

The Flowering of Natural History Institutions in California

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The genesis and early years of a diversity of natural history institutions in California are presented as a single intertwined narrative, focusing on interactions among a selection of key individuals (mostly botanists) who played multiple roles. The California Academy of Sciences was founded in 1853 by a group of gentleman scholars, represented by Albert Kellogg. Hans Hermann Behr provided an input of professional training the following year. The establishment of the California Geological Survey in 1860 provided a further shot in the arm, with Josiah Dwight Whitney, William Henry Brewer, and Henry Nicholas Bolander having active roles in both the Survey and the Academy. When the Survey foundered, Whitney diverted his efforts towards ensuring a place for the Survey collections within the fledgling University of California. The collections became the responsibility of Joseph LeConte, one of the newly recruited faculty. LeConte developed a shared passion for Yosemite Valley with John Muir, who he met through Ezra and Jeanne Carr. Muir also developed a friendship with Kellogg, who became estranged from the Academy following the contentious election of 1887, which was purportedly instigated by Mary Katherine Curran. Curran, as Katharine Brandegee, subsequently crossed philosophical swords with Edward Lee Greene, a confirmed splitter who became professor of botany at the University where he inspired Willis Linn Jepson. Brandegee, who had been mentored by Behr, may have in turn influenced Harvey Monroe Hall, who laid the foundation for experimental plant taxonomy at the Plant Biology Department of the Carnegie Institution of Washington at Stanford University. Hall's presence at Stanford University followed President David Starr Jordan's previous support of Luther Burbank. Also at Stanford was William Russel Dudley, who became active in various forestry-related issues, including the founding of the Sempervirens Club and Big Basin Redwoods Park. Muir, Jordan, Dudley, and Jepson all were involved in the founding and early years of the Sierra Club. They also advocated for Yosemite National Park, the establishment of a forestry school in California, and the re-establishment of the State Board of Forestry. The previous Board, with Kellogg as a commissioner and John Gill Lemmon as Botanist, had been disbanded in 1893. Sara Plummer Lemmon, a member of the Academy with her husband, rallied the California Federation of Women's Clubs in support of forestry issues as well. Many of these goals reached fruition during the governorship of George Cooper Pardee.

In a previous paper (Ertter 2000), I explored the intertwined origin and early years of the various institutions of natural history in California, notably the California Academy of Sciences, the California Geological Survey, the University of California, and Stanford University. In many instances the same cast of characters (e.g., Josiah Dwight Whitney and Katharine Brandegee) played significant roles in multiple institutions. The present paper, in addition to recapitulating the core of the previous paper, expands the concept of "institutions of natural history" beyond academ-

ic and research institutions and/or those that collect and house natural history collections *per se*. In particular, I took this opportunity to analyze the genesis of land management agencies that are now an integral part of natural history activities, and whose controversial embryonic years overlapped those of the academic institutions. Foremost are the newly established park and forest management agencies at both state and federal levels. Coupled with the rise of the resultant government agencies was the appearance of non-governmental organizations, when the citizen groups whose active advocacy was instrumental in getting the governmental agencies established opted to become formally organized with the dual goals of outdoor enjoyment and watchdog oversight. As a result, these non-profit groups also serve as active participants in current natural history research and management,

The logic for an expanded definition of “institution” derives from the degree to which the same cadre of influential individuals play significant multiple roles, weaving a single story out of what has generally been treated as independent institutional histories. As a disclaimer, the individuals highlighted in the current paper are not necessarily the most significant in the history of each institution and, in fact, are only peripheral to the founding of the various land-management agencies. My choice of individuals to highlight is accordingly not always proportional to their influence in each institution, but rather represents the extent to which the same names keep showing up in multiple contexts, many of which I had previously never suspected. And, being a botanist myself, I am most familiar with those individuals with at least some botanical connection, even if their primary research focus lay elsewhere. Likewise, the land-management and conservation institutions highlighted are not necessarily those with the greatest present-day impact on natural history resources, but rather they are those whose origins fall within the covered time-frame and within which the highlighted individuals played at least some role. These institutions, nevertheless, stand as representatives of our current panoply of governmental agencies and non-governmental organizations whose collective efforts increasingly affect the future of our natural history legacy.

California Academy of Sciences: The Early Years

The development of institutions of natural history in California begins in 1853 with the founding of the California Academy of Natural Sciences (shortened to the California Academy of Sciences in 1868). The seven founders were all gentlemen-scholars, as was the norm for scientific practitioners in the 19th century. Dr. Albert Kellogg (Fig. 1), the founder with the strongest botanical inclination, exemplified the gentleman-scholar tradition to the extreme, to the extent of sacrificing his professional career as a physician-pharmacist to focus on the wealth of undescribed plant species by which he was surrounded (Greene 1887). Kellogg’s botanical efforts took the form of beautifully rendered sketches of many of the plants he thought were new to science, accompanied by a Latin name and formal description. Having no formal training, however, “his terminology was somewhat original and his way of making Latin adjectives even more so” (Greene 1887:149).

A component of professional training was introduced into the fledgling Academy with the arrival of Hans Hermann Behr (Fig. 2) in 1854. Trained in medicine and natural science at the universities of Halle, Würzburg, and Berlin, Behr represents the group of educated refugees from the tumultuous birth-pangs of the modern German nation who infused the American frontier with a dose of solid Continental science in the mid 1800s (Gutzkow et al. 1905; Ertter 2003). His high standards also set him apart from many of his fellow medical practitioners in San Francisco, resulting in the loss of many patients when the “scientific humbugs and professional quacks” he scorned retaliated by accusing Behr of being in league with Jesuits “of the most sinister designs” (Leviton and Aldrich 1997:428).

Behr’s credentials and Teutonic self-assuredness might have also served to encourage the gen-



FIGURE 1. Albert Kellogg

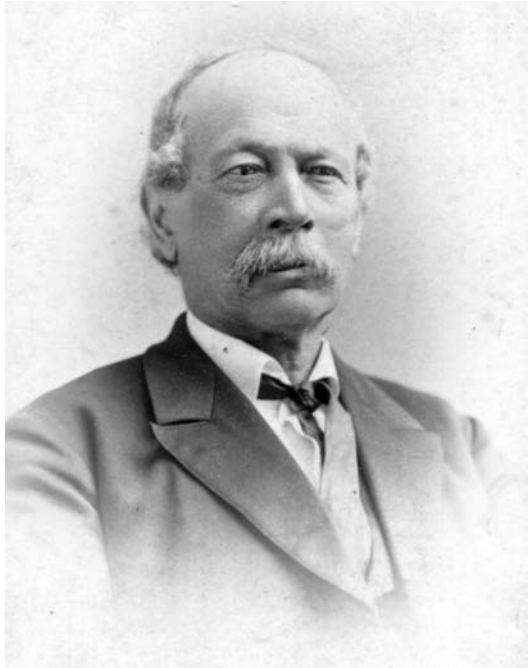


FIGURE 2. Hans Hermann Behr

tlemen-scholars in the Academy to publish new species presented at the weekly membership meetings. The *Proceedings* from these meetings were first published in *The Pacific*, a local Christian weekly newspaper, and only after several years reprinted as a unit for distribution to other institutions (Curran 1885; Leviton and Aldrich 1997). Other local periodicals were also used as an outlet for publishing new species, including *The Hesperian* and *Pacific Rural Press*. The nearly complete lack of comparative material and critical literature inevitably resulted in the superfluous description of species already named elsewhere, which, combined with the aberrant publication format, led scientists at established institutions in the eastern United States and Europe largely to ignore species published by the Academy. In response, the Academy passed a resolution in 1854 that “we will regard every publication of new species, which has been or which may be made through the daily papers of this city, as substantial evidence of priority of discovery.”

Eventually the Academy’s stand on priority was accepted by Eastern scientists, such that Academy member John Gill Lemmon (Fig. 3) stated that he had been encouraged to describe new species by no less an esteemed botanist than Asa Gray at Harvard, who represented the voice of botanical authority in the United States at that time. Lemmon further castigated “the custom of some Eastern men to describe all sorts of California plants from any kind of specimens, without ever having seen them grow, and take the chances as to their being new and the descriptions accurate” (quoted in Leviton and Aldrich 1997:239). In these early years one accordingly already sees the lines being drawn between “herbarium botanists,” who depend entirely on dried material, and the incipient effort to understand species within a living ecological context.

Lemmon also serves to represent the many members elected to the Academy during the first few decades following its founding. A survivor of the infamous Andersonville Confederate prison, in 1866 Lemmon came to his brother’s ranch in Sierra Valley to recuperate. After a year of “liberal diet” that increased his weight to a full 90 pounds, Lemmon was able to walk a little way alone,



FIGURE 3. John Gill Lemmon



FIGURE 4. Sara Allen Plummer Lemmon

“being greatly stimulated by handfuls of unrecognizable plants” (Lemmon 1908:18). This botanical incentive led to a career as a multi-faceted freelance botanist, among the first in California, in partnership with his wife, Sara Allen Plummer Lemmon (Fig. 4). Sara, who established Santa Barbara’s first library, was among the first group of women accepted into the Academy in 1878, thereby fulfilling an early resolution proposed by Kellogg: “Be it resolved that we highly approve the aid of females in every department of natural history, and that we earnestly invite their cooperation” (quoted in Leviton and Aldrich 1997:21).

California Geological Survey

In spite of early accomplishments, it is unlikely that the California Academy of Sciences would have survived its first decade had it not been for the shot in the arm provided by California’s second significant institution of natural history, the California Geological Survey. The Academy’s near-demise prior to the establishment of the Survey in 1860 is documented in several sources, such as a letter from Behr to a fellow German expatriate, George Engelmann, who provided botanical expertise in St. Louis, Gateway to the American West:

I haven’t heard for a long time from the [Academy] and it seems that there are not too many signs of life. There are several things amiss, primarily the necessary funds. From this follows that neither collections can be wisely planned and carried out, nor that the needed literary support can be acquired. Much gets lost in the collections, and scientific descriptions and works lack all overview, because the few members who work can only refer to study-type monographs, travel reports, and natural history picture books. And thus it happens that the Society in the 7th year of its existence has really not achieved anything despite the grueling labors of one or two of its members. By the way, I must confess that I am only incompletely aware of the goals of the Society during the last

years and as an outsider I can only judge the results. (Letter of 10 November 1860, archives of Missouri Botanical Garden, translated by Edgar Denison; quoted in Ertter 2003:21)

In addition to serving as a centerpiece for state pride, the Survey was intended to locate new geological deposits and other natural resources that could be exploited for economic development, especially important given the near-exhaustion of known gold reserves (Goetzmann 1966). The California government accordingly approved a Geological Survey of the State in April 1860, headed by Josiah Dwight Whitney as State Geologist. The legislated mandate of the Survey was to map California and to prepare “a full and scientific description of its rocks, fossils, soils, and minerals, and of its botanical and zoological productions, together with specimens of the same, which specimens shall be properly labeled and arranged, and deposited in such place as shall be hereafter provided for that purpose by the legislature.” Whitney selected William H. Brewer, an agricultural chemistry professor from Pennsylvania, as his right-hand man. Brewer also served as primary botanist, supplemented by collections from the Survey’s surgeon-naturalist James G. Cooper.

The heavy winter rains of 1861–1862, while disastrous for the state economy and a serious setback for the Survey, proved to be an immense boon to the Academy. Unable to conduct fieldwork due to washed out roads and bridges, the members of the Survey became active in the Academy and soon filled most of the officer positions. Whitney served as Academy president for many years, while Brewer became corresponding secretary and Cooper curator of zoology. At the same time Kellogg and other members of the Academy served as an additional source of specimens for the Survey.

When Brewer left the Survey after four years to accept a position at Yale, his botanical duties were taken over by Henry Nicholas Bolander (Fig. 5), an expatriate German school teacher who had joined the Academy in 1862 (Jepson 1898). Unfortunately, the Survey’s increasingly dire financial situation allowed Bolander to be hired only periodically, apparently on a contract basis. Bolander’s total collections nevertheless exceeded those of Brewer, with a special focus on previously overlooked graminoids and bryophytes. Bolander also played an active role in Academy affairs, and was credited by Lemmon with encouraging the recovering veteran’s botanical interest (Lemmon 1908).

All of the botanical collections for the Survey, from whatever source, were incorporated into a single numbering sequence. These were sent to Harvard, where America’s foremost botanist, Asa Gray, was preparing a synoptical flora of North America. Gray was accordingly not

only eminently suited to work up the Survey’s collection, but he needed to see the new material for incorporation into this magnum opus. After Brewer moved to Yale, he periodically traveled to Harvard to work with Gray on preparing the botanical report of the Survey. This was at considerable personal expense to Brewer, since no State funds were made available in spite of a legislative mandate to produce the report (Farquhar 1930). It was accordingly only when a group of



FIGURE 5. Henry Nicolas Bolander

California's wealthier citizens, spearheaded by railroad magnate and former governor Leland Stanford, donated the necessary funds to cover publication costs, including the hiring of Sereno Watson as an assistant to Gray and Brewer, that the botanical report for the Survey was completed. The resultant two-volume *Botany of California* (Brewer et al. 1876; Watson 1880) stands as the first flora of California. It incorporates not only collections made by the Survey team but by all botanists who had collected in California, including Kellogg, Behr, Lemmon, and the latter's soon-to-be-wife Sara Plummer.

The infusion of fresh blood had rejuvenated the Academy, but the Survey itself had fallen on hard times. Initial enthusiasm from the state legislature had rapidly waned when lucrative new mineral deposits were not immediately forthcoming, forcing Whitney to spend most of his time justifying continued support for the Survey from "the jackasses in Sacramento" whose "votes can only be had this year by purchase" (quoted in Brewster 1909:264). The nail in the coffin was a speculation boom involving Santa Barbara's vast petroleum reserves, which the Survey was accused of having overlooked. Although it was later shown that the speculation was probably driven by a scam in which a sample of refined Pennsylvania oil had been used in place of the thick Santa Barbara crude (which was in fact of little value using technology available at the time), the damage to the Survey's reputation had already been done (Goetzmann 1966). As summarized by Whitney, "'Petroleum' is what has killed us. By the word 'petroleum,' understand the desire to sell worthless property for large sums and the impolicy of having anybody around to interfere with the little game" (quoted in Brewster 1909:267).

University of California: Early Years

In that the botanical specimens had been sent to Harvard for processing (sans funds), Whitney was also accused of running the Survey for the benefit of Harvard University (Brewster 1909). In actuality, Whitney lobbied hard to obtain state funds for housing the collections resulting from the Survey in California, divided between the Academy and the State Agricultural Society in Sacramento (Appendix E *in* Leviton and Aldrich 1997). When this attempt failed, he turned his efforts instead into assuring a place for the collections within the newly proposed University of California. Serving as the chair of the commission charged with drafting plans for the University, Whitney maintained that "the establishment of the Geological Survey was in fact the first step towards the production of a State University. Without the information to be obtained by that Survey, no thorough instruction was possible on this coast, either in geography, geology, or natural history; for the student of these branches requires to be taught in that which is about him, and with which he is brought into daily contact, as well as that which is distant and only theoretically important." (quoted in Stadtman 1970:27).

Whitney's efforts evidently paid off (probably aided by rivalry with Harvard!) Of the 28 sections of California Assembly Bill 583 that brought the University of California into being in 1868, Section 24 deals exclusively with accommodations for the Survey collections, which "shall belong to the University, and . . . be arranged by the resident Professors of the University in a building by themselves, which shall be denominated the 'Museum of the University'." Although it is unclear exactly when a set of the Survey's botanical collections were deposited in the fledgling University, other collections were apparently housed in South Hall, one of the first two buildings constructed when the Berkeley campus opened in 1873.

Subsequent references to the mandated "Museum of the University" are few and far between, with one of the more intriguing being an 1875 "Report of the Results of Excursion of the Scientific Party of the University" submitted by Joseph LeConte, the first Professor of Geology, Natural History, and Botany:

In accordance with my promise I hereby make a brief report of the results of the recent excursion made by the University Scientific Party. The party as you know was organized for the purpose of utilizing the Spring recess of a week, in giving some practical instruction in Geology, Lithology, and Surveying; but expected also to make some collections of plants, rocks, fossils, etc., for the Museum. . . . We started on the 25th March. Our route passed through San Pablo, Martinez, Pacheco, to Nortonville; thence to Mt. Diablo Summit through Pine Cañon and return by Walnut Creek, Lafayette, Summit House to Berkeley. As our time was very limited we stopped but little until our objective points were reached. We gathered, however, on the first day, some cretaceous fossils near Martinez, and Mr. McLean, our young botanist a large number of plants. (LeConte 1875.)

LeConte apparently did not collect plants himself, but the several hundred collections from throughout California by Franklin P. McLean (aka Maclean), a graduate of the College of Pharmacy, are apparently the earliest extant herbarium specimens prepared under the University aegis.

Joseph and his brother John LeConte were among the initial faculty recruited after the University was formally established in 1868 by the merger of a pre-existing private College of California (where Brewer had served as Professor of Natural Sciences in 1863) and the proposed State Agricultural, Mining, and Mechanical Arts College. The LeConte brothers were among several newly recruited faculty who were fleeing the deprivations of Reconstructionist South, leading to James Cooper's slur about "that Asylum for rebel Professors" (quoted in Leviton & Aldrich 1997:123). Although Cooper, zoologist for the Survey who was also active in the Academy, apparently had little respect for the new University, other Academy members taught courses during the early years, including Bolander and Kellogg (Constance 1978).

Another initial faculty recruit who played a significant role in California's natural history, albeit indirect, is Ezra Slocum Carr. Carr was recruited as Professor of Agriculture, Chemistry, and Horticulture at UC after having parted ways with the University of Wisconsin over a variety of academic controversies. His primary claim to fame at UC was a continuation of this combative tradition, when he found himself on the losing side of one of the seminal battles that would dramatically shape the University's future. The specific issue was to what extent the University would model itself according to the provisions of the 1862 Morrill Act that provided the funding for its establishment. Also called the Agricultural College Land Grant Act, the federal legislation mandated a focus on "such branches of learning as are related to agriculture and the mechanical arts . . . in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life" (quoted in Stadtman 1970:25). Carr staunchly supported a close adherence to this applied focus, carrying the banner for "farmers and workingmen [who] were challenging established wealth, established authority, and established intellectual values, [and who] found the University, even as it then existed, too rich for the needs of the common man" (Stadtman 1970: 69).

Carr was opposed by University President Daniel Coit Gilman, who advocated a broader liberal arts curriculum. Whitney sympathized with Gilman, who he described as "engaged in a hard fight to save the University from the claws of the grangers [farmers] who want to make a manual-labor school of it" (quoted in Brewster 1909:288). Gilman's camp carried the day, and Carr was dismissed in 1875 after refusing to resign. Not unscathed, Gilman also departed the arena, accepting the presidency of the newly established John Hopkins University in 1876. Here he was able to pursue his vision unfettered, pioneering the combination of research and teaching that helped revolutionize higher education in the United States (<http://www.jhu.edu/>).

Carr's primary connection to the current narrative, however, is the friendship he and his wife Jeanne had with a young Scotsman who had preceded them to California from Wisconsin the previous year, by name of John Muir (Fig. 6). As analyzed by Gisel (2001), Jeanne Carr played a piv-

otal role as mentor and de facto agent for Muir, convincing him to convert his astute observations and insights into print. Although best known for his lilting essays in praise and defense of his beloved Yosemite Valley and the natural world in general, Muir was also an accomplished botanist who contributed specimens to Gray at Harvard, resulting in the discovery of several new species. Muir's primary scientific contribution, however, was to correctly interpret the glacial origin of Yosemite Valley, contradicting the cataclysmic explanation put forth by Whitney.

Through the Carrs, Muir made the acquaintance of Joseph LeConte (Brentano 2000; Gisel 2001). The two men first met when LeConte was on a camping trip to Yosemite in 1870, having joined several students on a "university excursion party" only months after his arrival in California. This was prior to Muir's literary efforts (encouraged by Carr), when he was working for a sawmill in Yosemite Valley itself. The meeting occurred as the excursion was on its way to Yosemite Falls:



FIGURE 6. John Muir

Stopped a moment at the foot of the falls, at a saw-mill, to make inquiries. Here found a man in rough miller's garb, whose intelligent face and earnest, clear blue eye excited my interest. After some conversation, discovered that it was Mr. Muir, a gentleman of whom I had heard much from Mrs. Professor Carr and others. He had also received a letter from Mrs. Carr concerning our party, and was looking for us. . . . Mr. Muir is a gentleman of rare intelligence, of much knowledge of science, particularly of botany, which he has made a specialty. He has lived several years in the valley, and is thoroughly acquainted with the mountains in the vicinity. A man of so much intelligence tending a sawmill! (LeConte 1960:56, 59.)

The resultant friendship and mutual respect, anchored in a shared passion for both the beauty and the geology of the Sierra Nevada, was sufficient to weather some resentment about LeConte getting credit for Muir's insights on Yosemite glaciation (Gisel 2001). Muir also regretted that LeConte "had allowed himself to be caught and put in professional harness so early" (quoted in Brentano 2000:82), reflecting the contrast that existed between Muir's and LeConte's approach to nature's beauty. The 1870 excursion was only the first of several trips by LeConte to Yosemite and the surrounding Sierra Nevada, establishing his connection with the area to the extent that a memorial lodge was built in the Valley by the Sierra Club after his death in 1901, on LeConte's final expedition to his beloved Yosemite (Figs. 7–8).

Political Upheaval at the Academy

Muir and Jeanne Carr also developed a close friendship with Kellogg, who shared their poetic affinity for nature, resulting in a joint camping trip to Yosemite in 1873. This was the same year that Toland Medical College and the affiliated College of Pharmacy were absorbed as the



FIGURES 7 (above) and 8 (right). Sierra Club memorial to Joseph LeConte in Yosemite National Park. Photos by the author.

University's medical school, setting into play a chain of events that would ultimately result in Kellogg's falling out with the institution that he had helped found, and in which he had long been revered.

Among the first female students in the new medical school was a young widow, Mary Katharine Layne Curran (Fig. 9), who earned her M.D. in 1878. Strong-willed and uncompromising, Curran found a kindred spirit and mentor in Behr, who taught botany at the College of Pharmacy as the core of the available pharmacopoeia. As described by a fellow student:

We were all much interested in *Materia Medica*. Our professor was a very busy man and could not always give the time he wished to give to the subject: Therefore Mrs. Curran with a number of us who were members of the Academy of Sciences decided to go out with the Pharmaceutical Class — Dr. Herman Behr our instructor — and study the flora and plant life of the bay region usually Marin, Contra Costa and San Mateo Counties. Whatever was collected of



FIGURE 9. Mary Katharine Layne Curran

value or of special interest was taken or given to the Academy of Sciences. Mrs. Curran was a very close student and observer—so also was Dr. Behr and his deep interest in the Academy and the flora and plant life of California had a charm for the entire class. (L. Wanzer to E. Stockton, 1925, in University Herbarium archives)

With Behr's backing, Curran became active in the Academy, initially sharing her mentor's primary interest in entomology. However, after failing to establish a medical practice, she accepted the position of joint curator of botany at the Academy in 1883. In addition to overhauling curation of the herbarium, which she described as "in a shocking condition" (quoted in Setchell 1926:167), Curran began her life-long editorial activities by establishing the *Bulletin of the California Academy of Sciences*. Published therein is a little-known paper (Curran 1885) in which she evaluated all the plant species described at the Academy by Kellogg, Behr, and Bolander according to the recently published *Botany of California*, a paper that has gained tremendous significance following the destruction of many of the type specimens in 1906. The article was accompanied by reprints of detailed drawings, several of them exquisitely colored (Fig. 10), of species that Kellogg had published in *The Hesperian*, a by-then-defunct local monthly magazine.

At some point Curran also became active in Academy politics, culminating in the hotly contested election of 1887 that resulted in a wholesale replacement of incumbents with a new slate of officers. The specific issues have faded with time but probably involved disagreements over the windfall resulting from the magnanimous bequest of James Lick, "the eccentric cabinetmaker whose investments had made him a millionaire" (Stadtman 1970:108). Although Lick's gift was ultimately responsible for converting the Academy from a scholarly club to a premier research institute, the initial impact was one of extreme financial straits while the will was being contested by a dispossessed son, during which time the Academy was strained to pay taxes on land donated by Lick just prior to his death. When the unbelievable largess of well over half a million dollars was finally available to the Academy, disagreement then erupted over how it would be best directed. The most contentious question was whether the bequested prime real estate on Market Street should be used as the site of badly needed new quarters for the Academy's collections, as intended by Lick, or if it made better economic sense to construct a commercial building on the site that would generate income to maintain a new museum facility built elsewhere. The eventual structure was an innovative compromise, with commercial space in front and the Academy museum and offices in the rear, accessed through a prominent portal.

Disagreement over the Market Street lot was, however, apparently only one facet of opposition to incumbent George Davidson, a member of the United States Coast Survey who had served as president of the Academy for the preceding 16 years. The extent of disfavor is evidenced in the Reform Ticket of 1887 (copy in UC Herbarium archives), which proposes "To advance the cause of Science instead of the aggrandizement or profit of individuals" and "To put the Society in a position of respectability before the world, such as to deserve the large Bequests and Donations which are being withheld for the want of confidence in its management." It is quite likely that this Reform Ticket was printed by Curran, given her editorial activities and firm support of opposition candidate Harvey Willson Harkness. Indeed, Jepson (1933) goes so far as to claim that "the first political upheaval of the Academy [was] largely engineered by Mrs. Mary K. Curran." The end result was the replacement not only of Davidson by Harkness as Academy president, but also a nearly complete turn-over in the other elected positions and a deep resentment against the new administration by allies of Davidson and other former officers. A contemporary letter encapsulates the tenor: "Acad[em]y affairs as you will infer are run *a la Curran* and nobody else has anything to say in the matter — Greene draws off to Berkeley—how long this state of things may last *quien*



sabe. I enclose Harkness's inaugural written as I understand by Curran." (C.C. Parry to S.B. Parish, quoted in Ewan 1955:32).

The University may have acted as a stronghold for resistance to the new Academy administration in general, as evidenced by the appearance of Joseph LeConte as candidate for Academy president on an unsuccessful opposition ticket in the 1890 election (Leviton and Aldrich 1997). LeConte's disdain for Academy politics is clearly stated: "Under the presidency of J.D. Whitney the Academy was prosperous and held a high position among the scientific institutions of our country; but from that time, because of internal dissensions, it dropped lower and lower" (quoted in Ewan 1955:32). Edward Lee Greene, referred to in the letter from Parry to Parish, left his position as joint curator of botany with Curran to accept the newly established position of Professor of Botany at Berkeley. Malacologist William G.W. Harford, ousted from his post as Director of the Museum at the Academy, also relocated to the University, serving as assistant curator of the "Museum of the University of California" (Jepson 1933).

Kellogg also became embittered with the new administration, presumably out of loyalty to Davidson and Harford. His ties to Harford, whom Davidson referred to as Kellogg's "other-self" (in Greene 1889–1890:vi), were particularly strong, with Kellogg becoming a member of the Harford household in Alameda in his later years. Kellogg's estrangement from the Academy that he had helped found continued beyond his death (which occurred less than a year after the election), such that his botanical drawings were not willed to the Academy "while the present administration was in power." This led to further acrimonious debate and "a great many desultory remarks" over the status of Kellogg's work that had been accomplished during his paid tenure at the Academy (minutes of 3 Dec 1888, in Leviton and Aldrich 1997). The debate came to a head with the posthumous publication of a book containing Kellogg's illustrations and other material, separate from the Academy's purview (Greene 1889–1890). Davidson provided the introductory eulogy to the book, extolling how:

[Kellogg worked for the Academy] and believed in its success when the number of members could have been counted on one's fingers, and when the means of supporting such an institution and publishing its results came wholly from their professional earnings. . . . Dr. Kellogg did his full quota of work among workers, and bore his share of the trials; he never lost hope, he inspired others with his enthusiasm, he quieted dissension; he was confident there would spread among our people a desire for that scientific knowledge which is the foundation of the practical. Beyond the wild rush for wealth and the unsettledness of that period he foresaw the growth of schools, colleges, universities and societies for every branch of scientific research. . . . In fact, the California Academy of Sciences owes its present standing in science and wealth to the labors of Dr. Kellogg and his fellow workers. (Greene 1889–90:v–vi).

The Greene Era at Berkeley

The publication of Kellogg's final opus was spearheaded by Davidson, William P. Gibbons (another disenfranchised Academy member of long standing), and Edward Lee Greene (Fig. 11), mentioned previously as "drawing off" to Berkeley. Greene apparently retained a deep loyalty to Kellogg, who probably served as a mentor and role model following Greene's arrival in 1881 as pastor of St. Mark's Episcopal church in Berkeley. Greene obviously had reasons beyond Academy politics to accept the first strictly botanical appointment at the University in 1885, given that his conversion to Catholicism in 1884 left him unqualified to continue as an Episcopalian pastor (McIntosh 1983).

← FIGURE 10. Color lithograph of the leopard lily by Albert Kellogg that first appeared in *The Hesperian* and then was reproduced by Katharine Curran [Brandege] in 1885



FIGURE 11. Edward Lee Greene

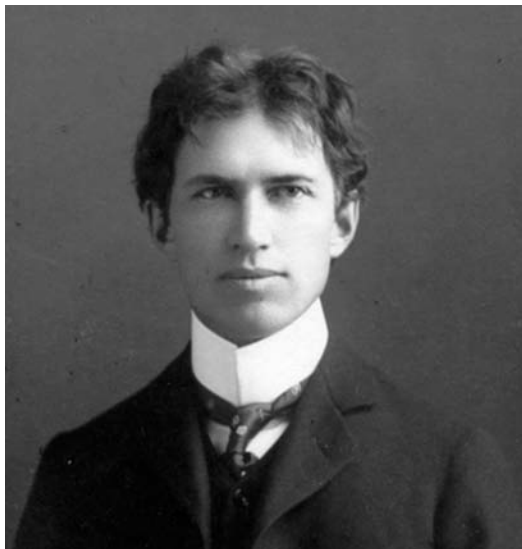


FIGURE 12. Willis Linn Jepson

Greene's ten years at Berkeley coincided with a flowering of botanical activity, with numerous energetic colleagues. His position had been lobbied for by Eugene W. Hilgard, who had replaced Ezra Carr when the unfortunate latter lost his political battle with President Gilman in 1875. Hilgard's appointment launched the University's College of Agriculture and Agricultural Experiment Station, followed by the establishment of a garden of economic plants in 1879. By 1890 a College of Natural Sciences had been established, containing a Department of Botany. Newly appointed faculty within the fledgling department included Joseph Burt-Davy, with seminal interests in agronomy and economic botany, and Marshall Avery Howe, who taught morphology and cryptogamic botany (Constance 1978). Several students also played active roles in the department, notably Willis Linn Jepson (Fig. 12) who arrived in 1885. In 1891 the instructors and students of the botany department founded the journal *Erythea* (Fig. 13) and the Chamisso Botanical Club, which had as a primary goal "the collection of materials upon which to found local plant-lists" (Jepson 1894:171).

Greene also established his own journal, *Pittonia*, in 1887, primarily as a personal outlet where he could publish new species and philosophies independent of critical review. This gained importance as Greene's views became increasingly marginalized, especially in the matter of ultimate priority (i.e., not accepting Linnaeus' *Species Plantarum* as a starting point). Greene also earned notoriety as a hardcore splitter, with the philosophy "that many species exist in nature, for which no specific characters can easily, or even by any known criterion, be found at all" (Greene 1889:298). His reputation has been further tarnished by the claim that this philosophy was rooted in creationist leanings: "The underlying reasons of Mr. Greene's devotion to 'new species' are not far to seek. He openly contemns [*sic*], as inconsistent with the Mosaic record, the theory of evolution held in greater or lesser degree by almost all biologists, and proclaims his belief in the special creation and the fixity of species" (Brandege 1893:64).

There is little evidence that Greene's idiosyncratic philosophies left much of an imprint in Berkeley at the time. Even Jepson, one of Greene's most devoted disciples, parted ways with his

mentor in fundamental aspects of taxonomic philosophy. Ironically, although Greene continues to be invoked as the quintessentially subjective descriptive taxonomist, a denigration all the more damning because of the purported creationist bent, his track record has actually been remarkably successful. In contrast to predictions that “It is safe to say that not more than one in ten of [Greene’s] species is tenable, and probably one in fifteen or twenty would be nearer the mark” (Brandege 1893:64), a respectable 70% of those species described by Greene while he was residing in California have stood the test of time (McVaugh 1983). It has also been argued (e.g., Ornduff 2000) that Greene’s anti-evolutionary stance has been overstated, as evidenced by Greene’s attribution of evolutionary views to Linnaeus (Greene 1909).

Greene nevertheless served as the foil for local supporters of Darwin’s revolutionary ideas and a more overtly experimental approach to taxonomy. Coinciding with Greene’s transit to the University, Behr (1884) was propounding that “the theory of evolution will be the most successful in explaining the resemblances and differences of organized life” and that the resultant “divergences and their ramifications may be compared to the branches of a pedigree.” He furthermore looked forward to the time when California would possess “a botanical garden or experimental grounds” where the potential role of hybridization could be evaluated, as the probable explanation (in Behr’s understanding) of “why several species described and characterized by different authors have not been found again” (Behr 1888). These beliefs were echoed by Curran (who, as previously noted, had Behr as a mentor) in such phrases as “The life history of a single species, its limit of variation, and its hybrids, if any, would be far more useful than a dozen ‘decades’ of new violets or Senecios.” (Brandege 1901:96).

This last quote contains a scarcely veiled gibe at Greene and his splitter philosophy, only one in a long series heaped on Greene. Curran’s relationship with Greene was amicable enough during their overlapping years at the Academy, which included a stint as joint curator of botany (1884–1887) when Greene aided Curran’s early botanical development. This early friendship quickly crumbled, however, following the bitter fall-out from the 1887 political battle at the Academy, in which Curran and Greene took sides in opposing camps (Ertter 2000). It is also conceivable that an element of “unrequited love” was involved, as suggested by Ewan (1942) and supported by a cryptic “Hell hath no fury” comment in one of Jepson’s notebooks. It is accordingly intriguing, at the very least, to wonder to what extent a failed love affair may have influenced the subsequent rise of biosystematics in California, as outlined later.

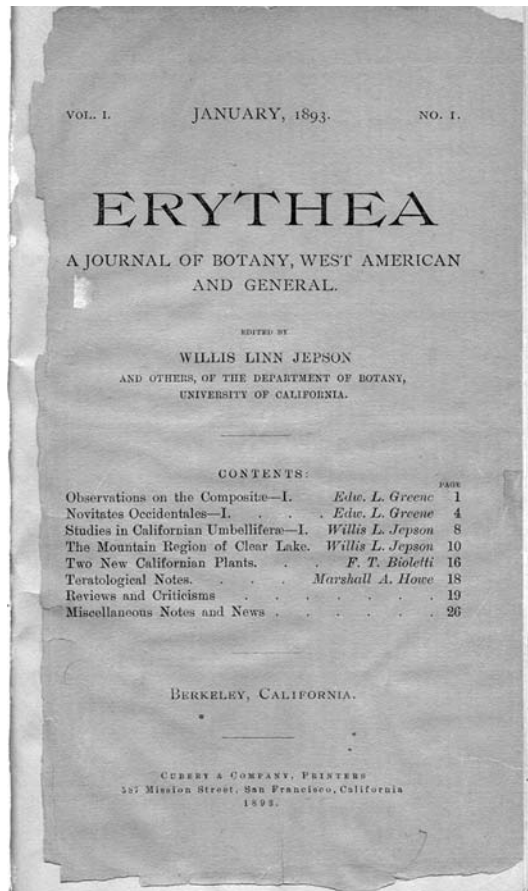


FIGURE 13. Title page of volume 1, number 1 of *Erythea* dated January 1891.

As additional evidence for the “unrequited love” hypothesis, two years after the falling out with Greene saw Curran remarried and known henceforth as Katharine (Kate) Brandegee. Townshend Stith Brandegee, who had served as botanist for several territorial surveys, had sufficient inheritance to allow financial independence for the blissful couple. Combined with initial funds from Harkness, the inheritance also allowed the founding of a new journal, *Zoe*, which gave Katharine an outlet for her outspoken analyses of Greene’s publications and others with whom she took issue (Setchell 1926).

The financial independence also allowed the Brandegees to leave the Academy and move to San Diego in 1894, bringing them closer to Townshend’s research focus of Baja California and the off-shore islands. The decision was perhaps influenced as well by fall-out from the political battles, which may have taken a toll on Katharine. Leaving the Academy herbarium in charge of Alice Eastwood, who had been recruited as assistant curator in 1892, the Brandegees took their personal library and herbarium to an idyllic mesa overlooking San Diego, at First and Redwood Streets. The large garden surrounding the brick herbarium would have given Katharine ample opportunity to initiate experimental studies, as implied in her comment that “The field investigation of hybrids is a most interesting and useful employment for botanists who do not have access to large herbaria and libraries” (Brandegee 1901:96).

It was presumably while in San Diego that the Brandegees became acquainted with the young Harvey Monroe Hall (Fig. 14), who taught school in Riverside before matriculating at the University of California in 1898. No mention is made in Hall’s biography (Babcock 1934) of a Brandegee influence, but it is evident from letters and other sources (e.g., Setchell 1926) that Hall and Katharine developed a warm friendship with a shared taxonomic philosophy. Excerpts such as “if one has not a bunch of new things at least once a month he is in danger of being called slow and will surely fail to cut much of a figure alongside of the ‘progressive botanists’” (Hall to K.

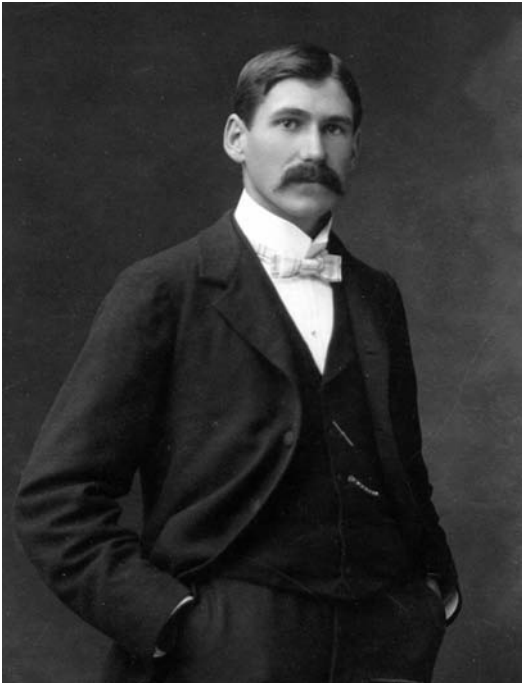


FIGURE 14. Harvey Monroe Hall



FIGURE 15. William Albert Setchell

Brandegee, letter of 26 Nov. 1905, UC Herbarium archives) and a call to “preserve the dignity of the species as you and I know them” (Hall to K. Brandegee, letter of 26 July 1918, UC Herbarium archives) give evidence of long conversations on taxonomic theory, and suggest that Hall accordingly also partook of Behr’s philosophical legacy.

Greene had departed Berkeley before Hall’s arrival, leaving the University of California one year after the Brandegees’ move to San Diego to accept a position at Catholic University in Washington in 1895. Contrary to his hopes of finding himself in a more centrally located and influential position, Greene’s views made him increasingly isolated, and embittered, in the battles that shaped the future of botanical nomenclature in the subsequent decades. Back in Berkeley, phycologist William Albert Setchell (Fig. 15) was recruited to fill Greene’s vacated position, beginning a long reign as chair of the department of botany. Jepson, who had already been serving as an instructor, was promoted to assistant professor after receiving the first Ph.D. in the department in 1898. When Burtt-Davy resigned in 1902 to pursue a prestigious career in South Africa, he was replaced by Hall, who finished his Ph.D. in 1906.

Hall is given credit for the Brandegees’ decision to move to Berkeley in 1906, when the San Diego climate proved incompatible with Katharine’s failing health (Babcock 1934). Negotiations with Setchell resulted in the donation of the Brandegees’ superb botanical library and herbarium to the University of California, effectively doubling the size of the existing herbarium and establishing the botany department as a world-class facility. In exchange, the Brandegees were provided with permanent research space, and, for Townshend, an Honorary Curator appointment (Setchell 1926; Ertter 2000).

Stanford University and the Carnegie Institution

An 1893 note in *Zoe*, prior to Greene’s departure from Berkeley and probably penned by Katharine, heralded the appearance of what would become the third major institution of natural history in the San Francisco Bay Area, Stanford University:

Prof. W[illiam] R[ussel] Dudley, late of Cornell, has taken the chair of systematic botany at Stanford University. With such men as he and Prof. Douglas H. Campbell in charge of the botanical work at Stanford University, where botany is taught according to modern methods, we may expect to have in time, a body of resident botanists whose entire stock of botanical knowledge is not confined to the possession of a limited terminology and a large capacity for discovering new species that do not exist. (*Zoe* 3:378, 1893)

The new university, which opened its doors in 1891, was founded by Leland and Jane Stanford in memory of their son Leland Stanford, Jr., who died in 1884 from typhoid fever. Leland Stanford, who has been previously mentioned as having helped fund the botanical report resulting from the Geological Survey, recruited David Starr Jordan to serve as president, a post held by Jordan for 22 years. Jordan in turn recruited William Russel Dudley as professor of botany, Dudley having taken his first botany course from Jordan at Cornell University (Jordan 1911). Leland Stanford’s death in 1893, only two years after the university’s opening, led to an extremely trying period when his estate was in probate. Of the subsequent long six years, Jordan later stated that “the future of a university hung by a single thread, the love of a good woman,” as Jane Stanford kept the dream alive (www.stanford.edu/home/stanford/history/begin.html).

Jordan, a practicing ichthyologist, also took an active role in the Academy. His election as president of the Academy in 1896 ended the Harkness administration and served, finally, to heal the rift between the feuding factions. It also initiated the seven-year “University Regime of the Academy,” during which the presidents of Stanford University and the University of California

took turns as primary officers of the Academy. Dudley also became involved with the Academy, serving with Setchell on the editorial committee for botany (Leviton and Aldrich 1997).

Jordan had a strong desire to have the new field of plant evolution represented at Stanford University, which eventually led to a close connection with the Carnegie Institution of Washington. The Institution was incorporated in 1902 after steel magnate Andrew Carnegie decided to establish a scientific institution with the mission “to encourage, in the broadest and most liberal manner, investigation, research, and discovery, and the application of knowledge to the improvement of mankind.” Selected as first director was Daniel Coit Gilman, former president of the University of California who was now approaching retirement as president of John Hopkins University. In contrast to his success at the latter university, power struggles at the Carnegie Institution led to Gilman’s resignation by the end of 1904 (Yochelson 1994).

The botanical connection between Stanford University and the Carnegie Institution goes back at least to 1904, when Jordan and entomologist Vernon Kellogg added their support to obtain Institution funding for well-known plant breeder Luther Burbank (Largent mss.). The California Academy of Sciences also passed a resolution endorsing the request, “in full confidence that such a grant will yield most valuable returns to science” (Leviton and Aldrich 1997:420). The Academy furthermore chose Burbank as the recipient of a gold medal presented as part of its Semi-Centennial Anniversary, designated “to be awarded to the person who, in the judgment of the Academy, has most advanced the interests of agriculture by his investigations and by the application of scientific principles to plant life” (quoted in Leviton and Aldrich 1997:419). The result was a hefty \$10,000 grant from the Carnegie Institution to Burbank “for Investigations in the Evolution of Plants,” renewed over a five-year period to support his plant breeding experiments in Santa Rosa. Jordan also gave Burbank a position in Stanford’s Bionomics department as “Special Lecturer in Evolution,” which came with a \$300 salary for two lectures per year (Largent mss.).

To the disappointment of Jordan and other scientific supporters, however, Burbank’s idiosyncratic methodology did not prove compatible with the expectations of an increasingly professionalized field. When the initial five-year agreement with the Carnegie Institution ended in 1909, the grant was accordingly not renewed. Stanford University and Burbank parted ways, but Jordan’s desire to have plant evolution represented at Stanford continued. It is accordingly reasonable to assume that the Burbank episode laid the foundation for Harvey Monroe Hall’s receipt of Carnegie Institution support beginning in 1919 and the eventual establishment of the Institution’s Plant Biology Department at Stanford in 1929.¹

Across the Bay at Berkeley, Hall had worked his way up from instructor at the University of California in 1903 to associate professor in 1916. He also served as curator of the herbarium and of the botanical garden, which had been initiated in 1879 by Eugene Hilgard as a garden of economic plants (Constance 1978). An expanded botanical garden, established by Greene in 1890, was situated on the north fork of Strawberry Creek. It eventually included as many as 1,500 species, some housed in an elegant glass conservatory that was completed in 1894 (Roberts 2000). These facilities were, however, apparently inadequate for the experimental taxonomy envisioned by Hall:

It was while he was connected with the University that Hall became keenly interested in botanical gardens and came to think of them as an important part of the working equipment of every botanical institution. . . . in 1911, when he wrote to President Wheeler about the proposed garden in Strawberry Cañon, he was thinking in broader terms than a garden, for he dwelt on “the importance

¹ The establishment of the Institution’s Department of Plant Biology at Stanford is actually somewhat ironic, in that Carnegie himself had spoken scornfully of Stanford University, stating in a letter to Andrew D. White that “Gov. Stanford made a useless rival as you and I saw in San Francisco to the State University. I could be no party to such a thing.” (quoted in Madsen 1969:158)

of looking forward to a time when a botanical garden operated in connection with botanical laboratories, libraries, and herbaria, where far-reaching studies in plant genetics, systematic botany, dendrology, plant pathology and physiology may be pursued.” (Babcock 1934:356, 363.)

By the time that the University’s botanical garden was finally relocated to Strawberry Canyon in the 1920s, Hall had already resigned to accept a position with the Carnegie Institution of Washington in 1919. He continued to reside in Berkeley until the Institution’s Department of Plant Biology was established at Stanford University in 1929, providing Hall with the experimental growing facilities that he desired (Babcock 1934). Hall was appointed acting professor of botany at Stanford University the same year, while retaining the position of honorary curator at the University of California (Babcock 1934). Before his untimely death four years later, he also laid the groundwork for the transplant experiments of Jens Clausen, David Keck, and William Hiesey, which would ultimately revolutionize plant taxonomy and establish the rigorously experimental discipline of biosystematics.

As a side-note to this condensed synopsis of the advent of experimental plant taxonomy, it is worth contrasting early expectations and beliefs with eventual outcomes. As noted previously, Greene’s reputation as a splitter served as a foil for his detractors who were early proponents of a more overtly experimental approach to plant taxonomy. However, not only have Greene’s species been vindicated beyond these predictions (McVaugh 1983), but other beliefs of his contemporary opponents have suffered as well. Since most of us would now automatically identify with the “evolutionists” over someone who subscribes to the “Mosaic record,” it comes as a surprise to realize that these pre-Synthesis proponents firmly believed that environmental influences and hybridization, not suspect Mendelian genetics, were the primary explanations for diversity. This philosophy underlies Greene’s rebuttal about “our friends the evolutionists” who invoke “soil, climate, or in one oft-repeated word, environment” (quoted in Brandegee 1893:64) to explain the genesis of species, and even genera, as well as claims such as:

If mutations prove to be but major variations in which the environic stimulus is hidden or indirect, it will become possible to study the origin of all new features or forms ecologically, since hybrids are to be regarded as new expressions of old forms. It appears probable that this method can be successfully applied to retracing the origin of existing species or stocks, and with increasing knowledge and skill in experimental manipulation, to repeating the change from a genus into a related one. (Hall and Clements 1923:3.)

In this light, Burbank’s inclusion in the current narrative makes perfect sense, as further evidenced by Brandegee’s admiration for Burbank’s experiments on *Zauschneria* as a means to “rid us of a host of species” (Brandegee 1901:96). At the same time, however, none of this should detract from the credit that these early proponents of experimental taxonomy fully deserve, even if the results of the experimental methodologies they laid the foundations for ultimately disproved their expectations. As clearly acknowledged by Clausen, Keck, and Hiesey in the introduction to one of their landmark publications (Fig. 16), based on research done at the Carnegie Institution:

Dr. Harvey Monroe Hall . . . was a pioneer in endeavoring to improve existing methods of plant taxonomy. He was led to recognize the need for a better understanding of relationships through his work on large, polymorphic species. A knowledge of the capacities of a plant to adjust itself to varying environments was especially desirable in species with intergrading forms occupying a series of habitats. This led Hall to undertake a series of experiments in which plants were transferred from one environment to another in order to test their capacity for modification. The investigations of the present report have emanated from the program that Hall carried on for a decade until his untimely death. Many of the plants discussed in this volume were collected and studied by him, and the transplant stations at which these experiments have been conducted were established through his initia-

tive. It is a matter of deep regret that Hall was unable to see the completion of the investigations which he inaugurated. (Clausen, Keck, and Hiesey 1940:iii.)

Land Management and Conservation Organizations

Of course, much more than the development of experimental systematics was taking place at the existing institutions of natural history. The most significant single event was the destruction of the Academy's magnificent new building in the firestorm that resulted from the Great Earthquake of 1906. Alice Eastwood (Fig. 17), who gained fame as a result of her efforts to save the botanical type specimens, spent the next decade working at Berkeley, Harvard, and other institutions before new facilities became available in Golden Gate Park in 1915 (Leviton and Aldrich 1997). During this same period, Willis Linn Jepson was establishing his reputation in California floristics at Berkeley, and William Russel Dudley quietly pursued his own taxonomic interests at Stanford University.

Jepson, Dudley, and Eastwood, along with most of the other individuals highlighted thus far, played various roles in the genesis of the final "institution" that the current narrative addresses; specifically, the land management agencies whose collective activities now dominate our natural resource legacy. As superbly analyzed by Clar's (1959) history of the California Board of Forestry, this genesis was a prolonged, convoluted process, with many setbacks along the way. Clar makes the critical point that the initial situation involved essentially no provision for a large timber operator to harvest mature timber from a sizeable area of federally owned land. Instead, much of the timber needed for early development was harvested from land that was transferred to private ownership with a single down-payment and then abandoned after the trees were removed, resulting in an increasing amount of ecologically ravaged tax-delinquent lands (Fig. 18).

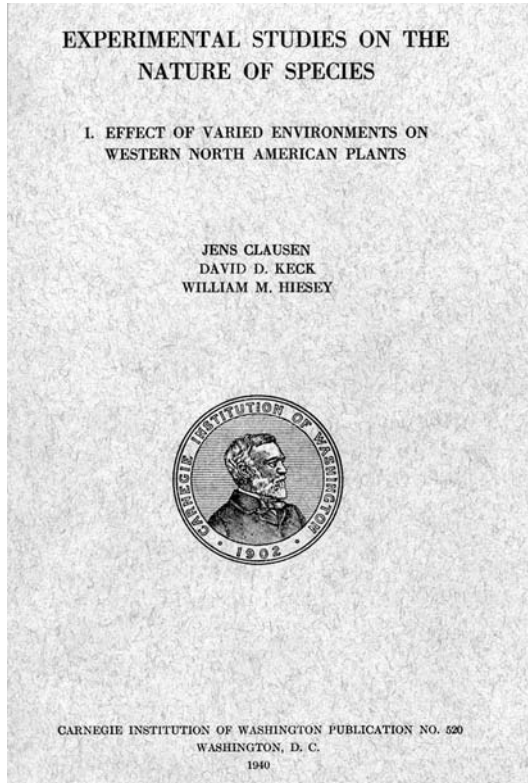


FIGURE 16. Title page of landmark 1940 publication by Clausen, Keck, and Hiesey on *Experimental Studies on the Nature of Species. I. Effect of Varied Environments on Western North American Plants*.



FIGURE 17. Alice Eastwood



FIGURE 18. Trees were removed, resulting in an increasing amount of ecologically ravaged tax-delinquent lands

The long-term consequences of such destruction were realized as early as the 1860s. Leland Stanford, in his 1862 inaugural address as governor, noted that “It cannot have escaped the attention of those familiar with the timber regions of this State, that there is a great and unnecessary waste of our stately forests” (quoted in Clar 1959:65). Bolander, erstwhile botanist for the California Geological Survey who was currently serving as Superintendent of Public Instruction and President of the State Horticultural Society, likewise stated in 1872 that “It is my firm conviction that if the redwoods are destroyed and they necessarily will be if not protected by a wise action of our government — California will become a desert in the true sense of the word. On their safety depends the future welfare of the State” (quoted in Clar 1959:77–78). This concern paralleled a counterpart movement at the national level, including the 1873 creation of a committee within the American Association for the Advancement of Science to address the need for legislation leading to forest preservation. Appointed to the committee were Whitney, then still acting as State Geologist, and Eugene Hilgard, prior to his arrival at the University of California (Clar 1959).

Admittedly, Bolander’s claim was rooted in the belief accepted at the time that the forests themselves created the climate, to a greater extent than is currently understood. Brewer, making an encore appearance at the Academy in 1875, asserted his belief in this theory, in spite of the lack of instrumental evidence that the destruction of forests had reduced rainfall anywhere in the United

States (Leviton and Aldrich 1997:182). The net result was that the constituency most concerned with the loss of forest coverage was the agricultural industry in southern California, which was completely dependent on rainfall in adjacent mountains. After several failed attempts, pressure from agricultural interests and allies finally resulted in the establishment of a California State Board of Forestry in 1885.

Prior to his death in 1887, Albert Kellogg served as one of three commissioners for the newly established Board, and probably arranged for the first meeting to be held in the California Academy of Sciences. In this capacity, Kellogg contributed information on vegetation to the First Biennial Report, which totaled 230 pages of fine print (Clar 1959). Subsequent reports (Fig. 19) were produced by a staff of hired specialists, led by a State Forester. Second in importance was John Gill Lemmon, hired as State Botanist in 1887. Lemmon's focus at the time was accordingly the forest trees of California, about which he wrote several books (Fig. 20), reports, and other articles, several bearing beautifully rendered illustrations prepared by Sara Lemmon (e.g., Lemmon 1890, 1900).

In addition to evaluating the existing forest resources of California, the early State Board of Forestry aggressively pursued a program to increase forested acreage, especially in grasslands and chaparral zones, tied to the aforementioned belief that doing so would increase rainfall. Experimental planting stations were established at Santa Monica, Chico, Merced, Hesperia, Livermore, and San Jacinto, with various species of *Eucalyptus* quickly becoming the favored choice (Figs. 21–22). As early as 1869, Bolander (among others) had recommended *Eucalyptus* (and, as a side note, opium poppy) for cultivation in California (Leviton and Aldrich 1997:108). Kellogg (1875) prepared a summation of *Eucalyptus* species and their useful characteristics, and

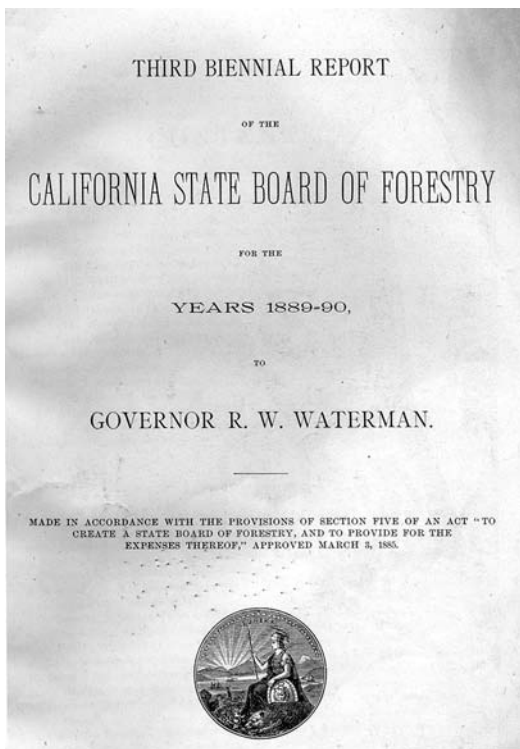


FIGURE 19. Title page of a biennial report of the California State Board of Forestry.

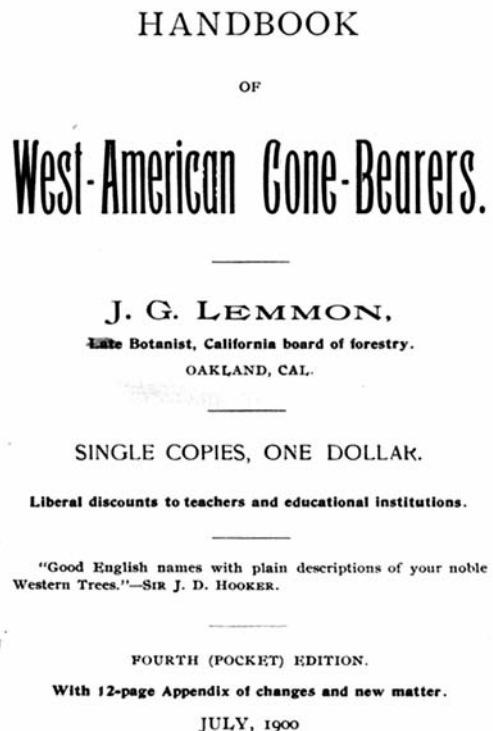


FIGURE 20. Title page of John Gill Lemmon's *Handbook of West-American Cone-bearers* (1900).

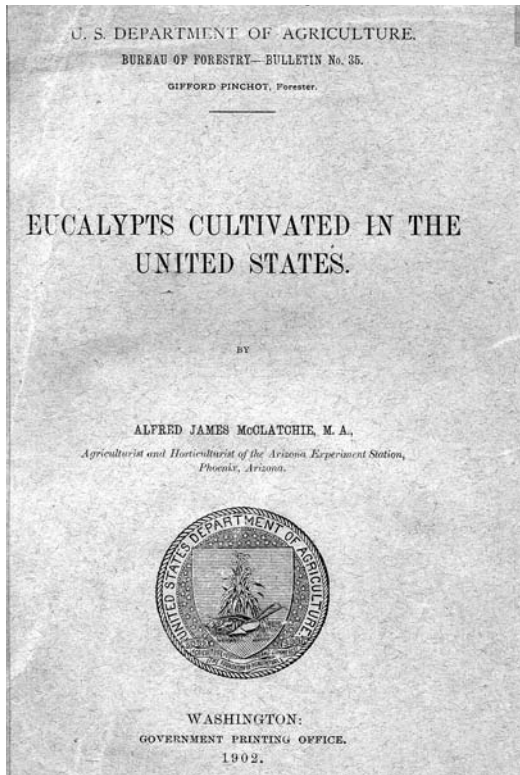


FIGURE 21. A.J. McClatchie on *Eucalyptus* cultivated in the United States (1875).



FIGURE 22. *Eucalyptus* grove in California, a remnant of the heady days of the *Eucalyptus* boom of the late 19th century.

Behr added his voice as well (ironically promoting *Eucalyptus* shingles for their alleged fire-resistant properties! [Leviton and Aldrich 1997:206]). The net result was a speculation boom in *Eucalyptus*, which eventually collapsed in the 1910s, not long after the then-State Forester resigned to take a position in the *Eucalyptus* industry (Clar 1959). A whiff of scandal associated with the latter is addressed by Clar (p. 301 ff.): “It would be improper to debate at the present date that certain persons in an official capacity were deliberately deceitful in overselling the commercial value of eucalyptus. The same can not be said for a few high pressure business men (of the type which are likely to be with us always).”

These early efforts of the California State Board of Forestry were soon curtailed, however, when the Board was disbanded in 1893, with the experiment stations transferred to the University of California (Clar 1959). Support for the Board had waned at least in part as backlash against steps toward forest protection taking place at the national level. The landmark Forest Reserve Act of 1891 gave the President the authority to designate forested reserves from among the public domain. Because no provision was made initially for legally harvesting timber from or grazing livestock in the new reserves, resentment began to swell against the “lock-up” of resources that had previously been widely exploited. Part of the backlash took the form of an effort to reduce the size of the forest reserves, which led the Academy to weigh in with an 1894 resolution in which “the Academy respectfully and most earnestly protests against any such reductions and encroachments, it being a trespass or spoilation of an inheritance which should by every legitimate means be preserved by

this generation for those who are to come after us” (quoted in Leviton and Aldrich 1997:347). Suspicion and resentment lingered even after a resource extraction policy developed, with most reserves becoming National Forests in 1907.

In addition to Forest Reserves, several national parks had also been established, starting with Yellowstone Park in 1872. The precedent for lands set aside “to be held for public use, resort, and recreation . . . inalienable for all time” actually occurred eight years earlier in 1864, when President Lincoln granted Yosemite Valley and Mariposa Big Trees to the state of California for public recreation. Yosemite (Fig. 23), accordingly, not only became the first state park in California, but the first such dedication of land in the world. Whitney served on the eight-person commission charged with overseeing the new state park, chaired by well-known landscape architect Frederick Olmsted. Other members of the California Geological Survey did some mapping of the boundaries and potential roads, personally funded by Olmsted. Whitney's main recorded action on the commission, however, was scuttling Olmsted's recommendation for a much-needed access road, which Whitney felt represented competition to his uphill battle to keep the Survey funded (Ranney 1952).

In 1890, just prior to the Forest Reserve Act, additional federal lands surrounding Yosemite state park were set aside as “reserved forest lands” to be managed along park lines (Mackintosh 2000). As with other national parks at the time, the resultant Yosemite and Sequoia National Parks were managed by the U.S. Army (a seemingly incongruous arrangement superbly illuminated by Meyerson [2001]).² Yosemite Valley itself remained a state park, but pressure began to develop for “recession,” the return of State lands to federal control. This was in large part driven by the poor custodial track record the State had thus far shown, including an 1868 bill to open the valley to 160-acre settlements (leaving Whitney “so disgusted with California that I can hardly stand it much longer” [quoted in Brewster 1909:264]).

John Muir is unquestionably the best known advocate for Yosemite Valley's recession and protection in general, but he by no means acted alone. Several other persons who have played multiple roles in the current narrative were also closely involved, notably Joseph LeConte, David Starr Jordan, Willis Linn Jepson, and William Russel Dudley. In 1892, they joined together with other like-minded advocates to found the Sierra Club,³ incorporated “to explore, enjoy, and render accessible the mountain regions of the Pacific Coast; to publish authentic information concerning them” and “to enlist the support and cooperation of the people and government in preserving the forests and other natural features of the Sierra Nevada.” The Sierra Club was one of multiple citizen groups that formed during the late 1800s which, in the words of Clar (1959:167), “largely substituted through voluntary effort the leadership which government declined to exert.”

The first headquarters of the Sierra Club, until 1898, were in the Academy's fine new building on Market Street, perhaps in one of the commercial rooms that had been “offered to scientific societies at moderate rent in accordance with the purposes of Mr. Lick” (Leviton and Aldrich 1997:326). The annual general meeting was held in the Academy's auditorium, with around 250 “members and friends” attending the first general meeting in 1892 (*Sierra Club Bulletin* 1:23). The

² According to Carl Albert Purpus, one of the Brandegee's correspondents, the Army was not always welcoming to botanists: “I had a very bad experience with Capt. Gale who is superintendent of [Sequoia] Park, as he was about ready to turn me and my man, who helps me collecting out of the park, although I had a letter of introduction to him by the General from last year.” (letter of 8 Sep 1897, Purpus to K. Brandegee; <http://ucjeps.berkeley.edu/Purpus/letters1897.html>).

³ Muir was president of the Club until his death in 1914; LeConte served as a director until 1898 and as co-vice president 1892–1898; Jordan was a director 1892–1903 and honorary vice president 1905–1931; Dudley served as corresponding secretary 1898–1905 and as a director 1898–1909; and Jepson, in addition to being one of the signers of the Articles of Incorporation, was an honorary vice president 1942–1946 (Brower 1951). Whitney was made an honorary member in 1892, Sara Lemmon is listed among the early members, and J.G. Lemmon's lengthy analysis of native conifers was printed in the *Sierra Club Bulletin* (Lemmon 1897).



FIGURE 23. Yosemite Valley looking east toward Half Dome. Photo by the author.

general meeting in 1895 focused on the topic of “The National Parks and Forest Reservations” (*Sierra Club Bulletin* 1:268-269). LeConte presided over the meeting, noting that “The timber of our country is disappearing at a rate which is simply unparalleled in the history of the world” (p. 269). Muir and Dudley (1896) both gave impassioned presentations, praising the efforts of “Uncle Sam’s blue-coats” in protecting the national parks (p. 273) in contrast to the destruction still occurring in the state park and the Sierra Reservation. Dudley subsequently prepared a series of “Forestry Notes” for the Club, including a depressing description of devastation wrought by unregulated grazing in the drought year of 1898, coinciding with the redeployment of the army to the

Philippines “leaving the parks to their enemies during the year they needed protection most” (Dudley 1899:292).

Dudley concluded his presentation at the 1895 meeting with a call for attention to “the urgent need of a redwood reservation in our Coast Range mountains” (*Sierra Club Bulletin* 1:285). Putting words into action, he subsequently played a founding and leadership role in the Sempervirens Club (Campbell 1913), which was established in 1900 to advocate for the protection of the Big Basin redwoods in San Mateo County. Protection for these magnificent trees had been proposed as early as 1887, in a petition to the State Board of Forestry (Clar 1959). Success was finally achieved in 1902, when Big Basin Redwoods joined Yosemite Valley as a state park.

Dudley was also active in the parallel effort to establish a formal school of forestry in California. His hopes to have such a program at Stanford University were, however, stymied by a “gentleman’s agreement” between Stanford president Jordan and the president of the University of California, Benjamin Ide Wheeler, which ceded the right to a forestry department to Berkeley (Wieslander 1965). The call for a forestry program at the University of California goes back to an 1873 address by University president Daniel Coit Gilman, backed by subsequent efforts of Eugene Hilgard as dean of agriculture. The 1891–1892 Biennial Report of the State Board of Forestry had also called for the establishment of a school of forestry in California, but efforts to obtain funding failed in the two subsequent legislative terms. Opposition took the form of such statements as “The school of forestry connected with the State University will accomplish nothing practical. It is not to be trusted with a fund of this kind” (quoted in Wieslander 1965:12). Even without a formal program at Berkeley, the first forestry courses began in 1903, when Jepson teamed up with another professor, Arnold V. Stubenrauch, to offer summer lectures at Idyllwild in the San Jacinto Mountains (Fig. 24).

The preceding efforts combined with others to form an increasing ground-swell promoting the reestablishment of a state board of forestry, both to regulate harvest and to curtail destructive fires. An 1899 meeting in San Francisco brought together delegates from 24 organizations, including the University of California, the Yosemite State Park Commission, the Sierra Club, and various commercial interests such as the Miner’s Association. The outcome was the establishment of the California Society for Conserving Waters and Protecting Forests, which, although not immediately successful in re-establishing state protection of forested lands and a school of forestry at Berkeley, provided strong impetus for a growing snowball. The California Federation of Women’s Clubs also carried the banner, spearheaded by Sara Lemmon as Chairman of the Committee of Forestry, calling for “the Promotion of Education in General, and the Special Promotion of Forestry” (S. Lemmon 1900).

The dam of opposition finally broke in the 1900s. One contributing factor was the acreage lost to devastating forest fires in 1903 and 1904, evidence that “Public calamity is always more effective in shaping public opinion than stuffy plans” (Clar 1959:183). Equally important was the 1902 election of George Cooper Pardee as governor of California. Often referred to as “the father of natural resource conservation in California” (Clar 1959:185), Pardee stands as California’s counterpart to the progressive presidency of Theodore Roosevelt. Unfortunately, Pardee’s support of conservation was also a contributing factor to his failure to be nominated for a second term. His relatively brief administration nevertheless saw the re-establishment of a California State Board of Forestry, albeit this time without a botanist. The close ties between state and federal forestry were particularly evident at this time, with Pardee soliciting a recommendation from Gifford Pinchot, first Chief of the National Forest Service (and an “intimate friend” of Dudley [Campbell 1913]), for the reconstituted State Forester position. Pinchot nominated one of his assistants, E.T. Allen, who continued to serve as chief inspector of the National Forest Reserves in California simultane-

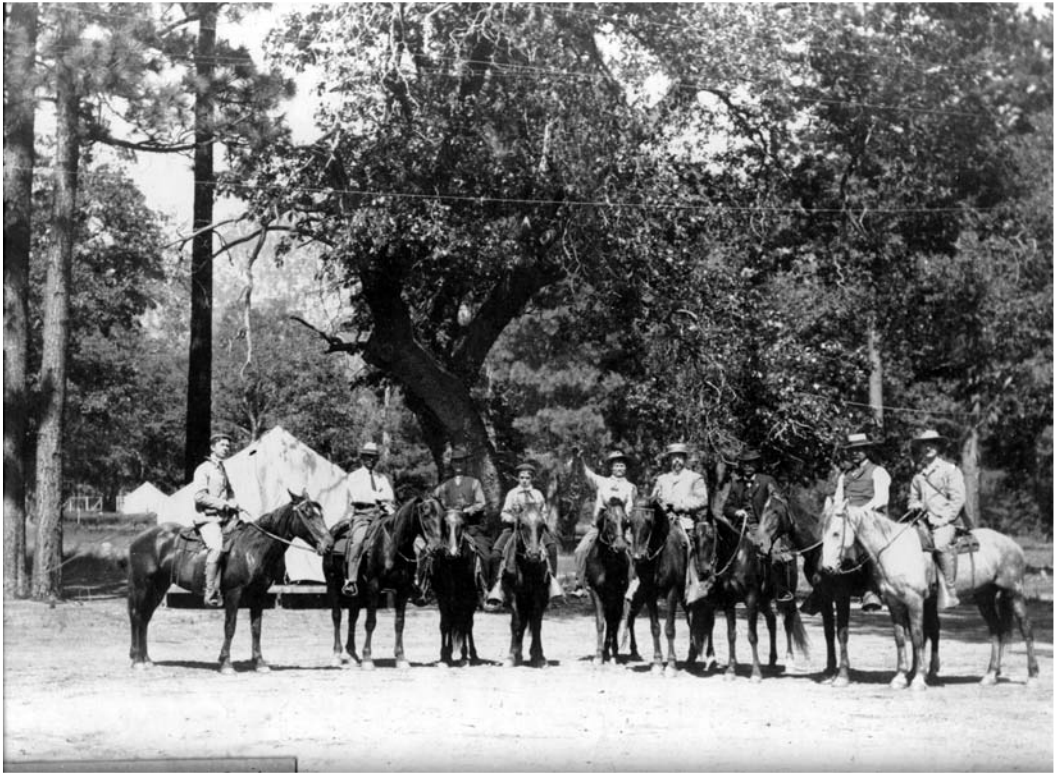


FIGURE 24. Students and faculty at the University of California's forest camp in the San Jacinto Mountains. Jepson is on the far left. Courtesy Jepson Herbarium Archives.

ously with his brief tenure as State Forester (Clar 1959).

The Yosemite Valley question was also settled during Pardee's tenure, aided by a whistle-stop tour to California in 1903 by President Theodore Roosevelt. Benjamin Ide Wheeler, president of the University of California and an active supporter of forest policies in California, was a friend of Roosevelt's from the days when Wheeler taught at Cornell University while Roosevelt was governor of New York. After Roosevelt delivered the commencement address at the University of California, he and Wheeler traveled to Yosemite Valley, there to be regaled by Muir and treated to a night under the towering Mariposa Grove (Finacom 2003). Roosevelt was won over, and Yosemite Valley and the Mariposa Grove were added to Yosemite National Park in 1906. The University's connection to Yosemite was further strengthened when the National Park Service coalesced in 1916, with a UC graduate, Stephen T. Mather, as the first Director.

EPILOGUE

The preceding narrative obviously covers only a subset of the institutions involved in California's natural history, the events that shaped them, and the individuals who played pivotal roles in this shaping. Nor, of course, does the story have an end, though the stopping place chosen here represents a satisfactory hiatus in major developments. A few additional related threads are nevertheless worth summarizing briefly. Sara Lemmon, backed by the California Federation of Women's Clubs, successfully lobbied for the designation of the California Poppy as official state flower, signed into law by Governor Pardee in 1903. Harvey Monroe Hall included Yosemite

National Park within his sphere of interest, producing the first complete flora of the park in collaboration with his wife, the pteridologist Carlotta Case Hall (Hall and Hall 1912). He was also instrumental in establishing a permanent natural area for scientific research, subsequently named in his honor, in the higher regions of Yosemite National Park and adjacent forest land (Babcock 1934). A Division of Forestry was finally established at the University of California in 1914, following heavy pressure by a Forestry Club that Willis Linn Jepson had helped organize (Wieslander 1965). Jepson was also heavily involved in the Save-the-Redwoods League following its establishment in 1919, and his wide-ranging speaking tours were instrumental in obtaining protection for northern California's magnificent redwoods (Beidleman 2000). Alice Eastwood was also a prime mover in the Save-the-Redwoods League, but it was her commitment to Mount Tamalpais that resulted in the honor she most deeply appreciated, in the form of Camp Alice Eastwood (Howell 1954). The Sierra Club's current high profile advocacy tends to overshadow its equally strong tradition of outdoor recreation and education, which in the early days took the form of several-week-long group outings with over a hundred participants. In the 1940s and 1950s these outings served as the setting for a series of Base Camp Botany floristic surveys organized by the California Academy of Sciences. The first ten Base Camp Botany surveys were compiled by John Thomas Howell, Eastwood's assistant and eventual successor, but in 1950 Howell had other commitments. Instead, this function was ably handled by a precocious 14-year-old, Peter Raven, who went on to make his own modest contribution to a diversity of natural history institutions around the world (brief synopsis in Carlquist 1997).

In summary, the present narrative illustrates profusely the extent to which committed individuals, working cooperatively in multiple arenas, are ultimately responsible for creating and shaping the institutions that are subsequently taken for granted. This fundamental reality was well captured by Clar (1959:262) with his statement "It has been observed that the great movement toward the conservation of forest and water resources in California had been pushed along under the goading of a relatively few but nonetheless determined citizens," and more recently by the late Galen Rowell (1997): "One citizen powered by passion tempered with common sense can overcome the complacency of millions."

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Images, other than those attributed to the author, are from the University and Jepson Herbaria Archives and the Archives of the California Academy of Sciences.

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