.T.F.) Evans was not found. Sarah married Clarence Dewhurst ca. 1885 and resided in Seattle with their three children. John, a hotel-keeper, married Annie ca. 1884 and resided in

- Harrisburg, with their two children. The relationship found between Ellen's and Sarah's husbands was surprising. Rev. Eli Dewhurst, a Baptist minister born in England in 1827, was the father of Clarence Dewhurst, who was born in Maine in 1859 to Eli and his previous wife Diantha. The Dewhurst family, Eli, Diantha and their children Freddie (age 5) and Clarence (age 1), are recorded in the 1860 census in Pembroke, Maine. [United States of America, Bureau of the Census. *Eighth Census of the United States, 1860*. Washington, D.C.: National Archives and Records Administration, 1860. Census Place: Pembroke, Washington, Maine; Micropublication 653, Roll 455, Page 0, Image, 404.]
- 27 The American Association for the Advancement of Science published from 1898 into the 1930s an annual accounting of the number of Doctor of Philosophy degrees awarded by American colleges and universities. These lists were in early years broken down by school, discipline, name of awardee, and title of each dissertation. For 1902, this record showed that Ph.D. degrees in all fields were awarded by 27 reporting institutions to a total of 214 individuals. Within the broadly defined fields of science alone, 26 institutions awarded 104 degrees. The University of California (Berkeley) conferred one Ph.D. in 1902 in all fields combined. That degree was awarded to Alice Robertson. Seven women received the Ph.D. in a field of science that year. The six other women who received the doctorate degree in 1902 were: Katherine Elizabeth Dopp, education, The University of Chicago; Florence May Lyon, botany, The University of Chicago; Margaret Baxter MacDonald, chemistry, Bryn Mawr College; Carlotta Joaquina Maury, geology, Cornell University; Mary Jan Ross, zoology, Cornell University; Margaret Everitt Schallenberger, psychology, Cornell University ('Doctorates conferred by American Universities', *Science*, 16 (401) (1902), 361-366).
- 28 M. B. Ritter, *More Than Gold in California 1849-1933* (The Professional Press, Berkeley, California, 1933), 240, 255.
- 29 William E. Ritter, 'A Summer's Dredging on the Coast of Southern California', *Science*, 15(367) (1902), 55-65.
- 30 Francis B. Sumner, 'The Biological Laboratory of the Bureau of Fisheries at Woods Hole, Mass. Report of Work for the Summer of 1904', *Science* 21(537) (1905), 566-572.
- 31 J.M. Cattell (ed.), Note 6.
- 32 M. B. Ritter, Note 28, 204-206.
- 33 J.M. Cattell (ed.), Note 6.
- 34 A. Robertson to B. Wheeler, 28 February 1906. University of California (System). Office of the President. Records. Alphabetical Files 1885-1913. Collection no. CU-5, Series 1. Bancroft Library, University of California, Berkeley, California.
- 35 B. Wheeler to A. Robertson, 1 March 1906, University of California (System). Office of the President. Records. Alphabetical Files 1885-1913. Collection no. CU-5, Series 1. Bancroft Library, University of California, Berkeley, California.
- 36 *Wellesley College Calendar* 1906-07, Wellesley, Massachusetts, 21.
- 37 P.A. Palmieri, *In Adamless Eden* (Yale University Press, New Haven, 1995), 53-54.
- 38 R. Dow, 'The scientific work of Albert Pitts Morse', *Psyche*, 44(1-2) (1937), 1-11.
- 39 A.W. Wilcox, 'Locomotion in young colonies of *Pectinatella magnifica*', *Biological Bulletin*, 11(5) (1906), 245-252.
- 40 The first graduating class at Wellesley College in 1882 included two recipients of Master of Arts (M.A.) degrees in Greek. The last M.A. students graduated from Wellesley in 1979. The College now offers only the baccalaureate level degree. Source Glasscock, J., ed., *Wellesley College 1875-1975: A Century of Women*, Wellesley College, Wellesley, Massachusetts, 136-

- 137; also Ian Graham, personal communication, 7 September 2007.
- 41 A. Robertson to Carrie Prudence Winter Kofoid, 13 January 1907, Charles Atwood Kofoid Papers, Accession 2007-01, Box 7A, Scripps Institution of Oceanography Archives, University of California San Diego.
- 42 A. Robertson to Carrie Prudence Winter Kofoid, 5 March 1911, Charles Atwood Kofoid Papers, Accession 2007-01, Box 7A, Scripps Institution of Oceanography Archives, University of California San Diego.
- 43 *Kansas City Star* (Kansas City, Missouri), 3 March 1911, 4.
- 44 *Boston Daily Globe*, (Boston, Massachusetts) 31 January 1911, 20; *Miami Herald* (Miami, Florida) 5 February 1911, 8.
- 45 *Boston Daily Globe* (Boston, Massachusetts), 26 February 1911, 1.
- 46 *Philadelphia Inquirer* (Philadelphia, Pennsylvania), 26 February 1911, 1.
- 47 *Dallas Morning News* (Dallas, Texas), 5 March 1911, 39.
- 48 *Boston Daily Globe*, 2 March 1911, p. 10; *Wilkes-Barre Times* (Wilkes-Barre, Pennsylvania) 2 March 1911, p. 13; *San Jose Mercury News* (San Jose, California) 23 March 1911, p. 8.
- 49 *Wellesley College News*, vol. 10, no. 20, 8 March 1911, p. 1.
- 50 A. Robertson to W.E. Ritter, 27 September 1911. William E. Ritter Papers, 1879-1944, Collection no. BANC MSS71/3 c, Bancroft Library, University of California, Berkeley, California.
- 51 Department of Zoology Annual Report 1913-1914, in Department of Zoology, Wellesley College Archives, Wellesley Massachusetts.
- 52 unsigned letter 24 March 1914, in Letters to Alice van Vechten Brown, College Hall Fire, Wellesley College Archives, Wellesley, Massachusetts.
- 53 A.P. Hackett, *Wellesley, Part of the American Story* (E. P. Dutton, New York, 1949), 167-181.
- 54 'Scrapbook on College Hall' compiled by Edwin Monaghan, pg 72, in Buildings, Wellesley College Archives, Wellesley, Massachusetts.
- 55 A.P. Hackett, Note 53.
- 56 A.P. Hackett, Note 53.
- 57 The temporary Zoology building constructed in 1914 was, regrettably, still in use in 1928. Marian Hubbard raises awareness of the situation in her article "The Plight of our Zoology Department", *Wellesley Alumnae Magazine*, vol. 12, no. 3, February 1928. She contrasts decrepit conditions at "the Ark" in 1928 with remembrances of the spacious, well-equipped laboratories and museum space that the department had in College Hall. Extremes of heat and cold, overcrowding, and water damage from the roof and leaky radiators, are among the complaints of the faculty and students of that time. A new permanent home for the Department of Zoology was finally built in 1931: the zoology wing of Sage Hall, which is now incorporated within the College's Science Center. Source J. Glasscock, ed., *Wellesley College 1875-1975: A Century of Women*, Wellesley College, Wellesley, Massachusetts, 317.
- 58 F.B. Sumner, 'The Biological Laboratory of the Bureau of Fisheries at Woods Hole, Mass. Report of the Past Year's Work, and Announcement for the Coming Season,' *Science* 29(756) (1909), 983-987.
- 59 *Chicago Tribune* (Chicago, Illinois), 23 March 1914; *Philadelphia Inquirer* (Philadelphia, Pennsylvania) 23 March 1914, 7; *Terre Haute Star* (Terre Haute, Indiana), 23 March 1914.
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- 61 J. Carpine-Lancre, personal communication, 17 June 2007.

- 62 'An Elegy to College Hall, Wellesley' *Kansas City Star* (Kansas City, Missouri, 30 April 1914), 8.
- 63 *Boston Transcript* (Boston, Massachusetts), 23 March 1914. Robertson's colleagues suffered equally profound losses to their research. Professor Caroline Thompson lost the results of three years of work on marine organisms, which was never recovered or published. Professor Marian Hubbard had worked for six years on variation and heredity in beetles, having grown many generations of beetles in the laboratory. Hubbard was the only long-term faculty member who did not complete her Ph.D., likely because of the loss of these specimens, related notes, and the apparatus.
- 64 F.B. Sumner, note 58.
- 65 Robertson to Samuel Henshaw, 29 June 1909, Museum of Comparative Zoology Archives, Harvard University.
- 66 Department of Zoology Annual Report, 21 June 1919, in Department of Zoology, Wellesley College Archives, Wellesley Massachusetts.
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- 71 M.B. Ritter, note 28, 180-182.
- 72 Edward B. Lyke, personal communication, 2 May 2007.
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- 104 Albert Scott Foster (ca 1883-1932) was an amateur botanist in the Pacific Northwest with a particular interest in lichens and mosses. Though he did not publish on his collections, he gave them to authorities and institutions for proper scientific study and preservation (e.g., G. K. Merrill, "Lichen notes no. 5. Remarks on nomenclature and three new names", *The Bryologist* 11(3) (1908), 48-53; C. C. Haynes, "An enumeration of the Washington and Oregon Hepaticae collected by Mr. A. S. Foster, 1904-1909", *The Bryologist*, 12(4) (1909) 65-71; G. K. Merrill, "Lichen notes no. 14. Two new Cetraria forms and three new combinations", *The Bryologist* 13(2) (1910) 25-30; G. K. Merrill, 'New and interesting lichens from the State of Washington', *The Bryologist* 16(4) (1913) 56-59.). J. W. Thomson published with the aid of the Norman C. Fassett Memorial Fund of Madison, Wisconsin, *A catalogue of lichens of the State of Washington* for the Lichenological Field Trip of the XI International Botanical Congress, Seattle, WA 1960. The first page of this work cites as the principal collectors on the Olympic Peninsula as A.S. Foster, the mycologist, Alexander Smith, and H. A. Imshaug. Foster also came under the influence of Professor Theodore Christian Frye (1869-1962). Frye was for a time chairman of the Department of Botany at the University of Washington and a close colleague of Trevor Kincaid, his counterpart in the Department of Zoology. Working together, these two men were instrumental in establishing the university's Friday Harbor Laboratories on San Juan Island in Puget Sound (G. E. Howard, 'Theodore Christian "Frye (1869-1962), *The Bryologist*, 66(3) (1963) 124-136). Foster also had marine interests and in 1913 accompanied Frye on an expedition to assess kelp resources in southern Alaska as part of the United States Bureau of Soils study of potash from kelp to be used in gunpowder as German supplies were being withdrawn from the American market at this time. (Foster to Merrill 7/17/13 Farlow Library and Herbarium, Harvard University; USDA Report No. 100. Contribution from the Bureau of Soils, 'Potash from Kelp', 1915 122 pp 40 plates). Foster made a series of botanical collections, including 33 algal specimens, that he donated to the Smithsonian's Department of Botany (see electronic catalogue of the Department of Botany).
- 105 Harim Chia, personal communication, 7/25/07.
- 106 Herbert Parlin Johnson (b. 23 September 1864) received the A.B. (1889) and A.M. (1900) degrees from Harvard University and the Ph.D. from the University of Chicago (1894). From 1894 to 1900 he was an assistant professor of zoology at University of California at Berkeley. He then departed Berkeley and focused on medical microbiology for the duration of his career [*American Men of Science*, 4<sup>th</sup> ed. (1927), 508].
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- 108 H. Johnson to W. Woodworth, 21 June 1899, Museum of Comparative Zoology Archives, Harvard University.
- 109 In his paper 'The Polychaeta of the Puget Sound Region', *Proceedings of the Boston Society of Natural History* 29 (1901), 381-437, Johnson acknowledges Robertson and Master John Dewhurst of Seattle for collecting the specimens. John Dewhurst was Alice's nephew. He was the oldest child of Alice's sister Sarah, born in July 1885 [1900 census]. Thus, he would have been 14 years old in 1899 when the collections were made, old enough to enjoy collecting and be useful company on outings with his aunt.
- 110 Gifts: card file, 1914, Department of Zoology, Wellesley College Archives, Wellesley,

Massachusetts.

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