

Science in the Founding and Early Development of the University of California

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The University of California, Los Angeles marks its centennial in 2019. When it began in 1919, it was the southern branch of the University of California. This paper takes a step back and examines how the University of California came to be founded and the role that science played in its early development. While California's 1850 Constitution called for establishing a state university, it was not until the 1862 Morrill Land Grant College Act that California was able to found a state university.

When the University of California was established in 1868, science was a major part of its founding and first curriculum. Newspapers and various groups called on the state to have a university that emphasized science and technology. This, along with the requirements of the Morrill Act, led the first board of the state university to establish within the university four colleges that dealt with science and technology and one that focused on other subjects. Students in all five colleges were expected to graduate from college with a broad scientific base of knowledge.

Science education at the University of California interacted with and supported the political economy of the state. Graduates and professors used scientific training and knowledge as they engaged with the public and helped expand and strengthen California's economy. The University of California, including through its scientific endeavors, aided in making California a more prosperous state.

The first efforts to found a state university in California began in 1849 at the state

constitutional convention. There, Samuel H. Willey, the chaplain of the convention and a minister from Monterey, proposed that the state have a public university. With his support, the state constitution included a provision for the use of state lands to fund a university.¹

Just a month after California became a state in September 1850, the *Daily Alta*, one of the leading newspapers in California's early years, published an editorial regarding the establishment of a state university. Having a state university would allow California to have "one of the best systems of education in the world."²

In spite of efforts early in the state's history, it was not until the Morrill Land Grant College Act of 1862 that California was able to establish its own state university. When the Morrill Act was signed into law, the Civil War was still in the first years. Even when the military campaigns were not yet going that well for the Union side, the United States Congress still took up important pieces of legislation that had consequences throughout the rest of the nineteenth century and beyond. The Morrill Act was one such bill. Officially titled "An Act donating Public Lands to the several States and Territories which may provide Colleges for the benefit of Agriculture and the Mechanic Arts,"³ this act helped bring about the establishment of institutions of higher education, including the University of California, throughout the entire United States.

The Morrill Land Grant Act was sponsored by Justin Smith Morrill, a United States

¹Irving G. Hendrick, "From Indifference to Imperative Duty: Educating Children in Early California" in *Rooted in Barbarous Soil: People, Culture, and Community in Gold Rush California*, ed. Kevin Starr and Richard J. Orsi (Berkeley: University of California Press, 2000), 244.

²"State University," *Daily Alta* (San Francisco), October 3, 1850, 2.

³Coy F. Cross II, *Justin Smith Morrill: Father of the Land-Grant Colleges* (East Lansing: Michigan State University Press, 1999), 92.

representative from Vermont.⁴ He first introduced legislation in 1857, and his bill passed both houses of Congress in 1859. However, President James Buchanan vetoed it arguing that the bill was unconstitutional. Morrill introduced a revised version of his legislation in December 1861 with a new president and a Congress with significantly fewer members due to the absence of Southern members because of the Civil War. This time when the votes took place in 1862, both houses of Congress passed it with wider margins of victory, even though Westerners were opposed to it out of concerns of having land in their states used to pay for schools that would be in the East. President Abraham Lincoln signed the Morrill Act into law on July 2, 1862.⁵

The law stipulated that for each Congressional representative and senator every state would receive 30,000 acres of public land. Money from the sale of the land would be used to fund the founding of colleges.⁶ Initially progress was slow in securing funding under the act as federal land was flooding the market. Besides the Morrill Act, federal land was also being sold with the passage of the Homestead Act and the transcontinental railroad law as well as land that veterans of the Mexican War and various Indian Wars had received. Nonetheless, states did follow through on the Morrill Act.

As stated in its official title, the Morrill Land Grant College Act was designed to bring about education in agriculture and the mechanic arts. The Morrill Act specified that each state would use the money generated to endow and support at least one college, whose chief object would be “without excluding other scientific and classical studies, and including military tactics,

⁴Ibid., xiii

⁵Ibid., 79-84.

⁶Ibid., 84-85.

to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.”⁷

While this was fairly specific as to what type of education needed to be included, the law left enough ambiguity to provide a number of different interpretations as to how to implement it.

Not long before the Morrill Act had been passed and signed into law, the *Daily Alta* printed an editorial discussing the need for a state university. This February 1862 editorial noted that the state had put into its constitution a provision for a state university in anticipation of the federal government providing some funding for such a purpose. While no university had been founded in the past twelve years, the state Assembly had appointed a special committee to look into the issue, and several of the proposals to the committee were outlined in the newspaper’s piece.⁸ According to the *Daily Alta*, the university should be organized so that it would have “unsurpassed facilities for the acquisition of a master’s knowledge of every branch of physical science and the learned professions, and if possible, of the fine arts also.”⁹ Science was at the top of the paper’s list of the type of knowledge students should be able to gain from a state university. Among the “learned professions,” the paper singled out medicine as being “one of the most important departments of the University.”¹⁰ In the opinion, then, of a major newspaper, the physical sciences and medicine were two of the most important areas of study to be taught by a

⁷Morrill Act from “Our Documents,” National Archives, <http://www.ourdocuments.gov/doc.php?doc=33&page=transcript>.

⁸“The State University of California,” *Daily Alta* (San Francisco), February 23, 1862, 2.

⁹Ibid.

¹⁰Ibid.

state university. However, in spite of the need for such an institution, the *Daily Alta* took the view that a state university should not be opened until enough funding was secured to operate it properly including supporting every department that would be needed. “If we cannot have a proper University, it were better to have none at all,” the *Daily Alta* opined. The paper took a pessimistic view that enough funding would not be found for another ten to fifteen years. Nonetheless, the state needed such “an institution of learning of the highest class” as not all young men who wanted to get a thorough education could be sent to the East Coast or Europe.¹¹ Thus, the paper concluded its editorial by stating that careful consideration of the matter made it clear that “a great University will be worth more to us than its pecuniary cost, and that it will secure to us, what we shall lose without it, the intellectual and educational headship of the States bordering on the Pacific.”¹² Fortunately for the *Daily Alta*’s editorial staff, California did not have to wait ten or more years to have a state university founded. Before the decade was out, the University of California would be established helping to secure the state’s intellectual and educational headship for the Pacific states.

In March 1868, legislation was introduced to establish the University of California. The Morrill Act finally allowed California to establish a state university, as the state now had the financial resources to support the operation of a school, although it still needed a location. Several site proposals had been made for the University of California. The one that the first board settled on was the site of the struggling College of California in Oakland. This deal gave the state an already-built campus along with the property the College of California had recently purchased

¹¹Ibid.

¹²Ibid.

in Berkeley, which would become the permanent site of the University of California.¹³

Since the University of California had been founded under the Morrill Act with science and technology as a primary rationale, it was to be expected that these areas would have a main focus. There were four colleges that dealt with science and technology and one that focused on other subjects. The first were the “Colleges of Arts,” which consisted of the State Colleges of Agriculture, of Mechanic Arts, of Mines, and of Civil Engineering. This left “A State College of Letters” to round out the original five divisions of the University of California. All students would, in general, take certain common curriculum and take more specialized classes based on the specific college they were in.¹⁴

Courses within the College of Agriculture were singled out for their direct contribution to California’s economy. For agricultural studies, the instruction was not just through lectures but also through practical work with plants and various agricultural processes, as California was viewed as being able to grow a wide range of crops as well as benefitting from forests. The goal of the agricultural curriculum was “to illustrate every capability of the State for special cultures, whether of forests, fruits, or field crops, and the most economical methods of production.”¹⁵ The University of California’s purpose, at least in terms of agricultural studies, was to aid in producing a greater and more economically efficient agricultural harvest. To accomplish this,

¹³Hendrick, 243, 246.

¹⁴University of California, *Circular of the University of California: Organization of the University* (Oakland: University of California, 1869 or 1870), 1, University Archives, The Bancroft Library, University of California, Berkeley.

¹⁵University of California, *Register of the University of California: Department of Letters and Science, 1872-73* (Oakland, CA: n.p., 1873), 31, University Archives, The Bancroft Library, University of California, Berkeley.

students and professors would be involved with testing “new plants and processes” with “the results made known to the public.”¹⁶ This was done in part by publishing their findings in widely circulated journals. By having results shared with the public, the University of California was directly engaging with farmers and others in the agriculture business. Professors and students would engage with and sometimes contribute to publications that also circulated in the general public. These included the official reports from the federal agricultural department, *Transactions of the California State Agricultural Society*, and various California horticultural and agricultural journals.¹⁷ Through reading and contributing to these journals, a dialogue was created between academia and the public.

Mining was another area of California’s developing political economy in which the University of California played a role. When the California legislature first began working on a bill to establish an institution under the Morrill Act, the institution was to be known as the “Agricultural and Mechanical Arts College.” However, mining interests wanted to ensure that their needs would be addressed, so with their urging, the legislature changed the proposed name to the “Agricultural, Mining, and Mechanical Arts College.” The bill also included a sentence stating that the school would emphasize how mechanical arts could be applied to agriculture and mining. After the University of California opened in 1868, it took several years before the university’s first trained geologists and engineers graduated. When these individuals—along with those trained elsewhere—entered the workforce, they collectively allowed California to have

¹⁶Ibid.

¹⁷Ibid.

advancing technologies in mining, milling, and other related industries.¹⁸

By the 1870s, the University of California with its mining school was already perceived as the leading institution for that profession in the western United States. While some miners had an engineering background, even those without such knowledge saw the benefits of learning at least basic knowledge of assaying, geology, and mineralogy. With the easily found gold of the early days of the Gold Rush gone, having some sort of technical training was seen as increasingly important to be a successful miner. The University of California was able to make such an education truly possible.¹⁹ The College of Mines was the division within the University of California that provided that education.

Students in the College of Letters were not necessarily being prepared for a scientific or technical career. However, they were still expected to graduate from college with a broad scientific base of knowledge. For instance, in the first year, students studied algebra, geometry, trigonometry, mensuration, natural history, and physiology and hygiene. Subjects covered in the second year included geometry, botany, chemistry, physics, mechanics, zoology, and navigation and surveying as well as work in the laboratory. Mechanics, physics, and zoology were also covered in the third year, along with logic, calculus, and geology and also a laboratory class. Finally, in the fourth year, students concluded with physics, geology, and laboratory work and rounded out their college years with classes in mental and moral philosophy, astronomy, natural

¹⁸Ronald H. Limbaugh, "Making Old Tools Work Better: Pragmatic Adaptation and Innovation in Gold-Rush Technology" in *A Golden State: Mining and Economic Development in Gold Rush California*, ed. James J. Rawls and Richard J. Orsi, California History Sesquicentennial Series; 2 (Berkeley: University of California Press, 1999), 45.

¹⁹Clark C. Spence, *Mining Engineers & the American West: The Lace-Boot Brigade, 1849-1933*, Yale Western Americana Series, 22 (New Haven, CT: Yale University Press, 1970), 24-25, 43-45.

theology, and political economy.²⁰ While not taking the specialized courses that the students in the Colleges of Arts took, the students in the College of Letters received instruction in most of the same basic scientific and mathematical subjects. Science, then, was an important part of the general curriculum at the University of California. It was expected that students who received a diploma from California's state university would have a level of proficiency in mathematics and various scientific disciplines. Science was not to be left just to those formally studying scientific and technical subjects.

With science and technology primary factors behind the Morrill Act and thus the creation of the University of California, the curriculum taught by the institution had a large focus on those subjects. Additionally, to support the scientific and technical classes, the University of California had several museums and collections of items relating to the various colleges and departments. These aided in instruction and also could provide opportunities for interactions with the public.

The University of California also engaged with the general public in scientific and literary discussions, done under the sponsorship of the Mechanics' Institute of San Francisco. Lectures were organized by the Mechanics' Institute and presented by professors and the president of the University of California. These lectures were attended by three to four hundred people, filling the lecture hall in San Francisco.²¹ The Mechanics' Institute had been active in advocating for the creation of a state university, and now with the organization's president a member of the university board a natural connection was developed between the two institutions. The

²⁰University of California, *Register of the University of California* (Oakland, CA: D. W. Gelwicks, State Printer, 1870), 44-48, University Archives, The Bancroft Library, University of California, Berkeley.

²¹*Register of the University of California, 1872-73, 25.*

Mechanics' Institute sought to educate a wide swath of the public that would not otherwise receive a college education, and professors from the University of California were able to help in this endeavor.

By 1880, three decades after statehood, California had a more than ten-year-old state university to complement other institutions of higher education, some of which had been present almost since statehood. A state university had been discussed and attempted beginning with the California Constitutional Convention, but it would literally take an act of the United States Congress—the Morrill Act in this case—to bring the university into existence.

The ultimate success of the University of California can be attributed to a number of factors, from the Morrill Act to the experiences of the colleges that came before. The University of California would have difficulties as it grew, but science education, and higher education in general, was on a stronger footing in the state of California.