CHAPTER 5

THE PENIKESE OF THE PACIFIC

For David Starr Jordan, the Hopkins Seaside Laboratory provided the opportunity to replicate those two impressionable summers he had experienced attending the Anderson School of Natural History on Penikese Island. Louis Agassiz had purposely chosen instructors from seminaries, normal schools, and small colleges to attend the Anderson School of Natural History, who themselves, at their own institutions, were training young people to become teachers. In a similar manner, during the first twenty-five years of its existence, the Hopkins Seaside Laboratory opened its doors to these instructors; allowing them to enroll in the regular courses offered during the summer. Those instructors and students, who were afforded the opportunity to take part in the regular summer courses, came from a variety of institutions, of which included:

**High School Students** from Belmont, Pacific Grove, Redwood City, Santa Paula, San Jose and Palo Alto, California.

**Preparatory School Students** from Castilleja Hall, Harker School and Manzanita Hall in Palo Alto, and Washburn School in San Jose, California.

**Normal School Students** from California State Normal School, San Jose, California.

**Colleges and University Students** from Mills College and the University of California, Berkeley.

**Public School Teachers** from Eureka, Fortuna, Niles, Pacific Grove, Palo Alto, San Francisco, San Rafael, Santa Clara, Santa Rosa, Stockton, Yolo County, California and as far away as West Superior, Wisconsin.
High School Teachers from Hanford HS, Oakland HS, Santa Ana HS, San Bernardino HS, Watsonville HS, Woodland HS and as far away as a high school in Lincoln, Nebraska.

Principals and Superintendents: the Principal of Schools, Mountain View, the Principal of Grammar School, San Jose, the Superintendent of Public Schools, Iron County, Utah.

Professors and Instructors of Normal Schools: from the State Normal School of Los Angeles, CA the State Normal School of San Jose, CA and a State Normal School in Mansfield, Pennsylvania

Several Founders of the Pacific Coast Assembly Chautauqua Literary and Scientific Circle included Charles Lewis Anderson who reserved a private room during several summers (1896 and 1897), while Josiah Keep (1895) and Lucy M. Washburn (1892 and 1895) enrolled in regular courses.

Seminary, Preparatory and Private School Teachers: Lucy M. Washburn from Washburn Preparatory, Mrs. S. K. White, Teacher in Annie Wright Seminary, Tacoma, Washington, a Teacher from a Private School, Montecito, a Teacher of Natural Science, Waitsburg Academy, Waitsburg, Wisconsin, and a Teacher from Private School, Corning, California.

College and University Professors: Napa College, University of the Pacific, Throop Polytechnic Institute in Pasadena, Brigham Young College in Logan, Utah. University of Kansas, Pomona College, University of Utah, Latter Day Saints University, Salt Lake City, Utah, and a Teacher in Kobe College for Women, Kobe, Japan.

And so it was that the doors of Hopkins Seaside Laboratory were open to high school students; the teachers, principals, and superintendents of publics schools, and the teachers from seminary, preparatory, normal and private schools, for participation in the six-week courses of scientific instructions that took place each summer. Beyond the education of these individuals, were the instruction of undergraduate and graduates.
students of Stanford University, and the advancement of scientific understanding through the research efforts of the faculty and students of Stanford and visiting scientists from throughout the U.S. and around the world.
OFFERING STUDENTS ADVANCED INSTRUCTION IN ZOOLOGY

According to David Starr Jordan, Hopkins Seaside Laboratory was planned along the lines of Anton Dohrn's famous zoological station, the Stazione Zoologica in Naples, Italy. Having considered Charles Darwin’s idea that embryonic stages of development would provide the scientific evidence for evolutionary relationships, Dohrn positioned his seaside laboratory along the Mediterranean Sea; a location that provided easy access to an abundance of larval and embryonic forms of marine invertebrates and vertebrates. At this time in the history of science, comparative embryology was at the cornerstone of morphological evolutionary studies, and centered on Ernst Haeckel's recapitulation theory, known as ontogeny recapitulates phylogeny.

Comparative embryology became very much a part of an effort to develop and expand scientific research associated with the Darwinian theory of evolution, with studies in embryology and morphology becoming a major focus for zoologists during the last decade of the 19th century and well into the 20th century. As such, seaside laboratory studies using the most advanced microscopes and physiological equipment became the norm, with Stazione Zoologica in Naples leading the way, followed by the Marine Biological Laboratory in Woods Hole, Massachusetts and Hopkins Seaside Laboratory in Pacific Grove, California.

When Hopkins Seaside Laboratory opened in 1892, the summer course of instruction offered a class in zoology and botany. Stanford Bulletin for Hopkins Seaside Laboratory of 1892 provided the following description of the zoology class.

The elementary course in Zoology will consist of the study of the structure, physiology and life histories of some of the more common marine animals, such as sea anemones, jelly-fishes, star-fishes, sea-urchins, sea-cucumbers, worms, clams, abalones, squids, crabs and fishes. The course will include instructions in the use of the microscope.

The following year (1893) special instruction in morphology, physiology, embryology and histology were offered to advanced students and visiting scientists. Other than the Marine Biological Laboratory in Woods Hole, Massachusetts, the Hopkins Seaside Laboratory was the only facility in America offering course instruction and
research opportunities in advanced zoology associated with the study of marine organisms. As with Anton Dohrn, it would be the visionary leadership positioned at Hopkins Seaside Laboratory that recognized that invertebrate marine organisms provided a valuable alternative to the research associated with advanced zoology. Such foresight can be attributed to Oliver Peeble Jenkins (1892) in a statement that appeared in an article about Hopkins Seaside Laboratory "There is no field in science more inviting nor more promising of large results than those pertaining to the morphology and physiology of marine forms. The time has certainly arrived when those among us with scientific inclination and ambition can turn their attention with profit to these inviting fields."\(^5\)

OP Jenkins comment reflects the fact that in the latter half of the nineteenth century, research in zoology was progressing beyond observational studies. This advancement in scientific research was accompanied by the recognition that marine organisms offered unique advantages for the investigation of fundamental questions in biology, especially in the areas of comparative zoology and morphology. This understanding allowed for the advancement of zoology to be furthered by the research conducted at the Marine Biological Laboratory in Woods Hole, Massachusetts and the Hopkins Seaside Laboratory of Pacific Grove, California. These two seaside laboratories, positioned on opposite coasts of continental U.S., enabled a community of American biologist and visiting scientists from around the world, to gather each summer, and share their latest scientific ideas and research techniques. Besides providing a common meeting space for researchers, these earliest of seaside laboratories provided opportunities to train the next generation of American biologists, whom would themselves make significant contributions and advancements in the areas of biological research, education, and conservation.\(^6\)

\(^5\) Jenkins, O. P. (1892). "There is no field in science more inviting nor more promising of large results than those pertaining to the morphology and physiology of marine forms. The time has certainly arrived when those among us with scientific inclination and ambition can turn their attention with profit to these inviting fields."

\(^6\) The Marine Biological Laboratory and Hopkins Seaside Laboratory were among the earliest seaside laboratories in the U.S., established in the latter half of the nineteenth century.
REGULAR SUMMER SESSIONS FOR TWENTY-THREE YEARS

The Hopkins Seaside Laboratory conducted regular sessions for twenty-three of the twenty-five years, as courses of instruction were not offered at the facility during the summers of 1903 and 1904. Typically, the Laboratory's summer sessions began the last week of May, or first week of June, with the regular course of instruction continuing for five or six weeks. Investigators and students working without instruction were allowed to continue their work through the summer. During those twenty-three years of summer sessions, the Hopkins Seaside Laboratory conducted regular courses of instruction of Botany, Physiology and Zoology. Other courses offered at the Hopkins Seaside Laboratory during those years of instruction at Point Aulon included: A Course in the Physiology of Invertebrates (1899), A Course in General Cryptogramic Botany (1898), A Course in Embryology (1898), General Embryology (1911), Advanced Course in Zoology, A Course in Comparative Morphology and Histology of the Nervous System and Sense Organs (1898), A Course in the Physiology of Invertebrates (1899), Advanced Course in Zoology (1899). Advanced Course on the Structure and Physiology of the Algae (1901), General Ornithology (1901); Plant Cytology and Microtechnique (1902), Vertebrate Zoology (1906); Structure of the Nervous System and Sense Organs of Marine Vertebrates (1906); Special Algae (1909), Research in Histology and Cytology (1910).

During this twenty-three year period, several of these courses were repeated multiple times. And eventually, during last summer of instruction at the Hopkins Seaside Laboratory, the term ecology would show up as part of the course lexicon, as the future director of Hopkins Marine Station, Walter K. Fisher offered a class titled, "Invertebrate Zoology and Ecology" (1917).
Anton Julius Carlson. Hopkins Seaside Laboratory, Stanford University, Pacific Grove, California. Photograph Courtesy of Stanford University Archives.
NOTABLE STUDENTS

Among the names of those who attended sessions at the Hopkins Seaside Laboratory, one finds an extended list of notable Stanford graduates who spent one or more summers of their academic experience attending the teaching and research facility. Several of these notable students would become pioneers in experimental biology, others leaders in the areas of education and conservation. Below presents the beginnings of a list of the many notable students who spent a summer or more at the seaside laboratory.

Anton Julius Carlson - (Stanford, Ph. D. Physiology, 1903) [Student at Hopkins Seaside Laboratory in 1900, occupied investigator room 1901, 1902 and 1903]. Professor of Physiology and Chairman of the Physiology Department at the University of Chicago from 1916 until 1940.

Bertha L. Chapman (Mrs. V. M. Cady) - (Stanford, A. B. English, 1895) [Student at Hopkins Seaside Laboratory, 1897]. Leading Instructor of Nature Study and Lecturer on Hygiene.

Rheinhart P. Cowles - (Stanford, A. B. Chemistry, 1899) [Student at Hopkins Seaside Laboratory 1897, 1898 and laboratory assistant 1899]. Professor of Zoology at John Hopkins University, Master thesis advisor and mentor to Rachael Carson. Quoting from the book Rachel Carson: Author/Ecologist by E. A. Tremblay (2003): It was he [Rheinhart P. Cowles] who helped her figure out how to go about doing her research. In her last year at PCW [Pennsylvania College for Women], with no one to teach her advanced laboratory techniques, she had not been able to learn some of the skills she now felt she needed, but Cowles took her under his wing.... When Carson arrived at Johns Hopkins, she learned to her delight that her faculty advisor would be none other than Reinhart P. Cowles, the scientist who had been her mentor at Woods Hole. With his blessing, she set right to work, continuing her laboratory explorations of reptilian nervous systems—which she hoped would prove a fruitful subject for the graduate thesis she would have to write to earn her degree.... Professor Cowles helped her in another way by
suggesting a new topic for her master’s thesis, one that would be easier and quicker to complete, and more likely to yield useful results than had her study of reptiles. This time she would be investigating the urinary systems offish—actually trying to discern the functions of a kidney-like organ in certain species. To her relief, the experiments went well and led to an essay that was praised by academic referees—professors who judge original academic work. At the end of 1932, at long last, she received her master’s degree.  

**Bradley Moore Davis** - (Stanford, A. B. Botany, 1892) [Student at Hopkins Seaside Laboratory in 1892, occupied investigators room in 1895]. Assistant Professor of Plant Morphology at the University of Chicago. BM Davis also held a position at the Marine Biological Laboratory, Woods Hole, Massachusetts, where he was Director of the Department of Botany and at the Bureau of Fisheries.

**Charles Wilson Greene** - (Stanford A. B., Physiology, 1892; A. M., Physiology, 1893) [Laboratory assistant of Physiology during the summer session 1892, Instructor of Physiology 1893, 1894, 1895, 1896, 1898, 1899, 1900, occupied investigators room in 1902, 1906 and 1911]. Professor of Physiology and Pharmacology at the University of Missouri where he reorganized the Physiological Department into a center for research and teaching and set up the first laboratory of experimental pharmacology in the Mississippi Valley.

**Joseph Grinnell** - (Stanford, A. M., Zoology, 1901; Ph. D., Zoology, 1913) [Laboratory assistant during the summer session of 1900, Instructor 1901 and 1902]. Served as the first Director of the Museum of Vertebrate Zoology at the University of California, Berkeley from the museum's inception in 1908 until his death in 1939.

**Agnes E. Howe** - (Stanford, A. B., Economics, 1897) [Student at Hopkins Seaside Laboratory 1894 and 1895]. Miss Agnes E. Howe began her teaching career of fifty-four years in the state of Iowa at the age of 15. In 1885, she came to California's Ojai Valley, where she earned $60 a month, as an instructor to sixty pupils in an eighth-grade school.
Upon leaving Ojai in 1889, she instructed in Ventura, then entered and completed Stanford University. In 1897, she next joined the faculty at California State University of San Jose, where she taught history, economics, and civics for more than 21 years. In 1910, she was elected the first woman to serve as President of the California Teachers Association, and later served as the Superintendent of Schools of Santa Clara County from 1919-1923.

**Adelaide Lowry Pollock** - (Stanford, A. B., Physiology, 1901) [Student at Hopkins Seaside Laboratory in 1892, 1894, 1895, 1897, 1899, 1900, 1901]. Graduated with Phi Beta Kappa honors from Stanford and later earned an M. A. (Master of Arts) from the University of Washington. In 1864, Adelaide Pollock’s family had brought her as a four-year-old by wagon train to Oregon from Cedar Falls, Iowa. She completed courses at San Jose Normal School in 1888, taught briefly in Seattle, Washington, and in 1895 broke new ground in Stockton, California, as its first woman principal. She retired from the Seattle district on her return from war service in France with the Red Cross but continued to influence her former colleagues and their younger successors. Adelaide Pollock, who traced ancestors to the American Revolution, embodied the white Anglo-Saxon Protestant values that stamped the Seattle school system and its corps of principals before World War II.

**Norman B. Scofield** - (Stanford, A. B., Zoology, 1895, A. M. Zoology, 1897) [Student at Hopkins Seaside Laboratory in 1893 and 1894]. Mr. Scofield received his academic training in zoology at Stanford University and was a member of that University’s first graduating class in 1895. For 42 years, Norman Scofield was director of the California Department of Marine Fisheries Program (i.e. Director of the California Bureau of Commercial Fisheries of State Division of Fish and Game). The Memoriam published in the Bulletin for California Fish and Game for NB Scofield stated: *Through his foresight and effort, the California Department of Fish and Game's Marine Resources program was established. Especially noteworthy was his leadership in setting up a catch statistics system for the state's fisheries, upon which the conservation program is based and on*
which similar systems throughout the world have been modeled. According to WK Fisher: With the aid of Mr. N. B. Scofield of the State Fish and Game Commission a bill was introduced at the last meeting of the Legislature to create a marine-life refuge of the Station point and 1,000 feet seawards. This bill became a law August 14, 1931. The reservation created is known as the Hopkins Marine Life Refuge and is intended to conserve and protect the shore and shallow-water life which has suffered greatly from depredation during the past ten years.

Alvin W. Seale - (Stanford, A. B., Zoology, 1905) [Attended Hopkins Seaside Laboratory Summer Session in 1894 and 1905]. As a respected ichthyologist and world authority on the fishes of Polynesia, Alvin Seale was recruited by Barton W. Evermann of the California Academy of Sciences to assist in the planning of the Steinhart Aquarium being built in Golden Gate Park. When it opened in 1923, he was appointed Superintendent, and held that post until his final retirement in 1941, at the age of 70.

Charles D. Snyder - (Stanford, A. B. Physiology, 1896) [Attended Hopkins Seaside Laboratory Summer Session in 1896]. Professor of Experimental Physiology at Johns Hopkins University.

Nettie Maria Stevens - (Stanford, A. B., Physiology 1899; A. M., Physiology, 1900) [Attended Hopkins Seaside Laboratory Summer Session in 1897, 1898 as a student, Occupied Investigators Room 1899, 1900, 1901, 1911]. Associate in Experimental Morphology at Bryn Mawr College, one of the first researchers to describe the chromosomal basis of sex.
Clara Stoltenberg - (Stanford, A. B., Physiology, 1896; A. M., Physiology, 1897) [Miss Stoltenberg took part in seven of the twenty-three years of regular sessions of the Hopkins Seaside Laboratory; attending as a Stanford student in the summer of 1894; in the position of Assistant Instructor during the summer of 1896; occupying an investigators room during the summer of 1899 and in the position of Instructor during the summers of 1906, 1907 and 1908]. Professor of Anatomy at Stanford University; one of only two women to attain the rank of Professor during Stanford's first four decades.


Ray Lyman Wilbur - (Stanford, A. B., Physiology, 1896, A.M., Physiology, 1897; M.D. Cooper Medical College, 1899) [Attended Hopkins Seaside Laboratory Summer Session in 1895 and 1896]. Third President of Stanford University, Secretary of the Interior during the Herbert Hoover administration. At Stanford, 1894-1897, 1900-1903, and 1909-1949. President of the University, 1916-1943, Chancellor of the University, 1943-1949.

Margaret Wilhelmina Wythe - (University of California, Berkeley, M.S. 1923) [Attended Seaside Laboratory Summer Sessions of 1893, 1894, and 1898]. In 1912, Margaret Wythe became the assistant to Joseph Grinnell as curator of birds at the Museum of Vertebrate Zoology at the University of California, Berkeley earning $0.35 per hour. In 1923, she received her Master's degree and in 1925 was promoted to Assistant Curator of Birds. One of the more famous books published by Grinnell and Margaret W. Wythe was "Directory of the Bird-Life of the San Francisco Bay Region" in 1927.
VISITING SCIENTISTS

Besides the students who took part in regular summer course work in biology, a significant amount of scientific research was conducted by members of Stanford University, and visiting scientists from other institutions, who reserved private investigator rooms. Among the latter were Bashford Dean and William K. Gregory both from Columbia, Wesley R. Coe from Yale University, Ida H. Hyde of the University of Kansas, Howard Ayres, Director of Lake Laboratory, Milwaukee, Wisconsin, Franz Doflein of Freiberg, Germany, Jacques Loeb and Charles Manning Child, Assistant Professor of Zoology, both from the University of Chicago, and Cornelia M. Clapp, Professor of Zoology, Mt. Holyoke College. Presented in the appendix of this book is a list of Stanford students, faculty and visiting scientists who made use of the investigator rooms through the years.

LIBRARY AND PUBLICATIONS

There are several references to the existence of a library room at the Hopkins Seaside Laboratory including the Stanford University Annual Report (1892), (Jenkins, 1893), (Davis, 1895), Sanborn Map (1897), (MacFarland, 1902), and Sanborn Map (1914). Dr. Howard Ayers who visited the Seaside Laboratory in 1892 mentioned the availability of library: Mr. Hopkins has not been unmindful of the library which is a fundamental need of all research work, for he proposes to make and keep it the most complete collection of biological literature in connection with any biological laboratory in this country. Besides there being space available for a library room at the Seaside Laboratory, Timothy Hopkins provided funds for the publication of research efforts conducted by the investigators titled "The Hopkins Laboratory Contributions to Biology" which allowed for thirty-two volumes to be published. Beyond the education of those who attended the six-week summer session, there was the aforementioned scientific research conducted, and for the investigators of science, there was, at least on a minimal scale, a need for equipment.
THE EQUIPMENT AVAILABLE FOR USE

In the early days of the first seaside laboratories, practically the only equipment that was necessary was a place to sleep and a building in which to work. Those first days of the early seaside laboratories was a period when general biological observations and field trips were the primary activities of the students and biologists, for whom the facilities were established. A little glassware and a microscope was nearly all that was required, even for the most technical investigative science. For a long time it was quite easy for the biologist to bring along with them the necessary equipment required for their summer research, and these items could be set up in a very minimal amount of time. 19

Within the Stanford Annual Report of 1893 was presented a brief description of the equipment available for use to students attending Hopkins Seaside Laboratory: *Each student will be furnished with a good compound microscope. There is a good supply of reagents and supplies for microscopical work—dissecting microscopes, imbedding apparatus, and glassware. Apparatus for work in experimental physiology is also provided. While there is a good supply of microscopes, and a fair supply of excellent microtomes, investigators who wish to have exclusive use of a microtome, or of immersion or higher power lenses, should bring such apparatus with them.* 20
THE WATER GLASS

According to Bashford Dean, there was also available for use a unique instrument that provided an individual viewing access to Monterey Bay’s subtidal communities. “As a convenient means of collecting in the shallow rocky bays a water-glass has been found of great service, especially in securing conspicuous forms such as echinoderms and holothurians, and has to a certain degree served as a substitute for diving apparatus, which here, might well prove of the greatest value.”21 The water glass, mentioned by Bashford Dean, was a simple piece of research equipment commonly found at many of the early seaside laboratories. The usefulness of the water glass was described by Charles Cleveland Nutting in his Narrative of Bahama Expedition (1896):

*With the aid of the "water-glass." which is nothing more nor less than a glass-bottomed bucket, every detail of the sub-marine scene could be discerned almost as clearly as if one were looking into air rather than water, so exquisitely transparent is the sea around these islands. The bottom of the water-glass is sunk just a little beneath the surface, the bucket being held right side up. All the ripples are thus destroyed, with their attendant confusing reflections, and every object is as sharply defined as in the upper air. The scene thus revealed is one of such surpassing beauty that a poet, rather than a naturalist, should undertake its description.*22
Dimensions 37.4 × 53.4 cm (14.7 × 21 in)  
Gift of Dorothy A., John A., Jr., and Christopher Holabird in memory of William and Mary Holabird. Photograph courtesy of The Art Institute of Chicago.

Winslow Homer's watercolor *The Water Fan, presents* a young black man employing a water glass (also referred to as a "water telescope" or “sponge glass”) to better his view of the coral reef that lay below the surface.