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First Women Botanists at Berkeley

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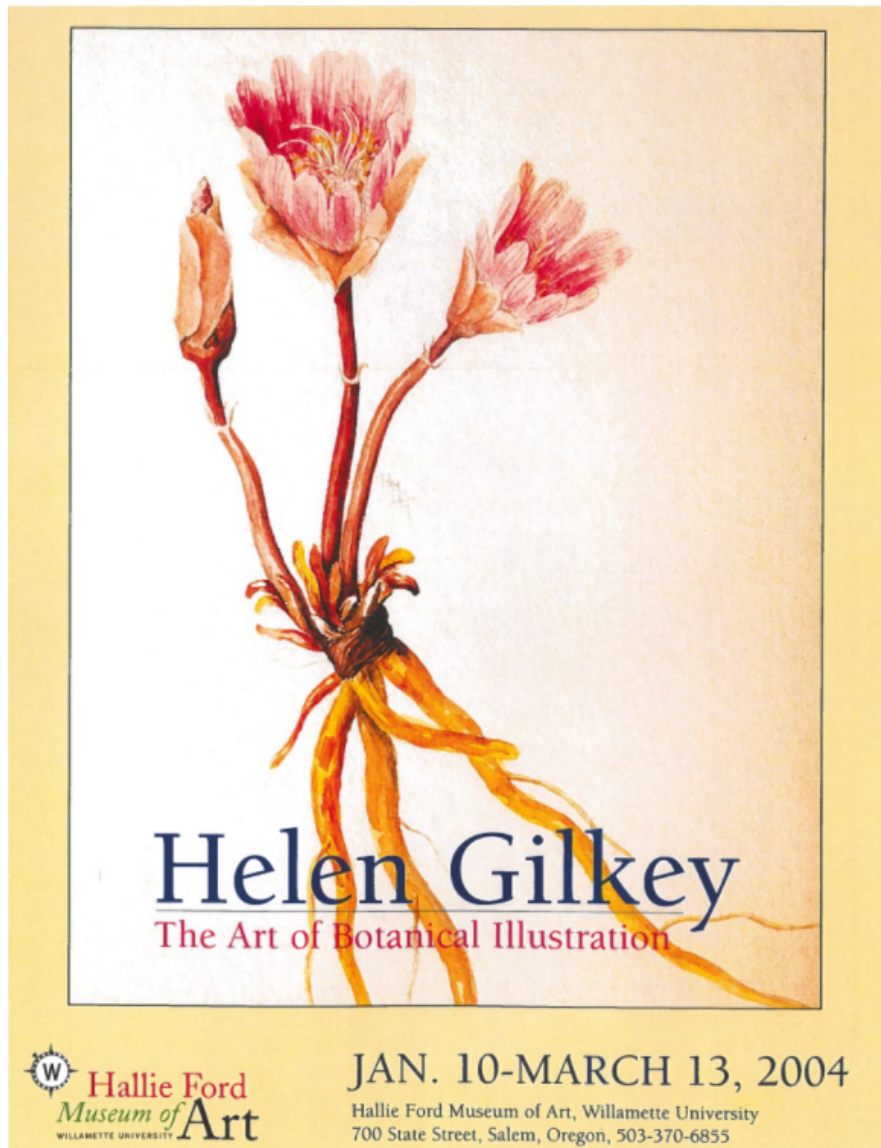
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First Women Botanists at Berkeley

By Sheila M. Humphreys



Credit: 2004 Hallie Ford Museum of Art, Willamette University

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Women Botany PhD Graduates and several associated with UC Berkeley

PhD	Name	Department	Undergrad Institution	Occupation
MD	Mary Katherine Layne Curran (Brandege)			Botanist, researcher, herbarium curator at CA Academy of Sciences and UCB Herbarium
	Jeanne C. Carr		No degree	Educator, botanist, writer
	Katherine Olivia Sessions	Chemistry	UCB 1881	Horticulturalist, educator
	Elizabeth Hight Smith, MS UMass 1905	Plant physiology	Smith College	Faculty, UCB, plant physiology
1915	Helen Margaret Gilkey	Botany	Oregon Agric. College	Curator/professor of botany, Oregon State
1918	Annie May Hurd (Karrer)	Botany	Univ. of Washington	Researcher, United States Department of Agriculture (USDA)
1921	Alice Maria Ottley	Botany	Cornell Univ.	Professor, Wellesley / Director, Herbarium
1923	Dolly Cora Lutjeharms (Hagan)	Botany	Univ. of Nebraska	Research at Univ. of Utah, Hawaii, New York
1926	Margaret Esther Myers	Botany	Univ. of Washington	Died in 1929; appointed at Riverside Junior College
1929	Irma Eleanor Schmidt (Webber)	Botany	UCB	Research, author of children's books
	Ethel Crum	Botany	Univ. of Illinois	UCB Herbarium
1930	Priscilla Avery	Botany	UCB 1926	Research, UC Botanical Garden
1932	Katherine Esau	Botany	Agricultural College of Berlin	Professor of Botany, UC Davis
1932	Lucile Roush (Mason)	Botany	Stanford Univ.	Instructor of biology, Mills College
	Annetta Carter	Botany	UCB 1930 MS, UCB 1932	Principal botanist, UCB Herbarium, collector
1936	Marion Stilwell (Cave)	Botany	Univ. of Colorado	Research, UC Botanical Garden
1936	Mary Leolin Bowerman	Botany	UCB	UCB Herbarium, Mount Diablo botanical research
1937	Elizabeth U. McCracken	Botany	Wellesley	Kansas State University
1939	Esther Parsons Perry	Soil Science	UCB	UCB Soil Survey Lab
	Ynés Mexía	Botany	no degree	Collector, classifier
1940	Helen Katherine Meyers (Sharsmith)	Botany	UCB 1927	UCB Herbarium

1950	Isabella Aiona (Abbott)	Botany	Univ. of Hawaii	Professor, Stanford and Univ. of Hawaii, Manoa
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150 Years of Women at Berkeley

During 2020–2021, the campus celebrated 150 years of women at the University of California, Berkeley, since its founding in 1868, in what is known as the 150W History Project. In conjunction with this celebration, I present here some of the remarkable women who studied and taught botany in the early decades at UC Berkeley. Explorers, collectors, teachers, curators, researchers, and committed conservationists, these extraordinary women were well known in their time but have largely disappeared from botanical history. These brief profiles of early women botanists may inspire others to look more deeply into their scientific contributions, as well as those of women who are not included.

The College of Agriculture and the Department of Botany at Berkeley

The areas of botany and agriculture were intertwined from the start at Berkeley. Joseph LeConte, a founding faculty member, was professor of geology, natural history, and botany, and taught the first botany class in 1869.¹ On his arrival, LeConte announced that he would begin his responsibility for natural science by teaching botany: “The course of lectures in this Department [i.e., geology and natural history] will commence in this class with Botany. In this first term Structural Botany is taken up, and in the second term the Physiology of Vegetable Growth and Reproduction, and the principles of classification of plants. The course is fully illustrated by the use of the microscope.” Students learned from renowned Harvard botanist Asa Gray’s classic text *Structural and Systematic Botany*; thus, the botanical authority of the Eastern botanists was asserted early on.



Botany Building, 1898.
Credit: Department of Botany, UC Berkeley

The College of Agriculture was the first school to be established, mandated by the State Legislature to offer practical education to help California farmers and educate their sons.² Departments created in the College of Agriculture, such as the Department of Entomology and Parasitology (1891), were oriented to improving crops. The Department of Plant Pathology (1904) was formed partly in response to farmers’ distress over an outbreak of asparagus rust. Further, the College of Agriculture was to establish “a system of moderate manual labor...having for its object practical education in agriculture, landscape gardening, the health of the students, and to afford them to defray a portion of the expenses of their education.” In 1875 The College of Agriculture’s first dean, Eugene Hilgard, began teaching botany, succeeding Joseph LeConte.

¹ A former officer in the Confederate army, LeConte practiced medicine before taking a degree at Harvard in geology under the eminent naturalist Louis Agassiz. LeConte held teaching posts at Franklin College and Southern Carolina College before starting his distinguished career at Berkeley.

² The Organic Act stipulated that “The College of Agriculture shall first be established...” Quoted in Vernon Stadtman, *The University of California 1868-1968* (McGraw-Hill: 1970), 154.

Hilgard was both professor of botany and dean of the College of Agriculture. He brought to Berkeley his vision of applying scientific methods to agriculture and the study of plant science. He established the Agricultural Experiment Station to apply science to solve farming problems. To win over support from California farmers, Hilgard engaged in constant personal outreach all over the state to skeptical farmers. Hilgard made the College of Agriculture “a friend the farmer could not do without.”³

Although there was strong support for botany, and classes were offered from the beginning, the Department of Botany was not formally created until 1890. Botany developed an expanding curriculum through the end of the nineteenth century. The first history of botany at Berkeley appears in *Botany at Berkeley: The First Hundred Years*, written by Lincoln Constance, professor of botany, in 1956.⁴ In his account, Constance mentions only six women, of whom none was a faculty member. Not until 1971 was the first full-time ladder-rank professor appointed in botany, Assistant Professor Nancy Vivrette.⁵



Botanical Garden, 1904.
Credit: Bancroft Library, UC Berkeley

Hilgard was both dean of the College of Agriculture and professor of botany. Agricultural interests behind the farmers pushed for a sharply different mandate for the university from the more academic focus of botany. The College of Agriculture and the Department of Botany were rivals because of their differing orientations; the study of agriculture focused on practical information to educate the sons of farmers and improve crops, whereas botany involved a more scientific and theoretical approach. As late as 1934, a plan was afoot on campus to move the Department of Botany into the College of Agriculture.

The Rev. Edward L. Greene, an Episcopal minister, was first chair of the Botany Department. In 1890, he founded the Botanical Garden, then located on the current site of Moffitt Library. The Botanical Garden contained “experimental cultures and...economically important plants for instruction of classes.”⁶ The University Herbarium was established in 1895 with a gift from field botanist William Brewer’s botanical specimens collected during his travels with the California Geological Survey in the early 1860s. Both the Botanical Garden and the University Herbarium were integral to the research and instructional programs in natural history at Berkeley from the 1890s on. Particularly pertinent to this narrative is that these two institutions were important sources of employment and research for women botanists.

Two men dominated the Botany Department for fifty years after Greene left for Johns Hopkins. William Setchell, an expert in marine algae, chaired the department from 1895 to 1934. His PhD

³ Vernon Stadtman, *op. cit.* 154.

⁴ Lincoln Constance, *Botany at Berkeley: The First Hundred Years* (Berkeley: University of California, Berkeley, 1956).

⁵ Professor Vivrette left Berkeley without tenure but spent the rest of her productive career as a seed analyst in industry.

⁶ Lincoln Constance, “Early History of the Botanical Garden,” *Botanical Garden Newsletter*, Summer 1998, 4–5.

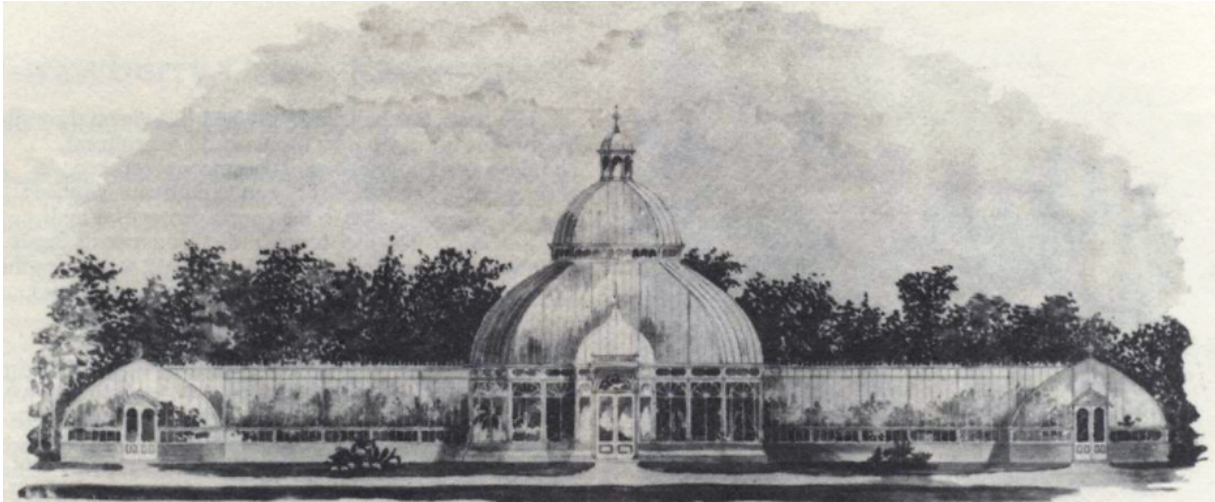
student Willis Linn Jepson became equally prominent. In 1898, Jepson earned Berkeley's first PhD degree in botany, which was just the tenth PhD degree granted at the university. He was immediately promoted to assistant professor and strongly influenced the Botany Department from 1898 until 1937. The two possessed very different personalities: Setchell was expansive and genial, whereas Jepson was introverted and jealous of his purview. Setchell, Jepson, and their own PhD graduates guided the research of most of the women profiled in this essay. Setchell supported the Botanical Garden and greatly increased the collections of the University Herbarium. "Botany man" Jepson, considered the first California-born botanist, centered his entire research career on the flora of California. Jepson's *Manual of Flowering Plants of California* (1923) was considered authoritative until about 1959.⁷ In his estate, he bequeathed his plant collections to Berkeley, with the provision that they be housed in an herbarium named in his honor after his death, separate from but associated with the University Herbarium. He endowed the Jepson herbarium in order to "to understand and conserve California flora."

Women in Agriculture and Botany at Berkeley

The focus of this essay is on women who earned master's and primarily doctoral degrees in botany and agriculture at Berkeley before 1950. Despite their distinction as teachers, curators, researchers, administrators, and botanical illustrators, most are not well known in Berkeley history. The careers of some of these women were eclipsed by their husbands', or with their husbands they functioned as a "two-person single career."

Well before Berkeley granted graduate degrees in botany, many notable women who were self-educated made their mark as important contributors in the largely male world of botany. This account begins with contributions of two botanists with colorful personalities who were closely associated with Berkeley, Katherine Curran Brandegee and Jeanne C. Carr, both self-taught. Two other equally vibrant and extremely prolific botanical collectors of this era who were strongly associated with UC Berkeley (but who also were not Berkeley alumnae) are profiled later in this essay, Annie Alexander and Ynés Mexía. Brandegee, Alexander, and Mexía donated vast numbers of specimens they collected to the university.

⁷ Willis Jepson, *Flowering Plants of California* (Berkeley: University of California, 1923–1925).



The first Garden Conservatory, situated on campus and modeled after the famous London Crystal Palace.
Credit: UC Botanical Garden archive



Mary Katherine Layne Curran Brandegee (1844–1920)
Credit: Jepson Herbarium, UC Berkeley

Mary Katherine Layne Curran Brandegee forged a path for women collectors and professional botanists in California in the decade before the establishment of a Botany Department at the University of California. She achieved fame as a botanical collector, taxonomist, and forceful writer and editor. Katherine Brandegee's importance to UC Berkeley in particular relates to the vast personal herbarium that she and her husband, Townshend S. Brandegee, donated to the University Herbarium in 1906, increasing its collection by 76,000 plant specimens.

The young Katherine Layne, known as Kate, moved as a girl with her family from a farm in Tennessee to Folsom, California. She married a local constable and took the name Curran but was widowed eight years later. The next year, in 1875, Curran moved to San Francisco and enrolled at age thirty-one as the third female student in the new UC Medical School. She became

fascinated by *Materia medica*—pharmacology based on plants—which was an essential part of Curran’s medical education, combining botany and medicine. Unable to establish a medical practice in San Francisco after her graduation in 1878, Curran decided to pursue botany. She spent her entire life collecting, classifying, and experimenting with plants.

Early in her career Curran affiliated with the California Academy of Sciences in San Francisco, which welcomed women from its inception, and was then the center of botanical research in the American West. She volunteered in the Academy’s herbarium from 1879 to 1883 while also collecting plant specimens throughout California and Nevada. By 1883, Curran was named curator of the Academy of Sciences Herbarium, the second woman in the nation to hold such a paid position. In this role, she classified the backlog of specimens at the herbarium and reorganized its jumbled finances. Curran revived and improved the publication *Bulletin of the California Academy of Sciences* to a higher standard. Through her rigorous science and incisive editing, she promoted botanical discoveries made in the West to the Eastern botanical establishment, represented by Asa Gray and the Harvard community. She paved the way for younger women botanists such as Alice Eastwood, her far more famous protégée, whose career she facilitated. Curran recruited Eastwood to the Academy from Colorado, then donated her own salary to enable Eastwood to be paid.

In 1889, Curran fell passionately in love with and married Townshend Brandegee, a Yale-educated civil engineer and botanist from the East who had been sent to California by the railroads to survey Western trees. The pair met at the Academy of Sciences. Kate and “Townie” shared a deep devotion to plants. During their wedding trip in 1889, they enjoyed walking the five hundred miles from San Diego to San Francisco, collecting plants along the route. The couple moved to San Diego for twelve years, where they built a house and created an experimental botanical garden and a brick herbarium, which was acknowledged as the world’s best private collection of plant specimens from the western United States and Mexico. In 1890, Kate



Kate and Townshend Brandegee.
Courtesy of University and Jepson Herbaria

Brandegee cofounded a new science journal, *Zoe*, which had a dual purpose: to hasten the dissemination of botanical discoveries made on the West Coast and to resist Eastern dominance by defending the credibility of Western botanists to describe and classify the plants they discovered in their own geography. In *Zoe*, she published the majority of her own scientific articles, identified as “K. Brandegee” to disguise her gender.

After the earthquake of 1906 destroyed much of the San Francisco-based Academy of Sciences collection, the Brandegees moved up to Berkeley. Both Brandegees continued research as daily volunteers at the University Herbarium, to which they donated their library and all their specimens. Kate Brandegee’s work has been underappreciated because the couple’s individual contributions were often considered as part of a single career. Together they published 159 papers. William Setchell, chair of the Botany Department, acknowledged the Brandegees’ unstinting service to the University Herbarium: “Their generosity and devotion have placed in

their debt all those botanists who in future years will come to the University to study the systematic botany of the western United States and of Mexico.”⁸



Jeanne C. Carr (1825–1903)
Credit: National Park Service

In 1869, **Jeanne C. Carr**, a self-taught botanist, writer, and outspoken champion for farmers and the education of women, moved from Wisconsin to Berkeley. Her husband, Ezra Carr, briefly held a professorship in the College of Agriculture. Both Carrs were aligned with the populist Granger movement, which represented California farmers and politicians who advocated that the new university be a limited technical college for the agricultural and mechanical arts.⁹ Grangers opposed what they considered an “elitist liberal arts” curriculum proposed by UC’s President Daniel Coit Gilman. The Grangers provided a political platform for Jeanne Carr’s speeches and writings about education and agriculture.

In addition to writing and speaking, Jeanne Carr taught botany at several schools for girls, such as Girls High School in San Francisco. At one point, Carr hoped to start an agricultural academy for women. She championed the education of women in articles like “Female Education in the United States” (1870) and “Professional Training Schools for Girls” (n.d.).¹⁰ Because of his opposition to the liberal arts and his insistence on a solely technical and agricultural curriculum, Ezra Carr was fired from the university by President Gilman. Shortly thereafter, he was elected state superintendent of public instruction for the state of California. Carr appointed his wife as deputy superintendent, making her the highest female political appointee in the state. As a result of her husband’s severe rheumatism, Jeanne Carr was the actual superintendent, acting in his stead. Jeanne Carr wrote more than seventy-five articles on a range of botanical topics, such as

⁸ William A. Setchell. “Townshend Stith Brandegee and Mary Catherine (Layne) (Curran) Brandegee” University of California Publications in Botany 13: 155-178, 1926.

⁹ The Grange was an American agricultural movement, founded in 1867, that served social, educational, and later political purposes.

¹⁰ The papers of Jeanne C. Carr are mostly archived in the Huntington Library, Pasadena.

the flowers of California. Carr was an intimate lifelong friend and influential mentor to John Muir, the most celebrated Western naturalist of his time.¹¹



Katherine Sessions (1857–1940)

Credit: 1881 Blue & Gold Yearbook, UC Berkeley Archives

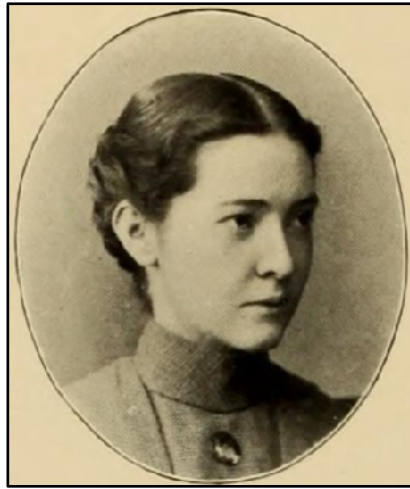
Katherine Olivia Sessions, an undergraduate student of botany, graduated from Berkeley in 1881 and went on to influence the landscape of San Diego. Sessions was born on Nob Hill in San Francisco and grew up on a small farm in Oakland. At Berkeley, she followed a science curriculum including botany because of her early love of plants and trees, but her undergraduate degree was conferred in chemistry. Kate, as she was known, was vivacious and popular. Sessions wrote her senior essay on “The Natural Sciences as a Field for Women’s Labor.” After graduation, she could not find a job in chemistry, so she taught school in Oakland and briefly in San Gabriel. Sessions soon migrated to San Diego, where she opened a nursery in partnership with an older couple. When it dissolved, she founded her own nursery and independently ran her business for more than fifty years, moving to several locations as the city of San Diego expanded. Sessions established herself as a skilled horticulturist and landscape designer. She embarked on a partnership with the city of San Diego in 1892 to lease thirty-two acres on which she established an experimental garden. In return for a ten-year lease, she agreed to plant one hundred trees a year for ten years and to provide three hundred other trees for planting in greater San Diego. In the experimental garden, Sessions introduced new species of plants from all over the world adapted to the Mediterranean climate of San Diego and reported their viability to the US Department of Agriculture Office of Plant Introduction. She is known as “Mother of Balboa Park” in San Diego, where a bronze statue of Sessions adorns the entrance to the park.



Statue of Kate Sessions
in Balboa Park

¹¹ See Catherine Gallagher, *Women at Berkeley, The First Hundred Years* (2021) forthcoming, Center for Studies in Higher Education, UC Berkeley and Bonnie Gisel, *Kindred Spirits: The Letters of John Muir and Jeanne C. Carr* (Salt Lake City: University of Utah Press, 2001).

A natural educator, Sessions eagerly shared her knowledge of botany with the public. She taught botany to school children and supervised gardens at public schools. Sessions wrote prolifically to educate the public in journals such as *California Garden*, the oldest horticultural journal in the country, which she helped to found. In recognition of her experimentation with new plants, in 1939, Sessions was the first woman to receive the Frank N. Meyer Medal from the American Genetic Association, the culminating honor of her career, for “distinguished services in plant introduction.” Though she did not marry or have children, Katherine Sessions’s botanical legacy lives on in the lush landscapes of San Diego. A book of her articles, *The Complete Writings of Kate Sessions in California Garden, 1909–1939*, was compiled in 1998 and republished in 2020.¹²



Elizabeth Hight Smith (1877–1933)
Credit: 1900 Yearbook, Smith College Archives

Elizabeth Hight Smith, although neither a Berkeley alumna nor a PhD, holds the distinction of being the first ladder-rank female professor of botany in the College of Agriculture. Smith grew up in Brookline, Massachusetts, and graduated from Smith College in 1900. Before entering graduate school, she taught high school in Connecticut for a year. She attended Massachusetts Agricultural College (later University of Massachusetts) and received the first master’s degree granted to a woman from that school in 1905. She followed her brother, Professor Ralph Eliot Smith, from Amherst to California. Ralph Smith answered an advertisement from Dean Hilgard for someone to control the outbreak of asparagus rust crushing the canning industry in California. Smith established the Department of Plant Pathology in the College of Agriculture at Berkeley in 1903, the first department of its kind in the nation. He founded and directed the College’s Citrus Experiment Station in Riverside.

Elizabeth Smith and her brother conducted joint research on diseases of plants essential to California agriculture. Smith co-authored articles with her brother on peach blight, fig smut, apricot rot, and diseases affecting citrus fruit. Their most cited joint work is a monograph on California plant diseases, published by the university’s Agricultural Experiment Station in

¹² *The Complete Writings of Kate Sessions in California Garden, 1909–1939*, ed. Barbara Schillreff Jones (San Diego: San Diego Floral Association, 1998, reprinted 2020).

1911.¹³ Elizabeth Smith created original drawings to illustrate this publication, identified with “EHS” on each image.

She began her UC employment with the title of assistant plant pathologist in the College of Agriculture, where she taught plant pathology as an instructor from 1905 to 1915. While her brother was in Southern California managing the agricultural stations, Elizabeth Smith fulfilled the duties of Acting Chair of Plant Pathology for six years from 1906-12, the first woman in the country to hold that position. Her promotion to assistant professor came in 1915; she served the department for 28 years as a full research partner keeping his laboratory going. Ralph Smith achieved the rank of professor of plant pathology at Berkeley in 1920. Berkeley Emeritus Professor Milton Schroth historian of plant pathology at Berkeley gives Elizabeth Smith short shrift in his essay, but describes her: “as a tower of strength” and acknowledges Smith’s role in her brother’s success: [she} “no doubt enabled him to do so many things until her accidental death.”¹⁴ An automobile crash ended her life suddenly in 1933. In 2018, the University of Massachusetts established graduate fellowships in Elizabeth Hight Smith’s name, to be awarded to women students in science.¹⁵



Helen Margaret Gilkey (1886–1972)

Credit: Oregon State University Yearbook Archives

Helen Gilkey, the first woman to earn a doctorate in botany at Berkeley in 1915, enjoyed a very significant scientific career as a botanist, curator, botanical artist, teacher, and scholar. Gilkey was nationally known as an expert in mycology, the study of fungi. Gilkey’s botanical drawings have been exhibited in museums and were included in Professor Jepson’s famous manual *Flowering Plants of America*. Her last book, the five-hundred-page *Handbook of Northwestern Plants* (1967), is still consulted as a standard reference.

¹³ Ralph E. Smith and Elizabeth H. Smith, *California Plant Diseases*, Bulletin of the California Agricultural Station, 218, June 1911.

¹⁴ Milton N. Schroth and A.R. Weinhold. *History of the Plant Pathology Department University of California Berkeley 1903-1991*. University of California, 2009.

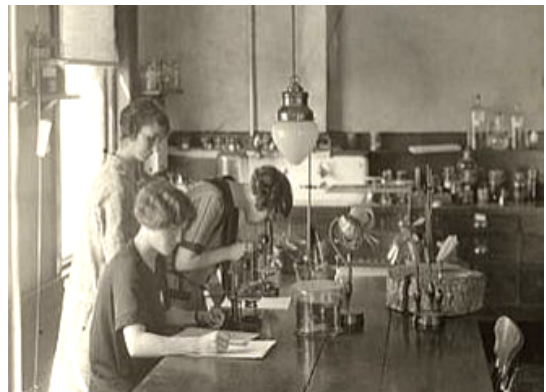
¹⁵ Dusty Christenson, “STEM Fellowships,” *Daily Hampshire Gazette*, August 15, 2018.



Helen Gilkey.

Gilkey grew up in Corvallis, Oregon, where her father was superintendent of grounds at the Oregon Agricultural College (which later became Oregon State University). She received both bachelor's and master's degrees there. Gilkey wrote her master's thesis about Oregon mushrooms. At Berkeley her doctoral adviser was Professor William Setchell, the influential chair of botany. He encouraged her research in the taxonomy of truffles, which formed the basis of her 1916 dissertation, "A Revision of the Tuberales (truffle fungi) of California." The Botany Department put Gilkey's artistic talent to good use by employing her as a scientific illustrator for three years after she graduated. It is apparent from correspondence between Gilkey and Willis Jepson that she made some of the drawings for his manual *Flowering Plants of America*.¹⁶

In 1918, Gilkey returned to her native Oregon to accept the position of curator at the Oregon State University (OSU) Herbarium, the second oldest herbarium in the Western United States. Jointly appointed as professor of botany, she taught for thirty-three years while also managing the herbarium. Directing the herbarium entailed continuous fundraising and eight changes of location during her tenure. Writing to Setchell in 1949, she explained the constraints of working at OSU: "Primarily this is a service institution. For years we have carried on very heavy extension work, so heavy that it precluded the possibility of research." Setchell commented, "I think you do wonderfully well to produce so much work without the facilities to be found in higher institutions." Gilkey was a beloved teacher on the OSU campus. A prominent Oregon wildlife biologist and returning GI, Dave Williams, took her course on aquatic plants in 1947.. Very shortly Gilkey sent the students into the field to collect specimens, bring them in for identification, and then press them. In his memoir Williams described Professor Gilkey's course as memorable and referred to her as one of his three most influential life mentors.¹⁷



Helen Gilkey with students in the botany lab.
Credit: Oregon State University Archives

Despite the demands of teaching and administration, Gilkey wrote and co-authored several books and wrote more than forty scientific articles, including biographical sketches of botanists, and an unpublished history of the herbarium at Oregon State. Gilkey also wrote articles for the public about noxious plants, such as her booklet "Livestock Poisoning Weeds of Oregon," as well as articles in the *Oregonian* newspaper. Her fine botanical portraits illustrated her writing. She also composed poetry, published in a slim volume compiled by her devoted sister, Beulah Gilkey.

¹⁶ Jepson, op. cit. Jepson did not acknowledge Gilkey's contributions. Quotes are drawn from the Gilkey-Jepson correspondence, which is archived at the Jepson Herbarium, UC Berkeley.

¹⁷ Dave Williams. *Memoir of a Wildlife Biologist* Audubon Society of Oregon, 2008.

Commenting in 1925 on her experience as a woman, Gilkey said, “I know of no phase of Botany in which a woman cannot be as successful as a man, provided of course that her interest, preparation, and ability are equal to his.” Years later she commented that in regard to discrimination against women, “as on the race question there is still a hang-over of Medieval philosophy.”¹⁸ A lifelong humanitarian, Gilkey supported the National Association for the Advancement of Colored People (NAACP), UNICEF, and other international peace organizations. Trappe quotes in his memorial tribute Gilkey’s letter withdrawing from the Daughters of the American Revolution because of their support of the American military in Nicaragua.¹⁹ Gilkey retired in 1951 and spent the next years writing, revising her publications, and until her eyesight failed, hunting truffles.

Among her many awards, Gilkey was named outstanding scientist by the Oregon Academy of Sciences in 1952 and by the Northwest Scientific Association in 1969. She was recognized in American Men of Science. Sixteen years after her retirement, she was accorded the Distinguished Service Award by Oregon State University in 1967. Gilkey continued her research until the age of 81. In 2006, the truffle genus *Gilkeya* was named in her honor: Pyronemataceae Helen Margaret Gilkey genus Monotypic taxon Mycology.



Annie May Hurd-Karrer (1893–1984)

Credit: 1915 Yearbook, University of Washington

Annie May Hurd, the second woman to earn her PhD in botany at Berkeley, obtained bachelor’s and master’s degrees in botany at the University of Washington in 1915 and 1917. In 1918, she earned a doctorate in botany at UC Berkeley, specializing in plant physiology. Her thesis treated the effect of light on plants: “Orientations and Phototropisms in *Fucus* and *Volvox* with Monochromatic Light of Equal Intensities.” Hurd immediately received an appointment as a researcher at the US Department of Agriculture, in the Division of Cereal Crops and Diseases, Bureau of Plant Industry. She was unique among her peers in finding government work, which facilitated the dissemination of her research. Hurd published sixteen papers in the USDA technical bulletins. After her marriage to physicist Sebastian Karrer in 1923, she was known as Hurd-Karrer. She continued to work for the USDA, specializing in the improvement of cereal

¹⁸ James M. Trappe, “Helen Margaret Gilkey (1886–1972),” *Mycologia* 67 (1975): 207–213.

¹⁹ Trappe, *ibid.*

crops. She published articles on diseases affecting corn. Hurd-Karrer rose to the position of associate plant physiologist in 1924, and by 1925 her research was published in the *American Journal of Botany*.²⁰ Her articles appeared in other prestigious journals, including the *Plant Physiology*, the *Journal of General Physiology*, and *Soil Science*. Three of her papers on the effects of selenium appeared in *Science* in the 1930s. In the 1940s, we find Hurd-Karrer presciently publishing about the damaging effects of herbicides such as sodium chlorate. on the susceptibility of crops. In USDA publications she continued in the 1940s to discuss the effects of herbicides such as sodium chlorate on plants.²¹ Hurd-Karrer was promoted to the post of plant physiologist in 1944, a position she held until 1949.



Alice Maria Ottley (1882–1971)
Credit: Wellesley Botanical Garden

Alice Maria Ottley received her PhD in botany from Berkeley in 1921, after spending her undergraduate years at Cornell University. Directed by Professor Willis Jepson, she wrote a thesis entitled “A Revision of the California Species of Lotus,” which was published by UC in 1923. Ottley then obtained a teaching position in botany at Wellesley College, where she remained for seventeen years. She rose from the rank of instructor to associate professor. In addition to teaching from 1922 to 1939, she directed the Wellesley Herbarium. In Wellesley history, Alice Ottley is overshadowed by her famous aunt, Professor of Botany Margaret Clay Ferguson. Margaret Ferguson herself had been chair of botany at Wellesley, director of the herbarium, and a strong mentor to her niece and many women. Ottley and Ferguson collaborated on research during and after Ottley’s Wellesley years. During her career, Ottley went on collecting expeditions to South Africa and Mozambique. She retired from her post at Wellesley in 1939 and continued to travel and collect with her aunt. In her publications she acknowledged her debt to her aunt. The Harvard Herbarium lists extensive specimens collected by Ferguson and Ottley during their travels in the years from 1934 to 1950.

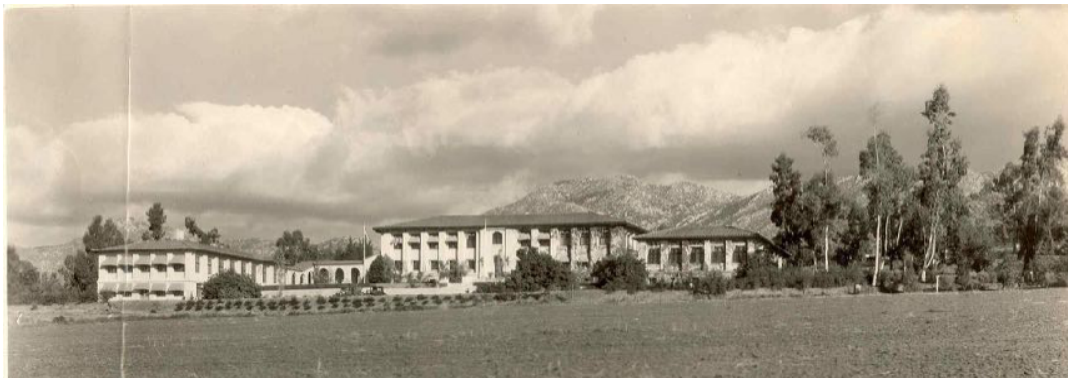
²⁰Annie Hurd-Karrer, “Acidity and Varietal Resistance of Wheat to *Tilletia tritici*,” *American Journal of Botany* 12, no.7 (July 1925).

²¹ Annie Hurd-Karrer. “Comparative Susceptibility of Crop Plants to Sodium Chlorate Injury.” Technical Bulletin 648. Washington, DC: United States Department of Agriculture (1940).



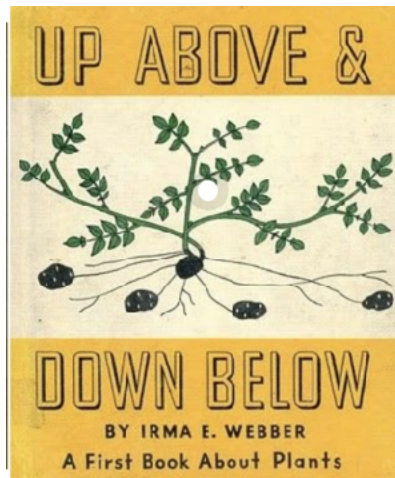
Dolly Cora Lutjeharms Hagan (1896–1981)
Credit: 1919 Yearbook, University of Nebraska

Dolly Cora Lutjeharms grew up in Alma, Nebraska, and received a bachelor's degree at the University of Nebraska in 1919. She attended UC Berkeley for graduate education in the College of Agriculture and completed her master's in 1920, with a thesis entitled "The Influence of Light and Darkness Upon the Germination of Tobacco Seeds" under Professor Thomas H. Goodspeed. Goodspeed was an expert on the taxonomy of *Nicotiana* and curator of the UC Botanical Garden. Subsequently she earned a doctorate in botany and agronomy in 1923. From 1919 to 1923, she was a teaching fellow in botany at Berkeley. Her dissertation, "Environmental Differences on North and South Slopes of a Canyon Based on Measurements of Climatic Factors and Plant Growth," concerned a canyon in Engleman, Colorado. At some point, Lutjeharms did research at Stanford. One of her first jobs was as a field assistant in ecology at the University of Washington.



1907 UC Riverside Citrus Experiment Station.
Credit: *Special Collections & Archives, UC Riverside (UA 042)*

Lutjeharms married Professor Harold R. Hagan, an insect embryologist at the University of Utah. He rose to associate professor in the Department of Botany and Entomology there. Dolly Hagan appears to have continued her research while she followed her husband to his successive academic posts at the University of Utah, the University of Hawaii, and City College of New York. Information about her subsequent research is difficult to trace, because her husband's career appears to have eclipsed her own.



Irma Edna Schmidt Webber (1904–1995)

Irma Edna Schmidt was born in San Diego, California. She earned all three of her degrees at UC Berkeley: BA in 1926, MA in 1927, and PhD in 1929. Her dissertation on paleobotany was titled “Pleistocene Woods from the Coast of California.” She married John Milton Webber, a fellow graduate student in the College of Agriculture whom she met at Berkeley in 1927. Her husband was a cytologist of cotton and other fiber crops. After two years working at the UC Citrus Experiment Station in Riverside, she was employed as a botanist for the Carnegie Institute and later the USDA, as was her husband. Irma Webber is listed as coauthor with Berkeley PhD Erling Dorf of “Studies of the Pliocene Paleobotany of California,” published by the Carnegie Institute of Washington in 1933. At the USDA, Webber focused on cotton and other fiber crops from 1936 to 1943. As a parent she became frustrated after not finding any appropriate books about natural science for her children. Between 1933 and 1958 Webber took action by writing and illustrating a series of books for young readers to popularize botany. Her papers pertaining to children’s literature are archived at the University of Minnesota.



Priscilla Avery (1899–1939)
Credit: California Botanical Society

One of five children, **Priscilla Avery** grew up in a cultivated family in Redlands, California. A brilliant student who held both Levi Strauss and Phoebe Hearst Scholarships, Avery graduated

from the University of California College of Agriculture with the highest honors. As a graduate student, Avery was appointed teaching fellow in zoology and assistant in the Division of Genetics in the College of Agriculture in 1927. She earned her doctorate in genetics in 1930 with a dissertation titled “ I. The Nature and Effects of Chromosomal Irregularities. II. The Role and Behavior of Chromosomes in Hyperdiploid Plants.” From 1928 to 1934, Avery held the position of preparator in the Department of Botany, and in 1934, she was appointed cytologist in the UC Botanical Garden. Botany chair William Setchell was very interested in research on *Nicotiana* (tobacco plant), reportedly because he enthusiastically smoked cigars and cigarettes. He influenced researchers like Avery to study the tobacco plant. She worked in a group under Professor Thomas Goodspeed, curator of the Botanical Garden. In the field of chromosome morphology and behavioral inheritance in *Nicotiana tabacum*, Avery published significantly. Her last paper in 1939, coauthored with Goodspeed, represented an immense amount of research done on hybrids and crosses.²²

Avery suffered from ill health all her life and died at the age of forty. Her colleague Marion Cave wrote of Priscilla Avery: “During the last fifteen years of her life she was engaged, almost exclusively, in cytological and genetic investigations of species origins and relationships in various genera of higher plants and particularly in *Crepis* [*Crepis* is commonly called hawksbeard, a plant similar to the dandelion] and *Nicotiana*. She published a number of significant contributions to the solution of cytogenetic problems. Her thorough biological preparation, long apprenticeship at the microscope, the necessary scientific imagination and analytic approach, combined always to make the results of her research not only adequate and reliable but also stimulating and suggestive. She advised and assisted many advanced students of botany and genetics, upon whom, and upon her associates in the laboratory, her courage, good humor, enthusiasm and unflinching generosity made a profound impression.”²³



Katherine Esau (1898-1997) with her beets.

Credit: UC Santa Barbara Cheadle Center for Biodiversity and Ecological Restoration

²² T. H. Goodspeed and P. Avery, “Trisomic and Other Types in *Nicotiana sylvestris*,” *Journal of Genetics* 38 (1939): 381–458.

²³ Marion Cave, “Priscilla Avery,” *Madroño* 5, no. 6 (April 1940): 196–198.

Katherine Esau (1898-1997), a pioneering plant anatomist, was called “the first lady of botany.” She was born in Yekaterinoslav in the Russian Empire, now part of Ukraine. Her parents were descendants of German Mennonites, who had been invited by Catherine the Great to Russia to promote agriculture. In Moscow Esau enrolled in the Golitsin Women’s College of Agriculture, but the Bolshevik Revolution interrupted her studies. Her father was considered part of the “counterrevolutionary bourgeoisie” which caused her family to flee to Berlin. Esau completed her studies in plant breeding at the Agricultural College of Berlin where she studied under a famous geneticist, Erwin Bauer. In 1922 Katherine’s family moved to a Mennonite community in Reedly, California. She got a job with the Spreckels Sugar Company in Salinas studying the curly-top virus disease affecting the sugarbeet; she was charged with breeding resistant beets through hybridization of healthy beets.

With encouragement from Berkeley botanist W.W. Robbins, Esau registered as a graduate student in botany at UC Berkeley in 1928 at age thirty. At that time Davis did not yet have a graduate program. None of her three Berkeley Professors, Robbins, T.A. Goodspeed and T. E. Rawlins, was a plant anatomist, so she worked quite independently. Esau was awarded the PhD from Berkeley in 1932, but she had conducted her research at Davis. She took several courses on the Berkeley campus, including Goodspeed’s course in genetics. She decided to focus her research on the effect of the curly-top virus on sugarbeets, a decision that led to her lifelong focus on pathological plant anatomy. Her thesis was titled “Some Pathological Changes in the Anatomy of Leaves of the Sugar Beet (*Beta vulgaris* L.) Affected by the Curly-top Disease.”

On completion of her PhD Esau was hired as an instructor and junior botanist at the College of Agriculture’s Experimental Station at UC Davis. Esau’s lab consisted of a windowless converted garage shared with other faculty and graduate students. In time she was promoted to full professor of plant pathology at Davis. In one of her early publications as a faculty member, she reported her discovery that the curly-top virus spreads through a plant via the food-conducting phloem tissue.²⁴ Esau’s research on the tobacco plant, another host of the curly-top virus, strengthened this concept. In 1946 UC Davis invited Esau, still an Associate Professor, to give the Faculty Research Lecture, a very high honor.

In 1954 Esau wrote the text *Plant Anatomy*,²⁵ considered the bible for structural botanists despite its length of 754 pages. The publisher wanted a shorter version for use as a college text, which resulted in Esau’s *Anatomy of Seed Plants*²⁶ in 1960. The third last revision to *Plant Anatomy* was published in 2007 by Esau’s student, Professor Ray Evert.

Just as Esau was ending her decades at Davis, electron microscopy (EM) was becoming available. “EM greatly enhanced our understanding of virus-plant host relations,” she said in her autobiographical interview.²⁷ In 1963 Esau’s longtime botanical collaborator at Davis, Vernon Cheadle, now Chancellor of Santa Barbara, recruited her to UCSB where she continued her

²⁴ Katherine Esau. “Studies of the breeding of sugar beets for resistance to curlytop.” *Hilgardia* 4:417-41,1930.

²⁵ Katherine Esau. *Plant Anatomy*. New York: McGraw-Hill, 1954, 1965, 2006.

²⁶ Katherine Esau. *Anatomy of Seed Plants*. New York: John Wiley & Sons, 1960.

²⁷ Katherine Esau with David E. Russell. *Katherine Esau: A Life of Achievements*. Davidson Library Oral History Program, University of California, Santa Barbara, 1991.

research for twenty-four years. She welcomed access to a new electron microscope and considered her research in retirement the most fulfilling of her career.

Asked if she saw herself as a pioneer, Esau replied “This is such a funny thing. I never worried about being a woman. I always thought that women could do just as well as men. Of course, the majority of women are not trained to think that way. They are trained to be homemakers.”²⁸

Esau accrued many distinguished awards. She became the sixth woman elected to the National Academy of Sciences (the first from UC Davis) in 1957 and received the National Medal of Sciences from President George Bush in 1989. The citation reads: “In recognition of her distinguished service to the American community of plant biologists, and for the excellence of her pioneering research, both basic and applied, on plant structure and development, which has spanned more than six decades; for her superlative performance as an educator, in the classroom and through her books; for the encouragement and inspiration she has given a legion of young, aspiring plant biologists; for providing a special role model for women in science.”²⁹



Marion Stilwell Cave (1904–1995)
Credit: Jepson Herbarium, UC Berkeley

Marion Elizabeth Stilwell majored in romance languages at the University of Colorado as an undergraduate, and graduated Phi Beta Kappa in 1925. She became interested in botany by chance, at the suggestion of a botany professor for whom she babysat. He gave her the manuscript of a German botanical study to translate for her master’s degree. Stilwell entered Berkeley as a graduate student in botany in 1927 but very soon met Roy Cave, a graduate student in economics, whom she married in 1928. Roy Cave earned his PhD and was hired by St. Louis University where the couple spent three years which Marion described as “lost” for her. Returning to the Bay area, Roy Cave was appointed at San Francisco State University where he later received tenure. Marion resumed her graduate study in genetics and obtained a PhD in 1936. She conducted her thesis research with Professor Ernest Brown Babcock, a plant geneticist and graduate of Berkeley’s College of Agriculture. She studied “Cytogenetics of Crepis.” Her

²⁸ Katherine Esau with David E. Russell, *idem*.

²⁹ National Science Foundation. “The President's National Medal of Science: Recipient Details.” https://www.nsf.gov/od/nms/recipient_details.jsp?recipient_id=120

early application of genetics to taxonomy was notable and innovative. Cave published at least one paper with Babcock: *A Study of Intra- and Interspecific Relations of Crepis foetida*. The reaction by Berkeley to Cave's marriage effectively barred her appointment to the faculty, although her husband taught in another field at a different university.

For forty years, Marion Cave held the title of research associate in the Botany Department. That position came without status or laboratory space, despite Cave's "pathbreaking contributions to plant genetics, cytology, and embryology." Her research was internationally known. In his oral history, Lincoln Constance discusses twenty years of collaboration with Marion Cave on a chromosome number survey of the Hydrophyllaceae (the waterleaf family) which represented one of the pioneering applications of cytogenetics to plant systematics. She corresponded with botanists all over the world. Cave's publications are archived at the Missouri Botanical Garden, where renowned botanist Peter Raven, whom she knew when he was an undergraduate student at Berkeley, was director for four decades.³⁰

Lincoln Constance described Marion Cave's position vaguely as "a cytologist who had various connections from time to time with the University of California Botanical Garden. Although she was really an expert in three different fields, she never had a formal university appointment." Cave excelled in cytology, the embryology of lilies, and freshwater algae. Constance's explanation of her status reflects the thinking of the time about not just nepotism, but also whether women deserved to have jobs at all if their husbands were employed. He continues, "For one, her husband was a professor of economics at San Francisco State, and the idea that there should be a woman faculty member in the department simply had not yet arrived... The general assumption was that since she had a husband with a good job—why did she need one too? After all, the department gave her a place to work. I'm sure you've heard some of this before. It wasn't very overt, but it probably was rather characteristic of masculine thinking of the time, I suppose." In 1950, Cave and Constance published a paper on chromosome numbers in the Hydrophyllaceae. Constance remarked, "She was senior author on all our papers. As I always said, it was eminently fair because she was doing all the work."³¹ Cave directed the dissertation research of several botany students whose official advisors were faculty.

In 1944–1945, Marion Cave and her husband worked in Washington, DC. She reported difficulty in finding a position using her level of training but worked as a research analyst in the Office of Strategic Services (OSS). She also made translations of forest legislation in Central and South American countries for the Office of the Coordinator of Inter-American Affairs. After the war, Cave became a research associate in the Botany Department until her retirement. Occasionally she taught although she disliked teaching. Filling in for Professor Goodspeed, Cave was a lecturer in botany in 1951 at Berkeley as well as at Mills College. In the 1950s, Cave embarked on new research projects, like the karyology of algae, with new collaborators such as Professor Mary Pocock, algologist at the University of Rhodes in South Africa, for which she received a Guggenheim Fellowship. During the late 1950s, with other California botanists, Cave initiated an *Index to Plant Chromosome Numbers*, in which chromosome numbers culled from the plant

³⁰ Cave refers to joint publications with Peter Raven in her oral history. "Interview with Marion S. Cave," recorded by Lorie Bunker, Society of Women Geographers, July 26, 1994, 17.

³¹ Lincoln Constance, "Versatile Berkeley Botanist: Plant Taxonomy and University Governance," an oral history conducted in 1986 by Ann Lage, Oral History Center, Bancroft Library, UC Berkeley.

literature worldwide were compiled by volunteers and published annually. From 1956 to 1964, she was editor and associate editor of the *Index*, a long-standing resource considered to be invaluable to researchers. In her oral history, conducted in 1994 at the age of ninety, Cave said she considered the *Chromosome Index* her greatest achievement.³² At the Ninth International Botanical Congress in Montreal in 1959 Cave organized a symposium in embryology. She was elected as one of the first members of the Society of Women Geographers (SWG) in 1957. Marion Cave was an expert photographer of botanical specimens and made 300 photographic portraits of students and colleagues.

Botany colleagues Lincoln Constance and Robert Ornduff, in an obituary for Cave, admitted that “if Marion were beginning her scientific career today, she would have become a full-fledged faculty member in a noted academic institution such as Harvard or Berkeley...that because she was not a faculty member, [Marion] had to carry out her research in the modest space and facilities accorded graduate students. Despite this, she managed to carry out a remarkably diverse series of careful, original, and technically difficult studies.”³³



Lucile Roush Mason (1896–1986)

Credit: 1940 Mills Yearbook, F. W. Olin Library, Mills College

³² “Interview with Marion S. Cave,” recorded by Lorie Bunker, Society of Women Geographers, July 26, 1994, 24.

³³ Donald R. Kaplan, Lincoln Constance, and Robert Ornduff, “Obituary: Marion Stilwell Cave (1904–1995),” *Madroño* 44, no. 2 (April–June 1997): 211–213.

Lucile Roush, a graduate of Stanford, received her doctorate in botany from Berkeley in 1932. Roush wrote a dissertation under William Setchell, “The Crustaceous Corallines of the Pacific Coast of North America.” Setchell, still chair of botany and director of the university herbarium, described Roush’s thesis as “a detailed account of the species of the coasts of Pacific North America, with illustrations, critical notes, as well as a general review of the subfamilies, of the genera, and species ranging from Bering Straits to Panama.” The next year Roush married her classmate Herbert Mason, a Stanford alumnus. Their career paths necessarily diverged, typifying the fate of women who married faculty in the same discipline in the anti-nepotism era in academia. Her husband was immediately appointed as assistant professor in the Botany Department at Berkeley after earning his PhD, and later he succeeded Setchell as chair. Lucile Roush and Setchell continued to coauthor articles long after she graduated. In 1943, Lucile Roush Mason co-authored a paper with her former adviser, in which Setchell refers to her as the “junior author.”³⁴



Lucile Roush Mason and husband
Professor Herbert L. Mason in
1933.

*Credit: University and Jepson
Herbaria, UC Berkeley*

Hampered by nepotism rules, Lucile Mason nevertheless appears to have patched together a productive career. During and after her doctoral studies, she was employed to organize the freshman botany labs at Berkeley. Colleague Annetta Carter (profiled below) called Mason “a grand teacher and a good friend to all the students.” Carter pointed out that Lucile Mason would have been a faculty member but for her marriage to Mason. He was an influential botanist, and she performed the duties of a good faculty wife: the couple were famous for their hospitality at their home in the Berkeley hills. They jointly planned annual dinners of the California Botanical Society. Between 1938 and 1944, Lucile Mason was instructor of biological sciences at nearby Mills College, in Oakland. From 1950 on, she continued at Mills as a lecturer in botany and bacteriology and served as director of the Highland-Mills Nursing Program from 1953 to 1964.



³⁴ William Albert Setchell and Lucile Roush Mason, “New or Little Known Crustaceous Corallines of Pacific North America,” Department of Botany, UC Berkeley (February 23, 1943).

Annetta Mary Carter (1907–1991)
Credit: University and Jepson Herbaria, UC Berkeley

Annetta Mary Carter earned a bachelor's degree in botany in 1930 after attending community college in Pasadena. During her senior year, Carter was employed by the Botany Department to mount plant specimens. Carter wrote a master's thesis about *Riccia fluitans* (commonly known as floating crystalwort, an aquatic floating plant of the liverwort genus); her degree was awarded in 1932. She obtained a teaching credential and expected to teach high school or junior college but couldn't find a job during the Great Depression. She returned to Berkeley's University Herbarium part-time, with the job of mounting plants, and gradually worked her way up during the next thirty-six years to the position of principal herbarium botanist. After her retirement, she continued as a research associate. Why did Carter not pursue a PhD? In her oral history, Carter claims that she was neither encouraged nor discouraged from continuing for a PhD by faculty but was daunted by the foreign language requirements in German.³⁵

Carter's life is unusually well documented through her oral history, her own writings, and an eloquent, thorough memorial article in *Madroño* by Berkeley botanist Dr. Barbara Ertter.³⁶ As the administrator of an herbarium, Carter was recognized to set a national standard. She corresponded with botanists all over the world whom she warmly welcomed to the University Herbarium. In addition, she served as secretary of the editorial board of *Madroño*, the journal of the California Botanical Society, from 1943 to 1963. This commitment entailed editing rough drafts of articles by the editor, Professor Mason, to polish them for publication, work which went unacknowledged.

A life- and career-changing experience occurred in 1947 when Carter was invited to accompany the famous collector and Berkeley benefactor Annie Alexander and her partner, Louise Kellogg, for a three-month expedition to Baja California. Alexander, a self-taught naturalist, explorer, and collector was independently wealthy. Since 1907 Alexander had spent four decades devoted to collecting vertebrate mammals, but with increasing age, she changed the focus of her collecting to flora. At that point, the wooden flower presses were less heavy to carry than animal traps on her expeditions. Alexander celebrated her eightieth birthday on the trip to Baja. Carrying their own supply of water, food (mostly rice), and gas, the three women drove a Dodge Power Wagon through treacherous mountainous country on unpaved roads. They hired local guides, pitched a tent at night, and cooked over a campfire. On this trip Carter discovered a new species, which she named after Louise Kellogg: *Acacia kelloggiana*. In her oral history, Carter describes this trip in detail; she also wrote about it in a 1948 article for UC Berkeley's *California Monthly Magazine*, "Somos tres mujeres sin miedo" (We are three women without fear). On New Year's Day, Carter reported, "I made a resolution which I've almost kept, to go back every year."³⁷

Keeping her promise, Carter returned to Baja California forty times. She also collected in Sonora, Sinaloa, Jalisco, and the Yucatan. Her meticulous logs, maps, and itineraries of these

³⁵ Annetta Mary Carter, "California Women in Botany," oral history. Oral History Center, Bancroft Library, UC Berkeley, 1985, 10.

³⁶ Barbara Ertter, "Obituary: Annetta Mary Carter (1907–1991)," *Madroño* 39, no. 3 (1992): 245–250. Dr. Ertter worked at the University and Jepson Herbaria as a research botanist in the 1990s.

³⁷ Carter, "California Women in Botany." 45.

trips are archived in Berkeley's University Herbarium. During her many strenuous expeditions, Carter collected five thousand specimens and sustained various injuries due to falls, including one when her horse stumbled on a narrow, rocky trail. Carter's passion was the remote Sierra de la Giganta, a rugged volcanic range between Loreto and La Paz. Ertter points out that Carter was an authority on the history, ethnobotany, and biogeography of the Sierra de la Giganta. Called "Senorita Anita" in Mexico, Carter was recognized by the Sociedad Botanica de Mexico. In 1992, the herbarium in La Paz, Baja California, was named Annetta Mary Carter Herbarium. She worked on significant additions to the 1980 classic Flora of Baja California by I. L. Wiggins. Barbara Ertter's essay contains a complete bibliography of Carter's numerous publications. Ertter ends her essay with a quote from the 1966 issue of Madroño dedicated to Annetta Carter: "you have been the trusted advisor of faculty and administrative officers, a generous counselor and confidante of successive generations of grateful students...intrepid field botanist and indefatigable collector and interpreter of the remote ranges of Baja California...gracious ambassadress to our Mexican botanical friends."



Ethel Katherine Crum (1886-1943)

Credit: Jepson and University Herbaria, UC Berkeley

A colleague of Annetta Carter was **Ethel Katherine Crum**, an assistant curator at the University Herbarium. As an undergraduate she majored in classics and literature at the University of Illinois. Crum taught literature in public schools for 20 years before returning to higher education to study for a Master's Degree in botany at Berkeley. She earned her MS in 1929 with a thesis entitled "The geographic distribution and relationships of *Isomeris*, *Cleomella* and *Wislizenia*, three genera of west American Capparidaceae" (caper family).

Willis Jepson hired Crum as a research assistant to work on volume two of his California Flora. Ethel Crum was appointed to the curatorial staff at the Herbarium in 1933, where she worked until retirement in 1943. She also collected widely in California and identified plant specimens with interest in potentilla (rose family). Crum preceded Annetta Carter as secretary to the editorial board of the California Botanical Society from 1933-43. "Miss Crum" upheld the highest standards for botanical journal editing and played an outsized role, acknowledged by

both Annetta Carter and Herbert Mason, in preparing Mason's drafts of articles for publication in *Madroño*.³⁸



Mary Leolin Bowerman (1908–2005)
Credit: *Fremontia Magazine*

Mary Leolin Bowerman, a classmate of Annetta Carter, also attended Pasadena Junior College and was influenced by the same botany teacher to transfer to UC Berkeley in 1928. Every student in Carter and Bowerman's undergraduate class of eight botany majors in 1930 was a woman. From the onset of her master's research and for the next seventy-five years, "Leo" Bowerman devoted her life to studying the flora of nearby Mount Diablo, beginning with her first visit in 1930. Botanist Dr. Barbara Ertter's scholarly and affectionate memorial tribute points out that Mary Bowerman was assigned to investigate Mount Diablo partly because she had a car.³⁹ Once there, she did her botanizing on foot.

Bowerman was the last doctoral student of Willis Linn Jepson, who was frustrated by what he considered her slow progress, which he attributed to her perfectionism. Her 1936 dissertation, "A Phytogeographic Analysis of the Vascular Plants of Mount Diablo," included these prescient words: "The California Landscape is changing rapidly as a result of the impact of man."

Barbara Ertter points out that Bowerman included ecological information to her survey, which was ahead of the science of her time: habitat, altitudinal range, and species distribution on the mountain. Bowerman explained that while many botanists were interested in California plants, few were interested in their ecology, except incidentally. Based on her doctoral work, she published a book in 1944, *The Flowering Plants and Ferns of Mount Diablo*.⁴⁰ Barbara Ertter worked with Bowerman for eight years to expand and update this book, which was finally reissued in 2002, when Bowerman was 95.

A cofounder of the conservation organization Save Mount Diablo in 1970, Bowerman fought for the rest of her days "to acquire more land, and more, and a little bit more" to add to what had become Mount Diablo State Park. She was rightfully worried about the loss of flora due to plans

³⁸ Herbert Mason, "Ethel Katherine Crum." *Madroño* 7, no. 2 (April 1943): 33–35.

³⁹ Barbara Ertter, "Savior of the Mountain: Mary Leolin Bowerman (1908–2005)," *Fremontia* 34, no. 2 (April 2006).

⁴⁰ Mary Leolin Bowerman, *The Flowering Plants and Ferns of Mount Diablo* (Berkeley: Gillick Press, 1944).

for commercial development on Mount Diablo. Before her death at ninety-seven, Mary Bowerman was pleased to learn that a buckwheat native to Mount Diablo, which she had spotted but had not viewed for many decades, was rediscovered.



Elizabeth Unger McCracken (1908–1997)
Credit: 1929 Legenda Yearbook, Wellesley College

Elizabeth Unger McCracken graduated from Wellesley College Phi Beta Kappa with a BA in 1929 and an MA in botany in 1932. She earned a PhD in botany from Berkeley in 1938 with a thesis titled “The Cytogenetic Effects of Grenz (Supersoft) Radiation on *Nicotiana langsdorffii*, Weinm.” First and foremost an educator, McCracken taught at Ohio University, Wesleyan, and Wellesley, before getting a permanent academic position at Kansas State University, an agricultural school at the time. During World War II, she worked for two years at the USDA and lectured at the University of Vermont. At Kansas State University, she held the title of assistant professor of botany from 1946 to 1950 and associate professor from 1950 to 1966; she was also cytogeneticist for the Agricultural Experiment Station. McCracken coauthored a Laboratory Manual for General Botany in 1958, as well as several subsequent revisions. Kansas State praised her research on the cytogenetics of wheat, contributions to the teaching of biology, and her loyal service. McCracken retired in 1977 and died in Kansas at eighty-eight.



Esther Parsons Perry (1903–1992)
Credit: Bancroft Library, UC Berkeley

Esther Parsons Perry was born in Berkeley but raised in Southern California. After spending her first two years at Los Angeles Normal School (precursor of UCLA), Perry earned a bachelor's degree in soil science from the College of Agriculture at Berkeley in 1925 and a master's in plant pathology in 1927. Perry became the first woman to receive a doctorate in soil science in the United States, which Berkeley awarded her in 1939. Advised by Professor Charles Shaw, Perry wrote a thesis addressing properties of California soil: "Profile Studies of the More Extensive Primary Soils Derived from Granitic Rocks in California." She conducted some of her research at the Citrus Experimental Station at Riverside in collaboration with Dr. W. P. Kelley, an agricultural chemist.

Perry's long career in Berkeley's soils survey lab extended from 1939 to 1965. Although she was a major figure in the California soil survey effort, she never was promoted to associate professor or put on a tenure track. For thirty-six years, she worked in and managed the soil survey lab in the basement of Hilgard Hall at UC Berkeley. Her job titles included "junior soil technologist" for fifteen years, from 1939 to 1954; "associate specialist soils," from 1954 to 1960; and "specialist," from 1960 to 1965. She was mentioned in *American Men of Science* in 1944. Perry was never acknowledged in USDA records as an official soil survey collaborator; she "just" ran the lab.

Perry resembled a large number of individuals, both men and women, who worked as researchers or technicians during their entire careers at the Agricultural Experiment Station but were not offered academic status at Berkeley. In soil science, as in engineering and all the earth sciences, very few women were working out in the field at the time. In the early 1950s, the College of Agriculture did not permit women to enroll in the summer soil science field course, Soil Science 105, which had been taught since 1910. Perry volunteered to teach the summer field course for the one woman who challenged the dean to permit her to take it. Perry served as instructor three more times before the course became coeducational. It was reported that in the field, Perry and her female student were obliged to follow along separately behind the men in the class.

Professor Gary Sposito of UC Berkeley was a student in the Perry lab—one of "Esther's Boys." Sposito "remembered her clipped, all-business voice giving orders in the lab. At the same time, she provided birthday cakes for all the students and a bed in the lab for those who decided that they needed to work all night on a project but needed to rest just a little." In a profile written for the 150W History Project for the Rausser College of Natural Resources, Professor Sposito commented that "Esther had a quiet determination that shone through all the bias she had to endure as a female scientist, typical of the sciences back then."⁴¹

⁴¹ Mackenzie Smith, "Celebrating CNR Women, Past and Present," UC Berkeley College of Natural Resources, January 12, 2018, <https://nature.berkeley.edu/150/celebrating-cnr-women>.



Ynés Henriqueta Mexía (1870–1938)
Credit: California Academy of Sciences

Ynés Henriqueta Mexía came to her passionate engagement with botany at midlife. Mrs. Mexía, as she was known, was said to be the most accomplished woman plant collector of her era, though she had no formal training. Mexía was born in Washington, DC, to a Mexican father, a diplomat, and an American mother. After her parents divorced, Mexía moved to Limestone, Texas, with her father and managed his ranch. She was once widowed and once divorced. In her forties, Mexía moved to San Francisco from Mexico City seeking medical treatment for depression and supported herself as a social worker.

In 1921, at the age of fifty-one, Mexía enrolled as a special student in botany classes at UC Berkeley. She joined botany graduate students in the Calypso Club on weekend field excursions and UC Extension trips. Mexía was determined to go on collecting trips, participating at her own expense and often striking out independently with native guides. Roxanna Ferris, the assistant curator of the Dudley Herbarium at Stanford, invited Mrs. Mexía to join a collecting expedition to Mexico in 1925 as a volunteer. During that trip, Mexía fell down a cliff, injuring herself, but she recovered and returned with five hundred specimens. She initiated correspondence with noted botanist Alice Eastwood, senior curator of the California Academy of Sciences (and protégée of Kate Brandegee, as noted earlier), with whom she forged a lifelong friendship. With Eastwood and botanist John Thomas Howell, Mexía drove through Nevada, Utah, Arizona, and California in an open Model T Ford on a collecting trip in 1933.



Mexía and student team “bringing home the specimens” in Contra Costa County, California, 1923.
Credit: California Academy of Sciences

In her twelve years of exploration, Mexía collected 150,000 botanical specimens. Her expeditions took her back to Mexico, where she had lived for many years, as well as to Alaska, Brazil, Peru, Ecuador, Chile, and Argentina. Mexía's best-known adventure was her trip by canoe up the length of the Amazon River at the age of sixty-one, which she reported in the *Sierra Club Bulletin* in 1933.⁴² The journey lasted three years. Mexía sent many specimens by steamer back to the California Academy of Sciences in San Francisco, and she sold other collections to finance her trips. Her expeditions were reported in such publications as the *Sierra Club Bulletin* and *Madroño*, the journal of the California Botanical Society. During her final trip to the mountains of Oaxaca, Mexico, Mexía took ill and returned to San Francisco to die soon afterward, in 1938.

Ynés Mexía's personal papers may be found in the Bancroft Library and at the California Academy of Sciences in San Francisco. In 2020, PBS Television produced a video about her life: "Ynés Mexía: Mexican American Botanist and Adventurer."⁴³ Very early on, she embraced the environmental movement; she joined the Sierra Club, Save the Redwoods League, and Audubon Association of the Pacific. In recognition of her prolific contributions, Mexía was elected to life membership in the California Academy of Sciences.



Helen Katherine Meyers Sharsmith (1905-1982)
Credit: Fremontia Magazine

An Oakland native, **Helen Meyers** earned a bachelor's degree in zoology from UC Berkeley in 1927. Next she received a master's degree, and proceeded, as did so many women with advanced degrees, to teach high school for three years. In the summer of 1930, Meyers attended the Yosemite Field School of Natural History, where she met her future husband Carl Sharsmith.⁴⁴ After her marriage, both Sharsmiths studied at UCLA before transferring to the PhD program in botany at Berkeley in 1932. Helen Sharsmith wrote her dissertation on "Flora of the Mount Hamilton Range" under Herbert Mason and was awarded her degree in 1940, as was her husband

⁴² Ynés Mexía, "Three Thousand Miles up the Amazon," *Sierra Club Bulletin* 18, no. 1 (1933): 88–96.

⁴³ PBS, "Ynés Mexía: Mexican American Botanist and Adventurer," *American Masters*, premiered April 1, 2020, <https://www.pbs.org/wnet/americanmasters/ynés-mexía-accomplished-latina-botanist-k6bggm/13948/>.

⁴⁴ Biographical material on Sharsmith is drawn from Annetta Carter. "Obituary. Helen Katherine Sharsmith" *Fremontia* 10(4): 26, 1983.

with the same advisor. As botanist Annetta Carter writes in her obituary of her friend Helen Sharsmith, the couple had two children, named John after John Muir, and Linnea, after Linnaeus. Helen accompanied her husband to a teaching post at Washington State University in Pullman, and to a staff position in Minneapolis. Carl Sharsmith was hired in a permanent post in the Biological Sciences Department at San Jose State University. Every summer the couple returned to Yosemite but eventually divorced.

Helen Sharsmith was appointed as senior herbarium botanist at the Berkeley Herbarium in 1950, where she remained until her retirement in 1969. In 1965, Sharsmith published *Spring Wildflowers of the Bay Area* which was reprinted due to its popularity.⁴⁵ At the Herbarium she headed public service activities, which included the Herbarium's extensive plant exchange program. Despite her considerable administrative responsibilities, she contributed research papers to the journal *Madroño*. Her monograph on "The Genus *Hesperolinon* (Linnaceae)" published by the Berkeley Botany Department was noted by British botanists as an outstanding floral morphological study.⁴⁶ Annetta Carter, in an obituary of her friend, points out that Helen Sharsmith was a skilled photographer, and kept photographic records of her early summers in the Yosemite High Country. Sharsmith's doctoral dissertation on the flora of Mount Hamilton was published by the Santa Clara Chapter of the California Native Plant Society in 1982.



Helen Sharsmith, Yosemite National Park
Credit: Jepson and University Herbaria, UC Berkeley



⁴⁵ Helen Sharsmith. *Spring Wildflowers of the Bay Area*. University of California Press, 1965.

⁴⁶ Carter. op.cit.

Isabella Kauakea Yau Yung Aiona Abbott (1919–2010)
Credit: Stanford University's Hopkins Seaside Laboratory.

Isabella Kauakea Yau Yung Aiona Abbott was recognized as a foremost expert on edible seaweed, which she had collected as a girl with her mother on the beach in Hana, Maui, in what was then the territory of Hawaii. Her native name means “white rain of Hana.” Aiona’s father emigrated from China to work on a Hawaiian sugar plantation. Her mother was a native Hawaiian. Aiona earned a BS in botany at the University of Hawaii and an MS from the University of Michigan in 1942. In 1946, she entered graduate school at Berkeley, where she met her husband, Don Abbott, a doctoral student in invertebrate zoology. She studied algal taxonomy and received her PhD in 1950. Called Isabella Abbott after her marriage, she is recognized as the first native Hawaiian woman to earn a doctorate in science.

Abbott followed her husband to Stanford’s Hopkins Marine Station in Pacific Grove, California, where her husband spent his career. For ten years, she raised their daughter while continuing to study the algae of the Pacific. In 1960, Abbott was hired as a lecturer at Hopkins Marine Station while continuing to conduct research and publish. Eventually, in 1971, Stanford promoted her to full professor of biology, making Abbott the first female full professor of biology at Stanford and the first full professor from an underrepresented community. Eventually, in 1971, Stanford promoted her from lecturer to full professor, making her the first full female professor of biology at Stanford University.



Isabella Aiona Abbott
at Stanford’s Hopkins Marine Station.
Credit: Chuck Painter, Stanford News

The Abbotts returned to Hawaii in 1982, where Abbott taught ethnobotany at the University of Hawaii, Manoa, until she died in 2010. She has been credited with discovering more than two hundred different algae species. She wrote more than 150 research papers and eight books, including *Marine Algae of California*, which has been considered a definitive description of marine algae along the Pacific coast.⁴⁷ “Izzy” Abbott was widely appreciated for her delicious native cuisine incorporating seaweed. Isabella Abbott was honored with the prestigious Gilbert Morgan Smith Medal by the National Academy of Sciences in 1997, which called her a “Living Treasure of Hawaii.”⁴⁸

The Evolution of Biology at UC Berkeley: An End and a Beginning

The various departments in which biology was taught at Berkeley were completely reorganized at the end of the 1980s after a decade of discussion.⁴⁹ With the restructuring and the closure of the Department of Botany in 1989, inevitably some institutional history has faded. Fortunately,

⁴⁷ Isabella Abbott, *Marine Algae of California*. (Stanford, CA: Stanford University Press, 1992).

⁴⁸ Indigenous Goddess Gang, “Dr. Isabella Aiona Abbott,” May 20, 2019, <https://www.indigenousgoddessgang.com/matriarch-monday/2019/5/20/isabella-aiona-abbott>.

⁴⁹ Daniel E. Koshland Jr., “An Interview with Daniel E. Koshland, Jr.,” an oral history conducted in 1998 and 1999 by Sally Hughes, in “The Reorganization of Biology at the University of California, Berkeley,” Oral History Center, Bancroft Library, UC Berkeley, 2003.

researchers have access to many records from archives at other universities, as well as those in the University and Jepson Herbaria, the UC Botanical Garden, and the Bancroft Library.

Some twenty departments were absorbed into several new ones in 1989.⁵⁰ Emerita Professor of Integrative Biology Marvalee Wake was chair of Zoology and both interim chair and founding chair of Integrative Biology (IB) during this period. She explained "...the new departments were amalgamations, rather than consolidations....Zoology faculty went to Molecular and Cell Biology (MCB) and IB. Faculty members of those departments had some choice, as determined by general area of research. For example, people in Botany went to three different departments: MCB, Plant Biology and Genetics in Conservation and Natural Resources (CNR) (people in plant physiology, development, etc.), and the ecologists and systematists, came to IB." Only the Paleontology Department faculty transferred in full to IB.⁵¹ Many departments in the College of Agriculture, such as the Department of Entomology, were eventually absorbed by what is now the Rausser College of Natural Resources.

Yet despite these changes, studies of systematics, evolution, and ecology of plants, informed by new molecular tools, remain strong at UC Berkeley in the tradition of these pioneering women. The future looks promising. The stories of women botanists at Berkeley are a beginning. They contribute to the ongoing 150W History Project, initiated by Chancellor Carol Christ's celebration of the 150th anniversary of women at Berkeley. I hope that this overview will inspire others to broaden and deepen this history.

⁵⁰ Professor Martin Trow, UCB historian of education, explains his view of the evolution of biology dictated new academic divisions: "As biology developed during the twentieth century, new academic departments were created reflecting evolving changes in the way biology was done and taught at Berkeley. The earliest of them centered on the different types and development of organisms as revealed by the theory of evolution. The field changed to focus on organs within organisms and then the cells within the cells, and finally the molecules within cells." M. A. Trow, "Biology at Berkeley," Research and Occasional Papers Series, UC Berkeley Center for Studies in Higher Education, March 1, 1999.

⁵¹ Professor Marvalee Wake provided further details of the reorganization. "The Department of Physiology-Anatomy migrated mostly to MCB. ...Furthermore, the Department of Human Dynamics, formerly named Department of Physical Education, was fused by decanal fiat only in 1998, nine years after the reorganized departments were established." Personal communication, March 14, 2022.

Botany Doctoral Degrees Awarded to Women 1915–1950, UC Berkeley

1915	Helen M. Gilkey
1918	Annie M. Hurd (Karrer)
1921	Alice M. Ottley
1923	Dolly C. Lutjeharms (Hagan)
1926	Margaret E. Myers
1929	Irma E. Schmidt (Webber)
1930	Priscilla Avery
1931	Dorothea G. Doubt
1931	Katherine Esau
1932	Lucile Roush (Mason)
1932	Hazel Hayden McKay
1934	Helen Mar Wheeler
1936	Mary Leolin Bowerman
1936	Muriel V. Bradley
1936	Marion Stilwell (Cave)
1937	Elizabeth U. McCracken
1938	Charlotte G. Nast
1940	Helen K. Sharsmith
1941	Margaret Kemp
1943	Catherine Roberts
1946	Nancy Robinson Axelrod
1946	Shuh-Wei Hwang
1948	Hilde E. Z. Hirsch
1949	Lois L. Eubank
1949	Marian Enzler Reeve
1950	Isabella Aiona (Abbott)
1950	Mildred M. Griffith

Source: Lincoln Constance, *Botany at Berkeley: The First Hundred Years*

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All errors in the text are my own. I welcome comments and corrections.

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