

Excerpts from **Noble Hills:**

Settler Colonialism and the Making of the Lick Observatory, 1846-1919

One Sunday afternoon in late August 1861, a reverend, a topographer, and a botanist, set out to summit the mountain. They had met nearly a decade earlier in upstate New York, where the botanist, William Brewer, was teaching in the town where the Reverend Laurentine Hamilton was a minister.¹ When Brewer was recruited by the California Geological Survey at the turn of the 1860s, Hamilton had also moved to California to work as a preacher for a small mining town. The two men rekindled their friendship, and along with the topographer Charles and Hoffman, they set out to survey the mountain.² As they made their way towards the summit, navigating through fields of brush, the Reverend Hamilton rushed ahead of the others and declared himself first to the top.³ As they returned to their office, Brewer and Hoffman debated what to name the mountain. Brewer made “diligent inquiries” into whether it had a previous name, but found none, and so they decided to name it Mount Hamilton in honor of their friend the minister who had beat them to the summit.⁴ It is Mount Hamilton on which the Lick Observatory was established in 1888, and still operates today.

Of course, the mountain did have a name – possibly many—before Brewer, Hoffman, and Hamilton’s excursion. Spanish colonists had named it *La Sierra de Santa Isabel* decades before.⁵ But Brewer and Hoffman had treated the mountain as *terra nullius* – empty land – and assumed upon themselves the power to name it. Their triumphant expedition to the summit reveals one of the realities of colonialism – that settlers reorder and rename the environment, replacing indigenous understandings of nature and place with their own. Repeated innumerable times, such episodes inscribed a new history upon the landscape. Spanish colonization, the Mexican rancho period, the Mexican-American War,

¹ William H. Brewer to A. T. Dewey, Jan 3, 1888. Series 8, Box 31, Folder 10, Lick Observatory Records.

² Ibid.

³ Ibid.

⁴ Ibid.

⁵ “California Place Names,” 153. Series 8, Box 31, Folder 10, Lick Observatory Records.

California statehood, and the gold rush not only preceded the Lick Observatory, they combined with the genocide of California Indians to form its history.

These events not only preceded the Lick Observatory, but together, they form its history. This history is important because it confronts the long-standing relationship between western astronomy and colonialism. Historians have long elucidated the ways that science and technology are fundamentally inseparable from their historical contexts - including structures of oppression built on race, colonialism, and the exploitation of land and labor. But while these entanglements are highly visible in histories of the biomedical sciences and of engineering and agriculture, the physical sciences have not been implicated to the same degree, are often seen as comparatively neutral and apolitical.⁶

Of course, that is not the case. Recently, the Thirty Meter Telescope, a project intended for the summit of Mauna a Wakea, which is a mountain sacred to Native Hawai'ians, has come under fire for being an instrument of colonialism. This controversy has raised questions about the history of astronomy. What exactly is the relationship between astronomy and colonialism? How did it originate, and how is it manifested? As the first permanently occupied mountaintop observatory in the world, the Lick Observatory is uniquely situated to address those questions. I argue that the observatory was enabled, motivated, and shaped by settler colonialism which is differentiated from other forms of colonialism by its aspiration to the replacement of native societies by invader societies and its permanent transformation of demography, economy, government, culture, and land.⁷ It is through the structures and epistemes created by that transformation that the Lick Observatory emerged.

For thousands of years, many Indigenous peoples inhabited the San Francisco Bay region – including the Ohlone, whose land included the coastal range that includes Mount Hamilton. Starting in

⁶ Sappol, *A Traffic of Dead Bodies*; Schienbinger, *Secret Cures of Slave*; Crease, Martin, and Staley, “Decolonizing Physics: Learning from the Periphery.”

⁷ Wolfe, *Settler Colonialism and the Transformation of Anthropology*, 2; Wolfe, “Settler Colonialism and the Elimination of the Native,” 388.

the 16th century, Spanish colonization and Catholic evangelization began through the establishment of missions. The missions introduced sweeping demographic transformations, and one third of the 150,000 California Indians who died between 1769 and 1846 died in coastal missions.⁸ In 1833, the Mexican secularization act dismantled the missions and parceled their extensive land holdings into ranchos, half of which were supposed to be returned to California Indian families. But in reality, most of the land was purchased by wealthy *rancheros*.⁹ The failure of repatriation added to the legacy of Indigenous dispossession and codified the place of former mission lands in the colonial capitalist market.

In 1846, US expansionism sparked the Mexican-American War, which ended with a victory for the United States and control of California and Texas. This victory brought national debate over the admission of both states as slave and free states vied for power. The Compromise of 1850 admitted California as a free state, but it also left California Indians racialized, marginalized, and exploited. The state legislature passed laws that allowed the incarceration and auctioning of jobless Indians, the seizure of orphaned children who were then bound to white families, and the revocation of citizenship, and the rights to testify in courts or serve on juries.¹⁰ Amidst tensions of the pre-Civil War era, white Californians violently constructed a racially stratified system of unfree labor while avoiding the political and economic uncertainties of Black slavery.

The situation for California Indians was worsened by the gold rush, which brought in an influx of prospectors and settlers into Northern California starting in 1849. These settlers sought to limit Hispanic and Indigenous presences, and Indian workers were pushed out of the mines and displaced from other labor sectors, leaving them more vulnerable to the vagrancy and forced labor laws.¹¹ In

⁸ Madley, *American Genocide*, 49.

⁹ Milliken, Shoup, and Ortiz, *Ohlone/Costanoan Indians of the San Francisco Peninsula and their Neighbors, Yesterday and Today*, 200.

¹⁰ *Ibid.*, 176.

¹¹ *Ibid.*, 176-180.

1852, a drought forced many Hispanic ranchers' to sell their lands to settlers, who aggressively removed Indian workers.¹²

In addition to legal and economic disenfranchisement, North American settlers also brought direct violence. Acts of violence against California Indians started as isolated incidents, but were sanctioned by the state government and became a state-wide genocide in which minor incidents triggered mass violence against entire communities.¹³ Soon, volunteer militias were routinely engaging in killing expeditions. Between 1846 and 1873, settlers murdered between nine and sixteen thousand California Indians.¹⁴ When Brewer, Hoffman, and Hamilton climbed up Mount Hamilton in 1861, they saw it as an unexplored site for adventure - but it was also a hallowed ground. The ease with which Brewer and Hoffman placed a name on the empty site was because it had been *emptied*. Although they could not see it, dispossession and violence along the California coast had enabled the new possibilities that shaped their venture.

Meanwhile, across North American Continent was a Pennsylvania Dutch farm boy named James Lick. Born in rural Pennsylvania in 1796 to a cabinetmaker, Lick worked as an apprentice to his father before moving to South America to grow his own business.¹⁵ In Buenos Aires, Valparaíso, and eventually Lima, he amassed wealth as a pianomaker and as a patron of an ever-growing list of ventures. After eleven years in Lima, he bet his future and his legacy on the possibility that California would shortly become a territory of the United States.¹⁶ Just two weeks after he arrived in San Francisco in 1848, the Mexican American War ended and he was proven right. He quickly began buying up real estate around the bay area – likely some of the former mission lands that had not been

¹² Ibid., 177.

¹³ Madley, *American Genocide*, 239.

¹⁴ Ibid., 50.

¹⁵ Wright, *James Lick's Monument*, 2; Osterbrock, Gustafson, and Unruh, *Eye on the Sky*, 3.

¹⁶ Osterbrock, Gustafson, and Unruh, *Eye on the Sky*, 5.

returned to California Indians. Gold was discovered in the Sierra Nevada just one month after his arrival, but although the Gold Rush increased the value of his properties as prospectors flooded into San Francisco, he stayed clear of the gold fever and kept his kept his sights on real estate.

Lick's decision to fund a large astronomical observatory might rightly confuse even his biographers. Scholars have offered a number of increasingly fantastical explanations for his decision to build a telescope, including the influence of a mystical priest in Rio de Janeiro, or a sudden revelation as he was walking down the street.¹⁷ The truth is probably a much less ethereal story; and simply the one of an elderly rich man who wanted to establish a legacy in a world increasingly obsessed with classifying and predicting the natural world. These obsessions were part of the particular cultural desires of the American West, and of the colonial world more broadly. In addition, Lick's ability to make this decision in the first place – to choose how to redistribute his wealth – was predicated on colonial systems of capital and land accumulation.

Lick's first encounter with astronomy was likely through the young geologist and astronomer George Madeira, who lectured on scientific topics in antebellum California. Madeira met Lick after one of his lectures in 1860, and two struck up a friendship.¹⁸ Madeira told Lick of the possibilities of astronomy, and according to his own perhaps unreliable accounts, it was he who suggested the idea of building a large telescope.¹⁹ At the same time, Lick also met Joseph Henry, who was the director of the Smithsonian Institution and president of the National Academy of Sciences. Henry described how James Smithson had bequeathed his wealth to the advancement of science and created a legacy for himself with the Smithsonian Institution.²⁰ He must have made an impression, because the next year,

¹⁷ Wright, *James Lick's Monument*, 6.

¹⁸ George Madeira to Edward Holden, July 14th, 1889. Series 8, Box 31, Folder 2. Lick Observatory Records.

¹⁹ Ibid.

²⁰ Joseph Henry to Thomas Huxley, August 1st, 1874. Series 8, Box 31, Folder 2, Lick Observatory Records.

Lick made his first philanthropic gift to science, giving land in downtown San Jose to the California Academy of Sciences to build a new headquarters.²¹

Lick's philanthropic endeavors smoothed over his posthumous reputation, with biographers describing him as a miserly, selfish, socially isolated man who's only redeeming feature was his philanthropic heart.²² But these gifts may have compensated for more than just a chilly personality. Lick's generation of extraordinarily wealthy landowners faced growing concerns about tensions surrounding wealth inequality and class division and increasingly used philanthropy as a way to ease their reputation with the working class.²³ But that never undid the fact that philanthropy is fundamentally predicated on accumulating disproportionate wealth, which Lick did with vigor by buying up what were probably former mission lands.

The third important influence on Lick was George Davidson, who was president of the California Academy of Sciences. Davidson had a passion for astronomy, and he and Lick began a close friendship in 1873.²⁴ That October, Lick announced his intentions to build an observatory in the Sierra Nevada. Years later, Davidson would recall that Lick had been especially interested in the astronomical activities of the California Academy of Sciences, but had never looked through a telescope himself.²⁵ Lick was not a professional astronomer, but he was also not a victim of mysticism or rogue priests. His planned gift reflected his desire to determine his legacy by establishing an observatory unlike any other in operation. But the question remained: where?

The debates about the location of the observatory reveal how the dispossession of California Indians created opportunities for repurposing lands, rewriting their histories, and changing their social

²¹ Osterbrock, Gustafson, and Unruh, *Eye on the Sky*, 11.

²² H.S. Foote, "The Lick Observatory on Mt. Hamilton," Santa Clara County, California – Pen Pictures from the Garden of the World, 126. Series 8, Box 31, Folder 1, Lick Observatory Records.

²³ Rieppel, *Assembling the Dinosaur*, 8.

²⁴ George Davidson, "A Few Incidents in My Conferences with Mr. James Lick in the Matter of the Great Telescope," James Lick and the Great Telescope, the University of California Magazine, 131. Series 8, Box 31, Folder 2, Lick Observatory Records.

²⁵ Ibid.

meanings. At first, Lick had no intentions of building the observatory on a high mountaintop, out of public sight. He wanted to build it somewhere publicly visible in downtown San Jose. This would have created numerous problems for the telescopes, such as light pollution and smog. Although these may seem like obvious problems for astronomers today, atmospheric issues were not as well-understood in the 19th century; moreover, Lick had no experience with astronomy. Even after he was convinced to place the observatory at a high altitude, his desire for visibility persisted through the two-year search for the site.

From 1873 to 1875, Lick and his colleagues considered a variety of sites, but each was rejected over atmospheric issues. Davidson suggested that Loma Prieta, an “Astronomical Mecca” on the San Francisco peninsula, but it was vulnerable to fogs and air fronts.²⁶ They also considered a peninsula extending into Lake Tahoe in the Sierra Nevadas, but heavy snows would have blocked access to the observatory in the winter. Mount St. Helena, an extinct volcano with a fogless flat top, seemed an obvious site for an observatory due to its flat top, but Lick’s taste for the mountain soured after an unfortunate incident with a toppling wagon on the bumpy road in which he was dumped into the mud.²⁷ Finally, the foreman Thomas Fraser suggested Mount Hamilton.²⁸ The mountain was tall enough for clear air, but didn’t receive heavy snows, was far enough away from the growing city of San Jose to avoid its light, but most importantly, it was close enough to Lick’s homestead that he could even see it from his mill.²⁹

Once the site was chosen, Lick and his Trust had to acquire the land. The acquisition process reveals the legal mechanisms of dispossession and privatization, and the settler-colonial revaluation of land in terms of productivity. The Lick Trust accumulated land through federal and state grants, and

²⁶ Ibid., 132.

²⁷ William B. Farwell, *The Life of James Lick*, *Quarterly of the Society of California Pioneers* 1, no. 2 (1924) qtd. in Wright, *James Lick’s Monument*, 25.

²⁸ Fraser, Thomas qtd. in Wright, *James Lick’s Monument*, 25

²⁹ Ibid.

through purchases of neighboring ranches— some of which had likely been privatized during mission secularization.

The bulk of the observatory lands comprised federal and state land grants acquired in 1876 and 1878 respectively, which were then supplemented by additional purchases well into the 20th century.³⁰

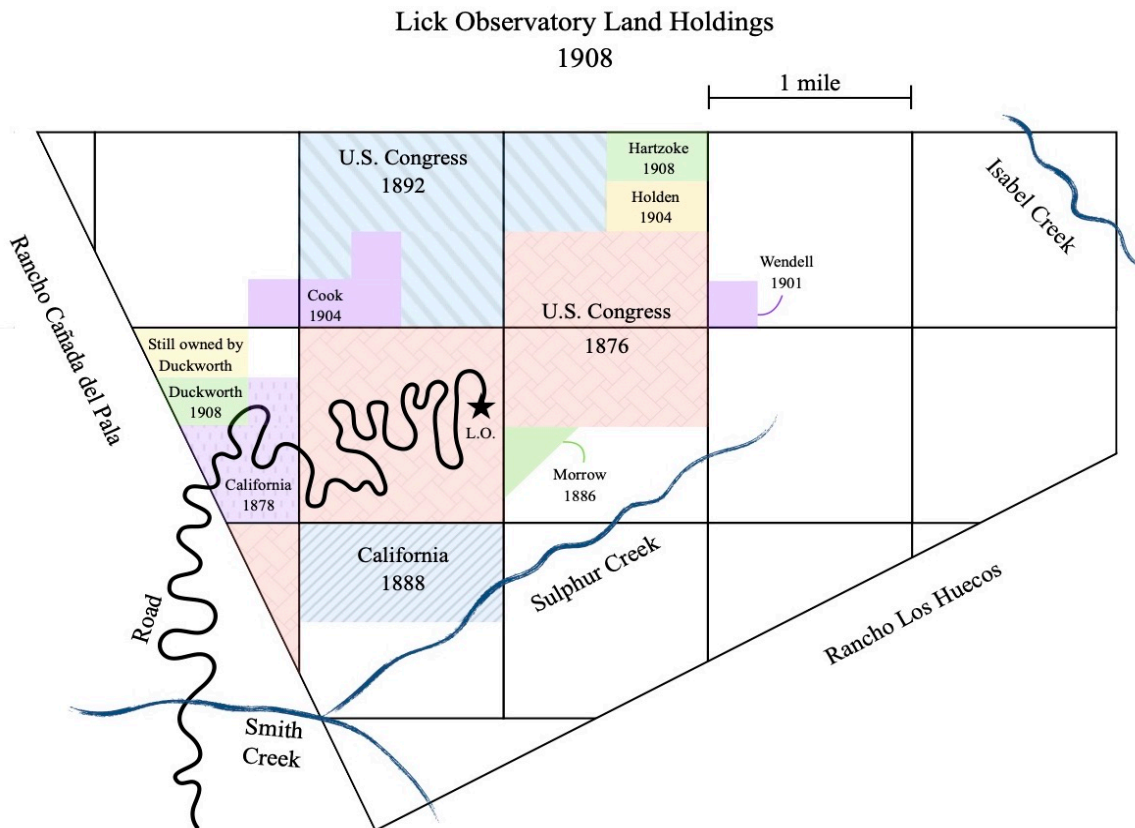


Figure 1. Lick Observatory Land Holdings, 1908. Each square is a one-square-mile sector as denoted in archival maps. Each land holding shows from what party it was acquired and the year it was acquired. Proportions are close to scale; road and stream paths are abstracted. Different maps conflict on whether the county road goes through the property purchased from Amelia Duckworth in the west. Map by the author from archival maps and listings.³¹

³⁰ “Lick Observatory Reservation,” June 1st, 1908. Series 2, Box 17, Folder 6; An Act Granting a Site for the Observatory to the Trustees of the Lick Observatory of the Astronomical Department of the University of California, June 4th, 1876. Series 2, Box 40, Folder 1; Grant of 150,000 Acres for Agricultural College Purposes, October 1st, 1876. Series 2, Box 40, Folder 1. Lick Observatory Records.

³¹ “Map of the Mt. Hamilton Reservation from Official Surveys,” 1876. Series 2, Box 40, Folder 1; “L.O. Reservation,” November 1907. Series 2, Box 17, Folder 6; Map of the western half of the observatory reservation, March 2nd, 1905. Series 2, Box 17, Folder 6; “Lick Observatory Reservation,” June 1st, 1908. Series 2, Box 17, Folder 6. Lick Observatory Records.

Conquest and dispossession prefigured the federal land grant system. For example, 200 acres were obtained because of the Morrill Land-Grant College Act of 1862, which empowered the federal government to transfer public lands to states to support educational institutions. The particular land purchased for the observatory had become “public” through an unratified 1851 treaty that the United States used to seize more than 2.5 million acres from seven Northern California Indian nations.³² Indigenous lands were not seized for the purpose of advancing astronomy, but dispossession came to shape the mode of federal and state support for the observatory.

Furthermore, these exchanges were predicated on fundamentally colonial and expansionist notions of land that had yet to be made productive for the ends of capitalist profits.³³ That notion is reflected in descriptions of the site in field notes on the topography, as well as in correspondence about land purchases. Between 1905 and 1908, William Campbell - then director of the observatory - corresponded with Amelia Duckworth about the potential purchase of her tract of land. Both parties invoked several lines of rhetoric during their negotiations. The first was an emphasis on the availability of natural resources (timber) on the land.³⁴ The second was geometry; Duckworth emphasized optimizing the geometry of the property, relying on the idea that a square tract was more desirable.³⁵ This simple assumption captured a feature of territorial expansionism in which imagined and real borders symbolized the economic and political taming of colonized lands.³⁶ The third was of disposability; Campbell proposed buying half of Duckworth’s property. “I do not deem it advisable to sell that portion only, as it would be a hard matter for me to dispose of the balance of the ranch,” she replied.³⁷ Duckworth found herself trapped in the tensions of capitalist definitions of property. These

³² Lee et al., “Land-Grab Universities.”

³³ Byrd, J.A., qtd. in Stein, “A Colonial History of the Higher Education Present,” 7.

³⁴ William W. Campbell to Amelia F. Duckworth, March 6th, 1905. Series 2, Box 17, Folder 6. Lick Observatory Records.

³⁵ Amelia F. Duckworth to William W. Campbell, August 3rd, 1906. Series 2, Box 17, Folder 6. Lick Observatory Records.

³⁶ Herbst, Jeffrey, “The Creation and Maintenance of National Boundaries in Africa;” Ryan, *The Cartographic Eye*.

³⁷ William W. Campbell to Amelia F. Duckworth, April 10th, 1905. Series 2, Box 17, Folder 6. Lick Observatory Records.

discourses re-emerged throughout the negotiations and standstills between Campbell and Duckworth, until Campbell finally bought half the land in 1908.

Throughout these years, the observatory started to act as a colony – it was permanently occupied by families that lived, worked, went to school, and played sports atop the mountain.³⁸ But this colony was met with the challenges of the environment it chose to occupy. The observatory's water supply came from a spring that flowed strongly in the winter and dried out during the summer. Residents stored water during the winter in four large cement and brick reservoirs.³⁹ But as early as 1890, this system was not meeting the domestic needs of the 25 residents of the mountain.⁴⁰ Over the next two decades, a series of technological interventions would temporarily solve the water problem for brief periods, only for it to reappear. Water famines occurred every few months or years until at least 1913, despite the continuous creation of new supply and storage systems that were seen as a model for other settlements in California.

Across the state, settlers implemented European farming and water management practices, which required reshaping the land by draining marshes, diverting streams, and tapping underground water.⁴¹ These colonial assaults on California's hydrological system had the effect of lowering the water table. At the same time, the gold rush catalyzed technologies for pumping and mining and brought industrial mining and corporate organization: capital investment, wage labor, and the professionalization of management and engineering.⁴² Hydraulic mining allowed corporations to carve away rock from mountains using highly pressurized water, in order to then sift the pulverized rock (and soil) for gold.⁴³ This practice spurred a number of ancillary industries that produced nozzles,

³⁸ "Celestial Tennis: Astronomers at Play." Series 8, Box 1, Folder 17. Lick Observatory Records.

³⁹ "Memorandum on the Water Supply," 1890?, 1. Series 2, Box 39, Folder 4. Lick Observatory Records.

⁴⁰ Ibid.

⁴¹ Anderson, *Tending the Wild*, 96.

⁴² Limbaugh, "Making Old Tools Work Better," 32.

⁴³ Ibid., 35.

hoses, pipes, motors, and pumps.⁴⁴ These technologies were motivated and produced by the extractive colonial practice of mining and the industrial landscape of resource exploitation. They were also fundamental to the development of both the Californian state at large, and the maintenance of colonies such as Mount Hamilton. The pump that siphoned water from stream to reservoir atop Mount Hamilton was a vestige of the hydraulic mining and water diversion techniques that had lowered the water table and filled streams with sediment in the first place.

These detrimental effects on the environment necessitated additional management systems. Cycles of exploitation and conservation cycles of exploitation and conservation followed settler-colonial epistememes of civilization and wilderness, and these legal and bureaucratic structures became political tools as well. One such example is the California Fish and Game Commission, which was created to respond to the problem of overfishing, but also played a significant role in defining the status of the observatory lands.

Since the beginning of the century, the observatory had been subject to game hunters shooting rifles on the summit. The last straw was in 1918, when one hunter accidentally shot into the car of the director of the observatory, missing him by just a few inches.⁴⁵ The director, William Campbell, began to advocate in earnest for protections against the use of firearms on the mountain. The answer was to come in the form of the California Fish and Game Commission, which was formed in 1870 to address disruptions to fish habitats by building fish ladders and hatching houses. It evolved, however, into the nation's first wildlife conservation agency, under whose jurisdiction game hunting and game refuges fell.⁴⁶ In December of 1918, Campbell wrote to the secretary of the Commission reporting the shooting and asking for advice on the problem, which eventually led to legal action to protect the observatory.⁴⁷ The Lick Observatory reservation was made into a game refuge early the next year, which prevented

⁴⁴ Ibid., 33-36.

⁴⁵ William W. Campbell to Mr. Westerfield, December 20th, 1918. Series 2, Box 21, Folder 1. Lick Observatory Records.

⁴⁶ "About the California Fish and Game Commission."

⁴⁷ William W. Campbell to Mr. Westerfield, December 20th, 1918. Lick Observatory Records.

hunters for firing guns within or onto the land.⁴⁸ Throughout his correspondence with the Fish and Game Commission, the university's lawyer, and others, Campbell referred to the observatory land as a "reservation" and the summit community as a "colony." The consciousness of the reservation was embedded in the American imagination of wilderness and borders in the nineteenth century, when both Indian reservations and nature preserves were created out of the same settler-colonial logics.⁴⁹

Campbell constructed the notion of the observatory as land to be protected against hunters in order to leverage the legal system of game preserves for its protection. On the other hand, when he chose to view it as a small town--heroically flourishing on the summit of a mountain, in which resources and engineering expertise should be invested-- it was a "colony." These overlapping identities encapsulated the tensions of repurposing land, while protecting its "natural" qualities against human management. In the quest for protections against physical violence, the leaders of the observatory had sought to protect an exploited space by appealing to its natural value. Together, the two cases of game refuge and water supply illustrate how the observatory acted as a colony, attempting to control its physical environment through competing practices of exploitation and conservation.

In sum, the observatory was a product of the social, political, and economic conditions created by exploitation and violence. Wealth accumulation was predicated first on unfree labor and then on resource extraction, and many California Indians were murdered or relocated from the lands that the observatory and its benefactors would come to inhabit. The observatory was not the legacy of a passionate astronomer who became extraordinarily wealthy, but rather of an extraordinarily wealthy man who was influenced by example of scientific patronage and a few chance relationships. The land for the observatory was acquired through legal and bureaucratic infrastructures of dispossession,

⁴⁸ H. C. Jones to William W. Campbell, April 23rd, 1919. Series 2, Box 21, Folder 1. Lick Observatory Records.

⁴⁹ Spence, *Dispossessing the Wilderness*, 3.

ownership, and distribution, and the observatory's founding and early operations were shaped by settler colonial logics of land management, extraction, conservation, and development.

In the 20th century, astronomy started to take on new forms, with both the Lick Observatory and Harvard College sending astronomical expeditions to South America, where they reinforced colonial hierarchies of power and production.⁵⁰ After the Second World War, large-scale collaborative multinational institutional scientific endeavors – known as “Big Science” -- became prevalent.⁵¹ One such example are the telescopes on Mauna a Wakea, the dormant Hawaiian volcano that is regarded as the center of creation for kānaka maoli, Native Hawaiians. Leandra Swanner argues that these can be understood as “neocolonial science” – where science has become the active agent of colonization.⁵²

The Lick Observatory shows us that the project of creating astronomy as a profession and institution in America has always been formed by the systems of power, enfranchisement, and disenfranchisement in which it has been situated. The relationship between American astronomy and colonialism, is not a post-World-War-II phenomenon or a discursive construct, but rather a historical pattern evident from the very earliest astronomical work in the United States.

⁵⁰ McGrath, “You Take Our Stars.”

⁵¹ Galison and Hevly, *Big Science*.

⁵² Swanner, “Instruments of Science or Conquest? Neocolonialism and Modern American Astronomy,” 293.

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