THE RISE AND FALL OF EDWARD S. HOLDEN: PART 2

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Back in the autumn of 1895, just as his nemesis Barnard was leaving Mount Hamilton, Holden was felled by a serious attack of sciatica. He suffered severe pain, and could barely move. He was taken down to San Jose, lying on a mattress in a wagon fitted up as a makeshift ambulance, and underwent an operation at the O'Connor Sanitarium. Holden's recovery was slow and he found the hospital depressing. When he learned that he would have to submit to a second operation, he decided to go to Santa Barbara in Southern California. Dr Richard Hall was a pioneering surgeon at its Cottage Hospital, and after his operation Holden could recuperate at the home of his wealthy friends, the A. Blair Thaws, in nearby Montecito. Holden had stayed with them the previous winter, in an unsuccessful attempt to throw off his neuralgia.

When Holden was released from the sanitarium in San Jose he spent a few days in Oakland, working hard in spite of his pain, trying to catch up on observatory business. Then he endured the long train ride to Santa Barbara and the second operation. This time he had had several boxes of books, his "Aeolian" (mechanical player piano) and some reels of music for it shipped south in advance, and his recuperation in sunny Montecito was a little more pleasant. He was back at work on Mount Hamilton by the beginning of December.142

By now Holden was spending little of his time on astronomical research. His administrative duties took up much of his day, and at night he preferred to read and to write, rather than spend long hours at the telescope. Before his illness he had completed a book on The Mogul Emperors of Hindustan; now he threw himself into composing a long article on astronomy for the Smithsonian Institution's Half century book, as well as a memoir on mountain-top observatories, tracing their development from 1741, when the French astronomer François de Plantade had died while observing on the Pic du Midi at an altitude of 9439 feet, to their culmination in Lick Observatory. All Holden's books and articles were thoroughly researched, and written in an entertaining style, though the astronomical parts are usually not as vivid as the personal vignettes and descriptive passages.143

In the spring of the year, Holden managed to wangle an appointment on the Board of Visitors of the Naval Academy at Annapolis. This provided the opportunity for his first trip east in almost ten years. Although he enjoyed the visit, Holden could not help comparing the Naval Observatory in Washington, "a great place as to buildings & instruments—& a simple hell as to envy hatred & all uncharitable men", unfavourably with Lick Observatory, where he believed that all his troubles were over now that Barnard was gone.144

However, soon after he returned to Mount Hamilton, Holden had a new crisis on his hands. This time it was with Campbell, his star spectroscopist. The
Campbells' young son Wallace became ill in August, and as he gradually grew worse, his parents took him to a hospital in San Francisco, where he was diagnosed as suffering from a "very severe case of malarial poisoning". Campbell returned to Mount Hamilton determined to find the source of the disease. Within a few days he discovered that the reservoirs which held the mountain community's water supply were in a "horrible state". Dead rats and other animals were floating in them, in various stages of decay. Campbell immediately made a written report to the director, warned all the other astronomers, and started boiling his own family's water. Holden, believing that his young subordinate was overreacting to the illness of his child, did nothing but send samples of the water to Berkeley for testing. He did not believe the dead rats and birds were the source of the boy's sickness. Even when E. W. Hilgard, the Director of the Agricultural Experiment Station in Berkeley, reported that the water was loaded with organic matter, far above normal tolerances, and that the reservoirs should be thoroughly cleaned, Holden did not go beyond asking for a remeasure with new water samples. Campbell exploded. He believed that the director was derelict in his duty, "either monstrously incompetent or criminally negligent".

When the new test convinced Holden that he must take action, he still tried to downplay the problem. He had clear water hauled directly from the spring to the observatory houses, but allowed public visitors to continue drinking the polluted water, without any warning that it was bad, until the reservoirs were finally cleaned over a month after the initial discovery. Campbell, by now thoroughly "dissatisfied" with the director, wrote a long and harsh account of this incident, which he insisted be copied into the observatory letter book. It was his declaration of war. Holden countered with another memo, supposedly written earlier but according to his young subordinate predated, in which he tried to cast the blame on Campbell himself. This sealed their enmity, which lasted until long after Holden had left Mount Hamilton.¹⁴⁵

When he had first come to Lick, Campbell had been one of Holden's strongest defenders. But as his own scientific reputation grew, the young spectroscopist began to see what he considered his director's faults more clearly. Increasingly, he had expressed doubts in Holden's scientific judgement, and his fairness and trustworthiness in dealing with other astronomers. But, as Campbell himself still realized, "a fellow gets cranky and doesn't think straight when he is shut up on a mountain for four months with every night clear. It isn't the best place to find patience, to say the least." Part of the problem was undoubtedly real, but part of it was undoubtedly in the subordinate's perception of the director.¹⁴⁶

Yet Campbell was not the only member of the Mount Hamilton staff who distrusted Holden. Charles D. Perrine, the observatory secretary and a dedicated would-be astronomer, was another. He had first attracted Holden's attention as a skilled amateur photographer of the solar eclipse of 1889, and had been appointed secretary in early 1893. Perrine, a young man whose previous secretarial experience had all been in the office of the Armour Packing Company in San Francisco, had a consuming interest in observational research. After working in the Lick office all day, he would persuade the faculty members to show him how to use the telescopes at night. Soon he had demonstrated his
abilities, discovering several new comets visually, photographing the Sun on a regular basis, and assisting Campbell at the 36-inch refractor. Perrine had all the necessary skills to be a regular astronomer, in the young Michigander's view. Although Perrine's title had been raised to secretary and assistant astronomer in 1895, the promotion had included no raise in pay, and he still had to work most of each day in the office. Holden had promised several times that he would switch him to full-time scientific work just as soon as he could find a new secretary, but each time a vacancy occurred, the director would hire another astronomer and keep Perrine at his desk. The Alameda native resented it greatly, especially as secretaries were so much easier to find than astronomers, and he made his displeasure known.  What he could not grasp, and what Holden could not tell him, was that a trained astronomer, with a strong background in the subject, would always be more attractive to the...
director than a skilled observer without any theoretical schooling, who he knew would continue working whatever his job title was.

The faculty member whose increasing enmity for Holden had the most important consequences, because it was actively expressed, was William J. Hussey (Figure 7). He was very nearly the same age as Campbell, and like him had been born on a farm in northern Ohio, in a very poor family. Like Campbell, he also went to the University of Michigan as a student of civil engineering, and became interested in astronomy. Hussey, who had to interrupt his education several times so that he could go back to work and earn enough money to continue at the university, studied under Schaeberle and Campbell at Ann Arbor. After graduation with a B.S. in 1889, he was hired on the Michigan faculty as an instructor in mathematics and astronomy. There he worked closely with Campbell, and when the latter was appointed to the Lick staff in Keeler’s place, he wanted to bring Hussey with him as a summertime volunteer assistant, just as he himself had come the previous year. Holden vetoed this scheme, but when Crew threatened to resign that autumn, the director recommended that his resignation be accepted and Hussey be hired in his place. However, the regents kept Crew on for the rest of the year, so Hussey did not come to Lick at that time.

He did manage to get an appointment as assistant professor of astronomy and instructor in mathematics at the very new Stanford University in 1892, just one year after it opened its doors for students. It was located near Mayfield, now a tiny suburb of Palo Alto, which then was the location and name of former Governor Leland Stanford’s ranch on the peninsula south of San Francisco, less than fifty miles from Mount Hamilton. One of the attractions of the position for Hussey was the nearness of the Stanford campus to Lick Observatory, and he arranged to spend the summer on the mountain as a volunteer assistant before he took up his teaching duties in the autumn.

Hussey was an ambitious, upwardly mobile careerist, a self-made man in the best tradition of the 1890s. He advised his brother, when he was considering accepting a new job, to compare it carefully with his present position and ask himself “which affords the best stepping stone to something better? In any move always have that in view. Never regard any position as a final goal.” Hussey followed his own advice skilfully. He ingratiated himself with Holden, who welcomed him to Lick Observatory whenever he could come to use the telescopes as a guest observer. He kept on very good terms with Campbell, who was his sponsor and advocate at Mount Hamilton. At the same time he prepared a plan for a new observatory, to be built around a large telescope, at Stanford University.

Hussey had ambitious plans for a Stanford Observatory. For the students, he envisaged a 20-inch telescope, five 8-inch visual telescopes plus a sixth designed for photographic work, another smaller photographic telescope, a meridian circle, and several spectrographs. The estimated cost, based on figures provided by Brashear in Allegheny, was $67,195. This was only for teaching purposes, however. The “crowning feature” of the observatory was to be the largest possible telescope. At the time Hussey prepared this plan, the Yerkes 40-inch refractor was still under construction, but he thought it would be possible to leapfrog it and build a 50-inch, which would be “about twice as
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powerful as the Lick glass”, at Stanford. The cost of this large telescope, complete with dome and mounting, he estimated as approximately $335,000, again using figures from Brashear. If this amount proved too large, Hussey gave “for comparison” estimates of the costs of a series of smaller telescopes, ranging from $227,500 for a 45-inch down to $34,250 for a 16-inch, in each case complete with dome and mounting. For a site, Hussey favoured a location in the hills about one mile south-east of the Stanford campus. He pointed out that in the winter, when it is often cloudy at the summit of Mount Hamilton, there are frequently long periods of clear weather on the Stanford campus. The site was far enough from the university to be free of lights (it is now within the city of Palo Alto), but close enough so that students and faculty members could easily get to it. Building it would put Stanford in the forefront of astronomical teaching and research.152

The main problem with this, as with most planned observatories, was to find the money to build it. Governor Stanford was immensely rich, and he and his wife wanted more than anything else to found an outstanding university for “the children of California” as a memorial to their only son, Leland Stanford, Jr., who had died as a youth. However, when the Governor himself died in 1893, his fortune was tied up until his will could be settled. The United States government filed a claim of $15 million against the estate, and the case was in the courts for years.153 Until it was decided, Hussey could not hope for funds for the observatory from the university. Hence he kept his eyes open for a potential donor, preferably a member of the Stanford family, and at the same time he cultivated the director of the Lick Observatory.

This Hussey did so successfully that long before Barnard actually resigned, Holden had decided to appoint the Stanford professor as soon as the position became vacant. Leuschner hoped to come back to Lick as a staff member, and Schaeberle recommended him strongly when Barnard finally did send in his resignation. The director promised to consider him, but actually he had already offered the job to Hussey; his letter had gone out the day after he saw the programme from the University of Chicago that listed Barnard as a member of its faculty. With no observatory in sight at Stanford, Hussey accepted, although the salary of $2,000 was considerably less than he had been making at Palo Alto.154 Before doing so, however, he had had a heart-to-heart talk with David Starr Jordan, the president of Stanford. Hussey told him that he wanted to return just as soon as the government claim was settled, and the way was cleared for astronomy at the new university. Jordan in his turn told Hussey that it would be best if he went to Mount Hamilton for a time, but promised that there would be a job waiting for him at Stanford whenever he wished to come back.155

Within little more than a week of the date on which the regents confirmed Hussey’s appointment, the mirror and other optics of the Crossley reflector were delivered on Mount Hamilton, undoubtedly linking the man and the telescope in Holden’s mind.156 The acquisition of this telescope was the short-lived high point of triumph of Holden’s administration of Lick Observatory. He had learned in early 1893 that Edward Crossley, a wealthy English amateur, wanted to sell his “Three-foot [diameter] Reflector”. It had been originally built by Andrew A. Common, a Newcastle engineer and astronomer, who used
it for several years, and then sold it to Crossley and went on to build a new "five-foot reflector" for himself. The skies in Halifax, where Crossley lived, were notoriously cloudy for astronomical observations, and after ten years Crossley’s interests had shifted from science to religion. He decided to dispose of the telescope.157 When Holden heard this news, he wrote to ask Crossley’s price. To his surprise, he learned that the North Country businessman would sell the telescope, completely equipped and with its dome, for £1,150 which, as Holden carefully noted on the telegram, was only $5,750 in American money. This figure was less than half what Crossley had paid for the telescope, only 3 per cent of Brashear’s estimate of the cost of a new refractor of the same light-gathering power, or 1 per cent of the sum the Lick trustees had spent to build their complete observatory. Holden dashed off a letter asking Crossley to hold the telescope for Lick Observatory, and started trying to get the needed funds from wealthy Americans whom he had marked out as potential donors. Crossley was extremely receptive and not only gave Lick Observatory the right of “first refusal” (to buy the telescope at the asking price), but when he did receive an actual offer from another would-be purchaser, notified Holden and gave him time to try to match the bid. The Englishman, convinced of the advantages of the Mount Hamilton skies for astronomical research, wanted his telescope to find its new home there.158

However, the panic of 1893, one of the worst depressions the United States had ever suffered, had extended into 1894, and rich men were hoarding their capital, not giving it to equip observatories. Neither Andrew Carnegie nor D. O. Mills came forth with the few thousand dollars needed to buy the Crossley reflector for Lick Observatory. Holden was forced to give up his hopes.159

A year later, the situation unexpectedly changed. Joseph Gledhill, Crossley’s house astronomer, advised Holden confidentially that the sale had not gone through, and that his master might be prepared to let Lick have the telescope free. Summoning up all his promotional skills, Holden composed a letter to Crossley, artfully designed to convince him to give the telescope to the University of California, for the good of science.160 Evidently the spinning mills of Halifax were doing better business than the steel mills of Pittsburgh, or Crossley was more sympathetic to the research ideal than Carnegie, for Holden’s plea achieved its purpose. Crossley agreed to donate the telescope, provided only that the University of California would pay the costs of disassembling the instrument and its dome and shipping them from England to Mount Hamilton, which he estimated as $1,000. This was the kind of challenge grant that the wealthy people of San Francisco found attractive, and Holden had no trouble in raising the sum from a galaxy of names that included Charles F. and William H. Crocker, D. O. Mills, C. P. Huntington and Levi Strauss. The regents adopted a high-blown resolution thanking Crossley for his gift, and voted to name the telescope for him. In the end it cost a little more to take down and ship the instrument and dome than he had estimated, but Crossley absorbed the additional expense, and they were soon on their way to the New World.161 The University of California paid nothing; Holden even had to go begging to the Wells Fargo Express Company and the Southern Pacific Railroad to ship the telescope and dome free from New York to San Jose. The
telescope arrived in July 1895, just as Hussey was appointed to the Lick faculty. The dome came by a more roundabout route and did not arrive until the autumn. Holden was already pressing to get the Crossley reflector into operation by the following spring.162

In 1895 most American astronomers did not think much of reflecting telescopes. In England William Herschel, the third Earl of Rosse, John Herschel and others had built and used progressively larger reflectors for astronomy, but they were awkward, ungainly instruments. Their mirrors were made of speculum metal, a hard, brittle alloy of copper and tin, which reflected at best only about half the light that fell on them. By the end of the nineteenth century glass, silvered on the front surface by a chemical deposition process, had replaced speculum as the preferred material for large mirrors.

Twenty years before, when the Lick trustees were trying to decide how to build a telescope “superior to and more powerful than any telescope yet made”, Howard Grubb, the Irish engineer and optical-shop owner, had argued effectively that only a reflector could fulfil these requirements. His firm had made a “4-foot reflector” for the University of Melbourne in Australia, and at various times he had proposed building a 6-ft, a 7-ft or even an 8-ft reflector as the Lick telescope. David Gill, the rising young Scottish astronomer, had analysed very perceptively the relative merits of reflectors and refractors for the Lick Trust. In the end, he concluded, the main function of a telescope is to collect light, and for the “new astronomy” the maximum possible amount of light would be needed to analyse faint stars and nebulae. This could only be provided by reflectors, which in principle could be made much larger than refractors, because a lens can only be held around its edge, and therefore sags slightly in the middle, while a mirror can be rigidly supported from below. Newcomb had also studied the problem carefully, and for a time he had favoured building a reflector rather than a refractor at Mount Hamilton.163

The weight of opinion in America, however, was strongly against reflectors. As Gill and Newcomb both realized, all existing reflectors were awkward and decidedly inferior in optical quality to the best refracting telescopes. The firm of Alvan Clark and Sons made no telescopes but refractors, and they were excellent instruments, particularly for visual observing. Traditional astronomers, such as Burnham, had nothing but contempt for reflectors.164 The Lick trustees in the end went with tradition and built the 36-inch refractor. Probably they were right, and 1880 was too early for reflectors. In 1895 most American astronomers still thought it was too early for such telescopes, in fact that their time would never come. A few far-seeing individuals such as Holden, Keeler, Brashear and Hale had the opposite opinion, but Hussey was not one of them.

When he first offered a job at Lick to Hussey, Holden indicated that he would be in charge of the 12-inch refractor and the Crocker photographic telescope, as Barnard had been before him, and would also get “certain nights with one of the two large telescopes”.165 He meant the 36-inch refractor and the Crossley reflector, which had at the time not yet arrived at Lick. It was the only mention of the Crossley in the letter. Barnard’s resignation was not effective until 1 October 1895, and Hussey’s appointment did not begin until 1 January 1896. In the interim the telescope was delivered at the summit, and Holden,
after looking it over, decided to postpone its erection until the following spring, and to put Hussey in charge of this job. He sent all the plans, photographs and memoranda he had received from Crossley to Hussey, so that he could familiarize himself with them. Hussey accepted the assignment without complaint.\textsuperscript{166}

In the spring of 1896 the Crossley (Figure 8) was erected under the supervision of "the Director assisted by Mr. Hussey", as Holden put it in his plans. The telescope was a notoriously awkward instrument. Barnard, always contemptuous of anything associated with Holden, gibed that it was "no good" and that he would not pay $5 for it. A year later Hussey referred to the telescope as "a pile of junk". Their testimony must be discounted, but Keeler's description of all the changes he had to make still later to render the Crossley usable shows clearly that it was a very poor instrument indeed to begin with.\textsuperscript{167} That March the Supreme Court rendered a final decision on the Stanford case; the government claim was disallowed and the entire estate went to the governor's heirs, most of it to his widow. Her share would ultimately pass to the university. Hussey hastened to congratulate President Jordan on the successful outcome of the case, and to assure him that "[e]ach day Mrs. Hussey and I have longed to be with you and take part in the jubilee". He closed his letter with the hope that in the not-too-distant future he would see the great domes of a new observatory looming above the campus. Attempting to make his vision a reality, Hussey arranged to meet privately with Josiah and Gertrude Stanford, two heirs of the governor, whom the Stanford University high command had identified as possible observatory benefactors. At Mount Hamilton he also tested the Crossley reflector, and found it unsatisfactory for visual observing.\textsuperscript{168}

The fact is that Hussey was not at all interested in this telescope. He considered himself an astronomer, not an engineer. His main interest was in astronomical research, and he had come to Lick Observatory to do this for a few years, not to rebuild an old clunker of a reflector. He was willing to spend some time on instrumental problems, but not a lot, and especially not if it interfered with his observing with the 12-inch and the 36-inch refractors, on which he had regularly assigned nights.\textsuperscript{169} None of the other astronomers leaped into the breach. Campbell claimed he wanted to use the Crossley for photographic spectroscopy, and had designed a spectrograph for it, but did nothing to push it through to completion.\textsuperscript{170} He, like all the other astronomers on Mount Hamilton, was too busy using the telescope he had to give up precious time and energy to get another one working. Holden, though he wanted to put the Crossley into operation, did not have the time or the instrumental ability to do it himself. So 1896 drifted away, without any results to show from the new instrument, for which he had prophesied so many great things.\textsuperscript{171}

Holden was an experienced director. He realized that someone had to be put in charge of the Crossley project, and told that his first responsibility was to get it working effectively. He asked Schaeberle if he would undertake this task, but the senior staff member refused point blank. Campbell was clearly too busy, working on a massive spectroscopic programme which Holden considered the most important work of the observatory. That left Hussey as the only choice. Holden had no other option, but it was an unfortunate assignment.
The former Stanford professor had already changed from the loyal subordinate he had been just a year before to a challenging antagonist. Hussey had been elected president of the Astronomical Society of the Pacific the previous year, and he now planned to break Holden’s grip on that organization. Although he had given up the presidency two years after founding the society, the Lick director remained year after year as chairman of its Publication Committee. Through it he controlled the journal of the society, which published, in the opinion of his critics, “too much E.S.H. and too little astronomy”. Hussey determined to persuade the Nominating Committee of the society to put forward a new slate for the Publication Committee, with Campbell as its chairman and with Holden left off completely. Frantic politicking ensued. The elderly Davidson, not even a member of the society but always eager to make trouble for Holden, buttonholed all the amateur astronomers he knew to line up support for Hussey’s ticket. However, Holden’s friends, led by Feodor R.
Ziel, the long-term secretary of the society, defeated it both in the Nominating Committee and in the contested election which followed. Holden remained triumphantly in control of the Publications, and Hussey was now another open enemy of his director.\textsuperscript{172}

The day Hussey returned to Mount Hamilton from the meeting at which his slate of candidates had been defeated, Holden called him in and told him that he was to stop observing with the 12-inch and the 36-inch, and should instead devote all his efforts to getting the Crossley into full operation. Hussey, who had been forewarned by Campbell, immediately protested. He insisted that this reassignment was directly contrary to the understanding under which he had been hired, and that Holden did not have the authority to order him to give up his research. Hussey maintained that he had the right to continue the work he was doing on double stars and comets “in order to acquire and maintain a reputation in it”. In fact he was speaking for the other astronomers as well as himself. Campbell, in particular, although he tried to keep in the background of the controversy as much as he could, told the others that if Holden succeeded in this case, he could in the future “arbitrarily interfere” with any of them.

However, the director had previously discussed the problem thoroughly with the regents who made up the Lick Observatory Committee, emphasizing the need to get the Crossley into operation. He had obtained their permission to order Hussey to devote the major part of his time to it, and he now did so, in a formal letter of instructions. Hussey, a vigorous advocate, demanded in writing to see the director’s authority, but Holden replied, also in writing, that he had explained the situation to the regents the last time he had been in San Francisco, and they had given him verbal instructions. An acrimonious exchange of letters between Hussey and Holden followed, but the staff member did “under protest” and “temporarily” give up all his observing except for one night per week with the 36-inch refractor.\textsuperscript{173}

Hussey then worked up a long and eloquent defence of his position, emphasizing his desire to continue the research which he had come to Lick Observatory to do. He said that he was willing to do his share in trying to get the Crossley into operation, and that he hoped it would be a success, although he doubted it, but that he was not willing to give up his regular scientific work “for what may be a mere mechanical experiment”. Hussey recounted his past career, in which he said he had never had any controversies but that “[y]ou have made no attempt to come to an amicable understanding, and your whole course in the matter appears to be a studied attempt to be offensive”. If Holden could “arbitrarily” change his line of work, why not that of every other astronomer? Of every other person in the University of California? He could not regard Holden’s “unnecessary, unreasonable, unfair” plan as final, and demanded that the director forward copies of his protest to the regents.\textsuperscript{174}

Tension was rife on the mountain. Campbell, Perrine, and Holden’s young assistant, Allen L. Colton (Figure 9), were all definitely on Hussey’s side. Schaeberle oscillated from one camp to the other, but had helped in the composition of this letter. Richard H. Tucker, who had come to the observatory a few years before to take over the meridian-circle work from Schaeberle, remained studiously neutral but sympathized with Holden.\textsuperscript{175} Robert G. Aitken, who had recently escaped from an instructorship in mathematics at the
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College of the Pacific, a tiny Methodist institution near San Jose, to a junior position on the Lick staff, also tried to keep out of the struggle as much as he could. He was young, underpaid, and had a wife to support; at least in public Aitken tended to agree with the director.

Although Holden was isolated, he kept up a stiff fight, but his heart was not really in it. He was tired of astronomy, and of Lick Observatory. He was observing even less than in previous years, and going home earlier when he did. He occupied his time by writing historical articles on his family, and a book on
heraldry. He suffered badly from neuralgia. His children were growing up and he hardly ever saw them, but it strained all his resources to pay for their education. He was tired of begging for money for Lick Observatory. Phoebe A. Hearst, the very wealthy widow whom he had been counting on to provide support for research at Mount Hamilton, had broken off all communication with him. To her his separation from his wife was apparently an important reason for not contributing money to the observatory. For the first time Holden confided to Newcomb that he would resign the directorship and leave if he could only get himself appointed as head of one of the large libraries in the East, such as the Library of Congress or the New York Public Library.176

Hussey realized that he was in a fight to the finish. He made sure he would have an escape route, if needed, by sending an account of his controversy with Holden to Jordan at Stanford, and reminding the president to “kindly hold a place in reserve for me, as you suggested in our conversations could be done”. Jordan ensured Hussey of his full support, writing, “My suggestion is that you fight every point and not resign. If you could rid California of the incubus of that immoral and incompetent man, it would be a public service of the first importance. If removed by the trustees or if you think it is necessary to do so, write to me and I will reappoint you here on the same terms as before, hoping some time to do better. But there is a principle at stake and the sooner it is settled the better.” Hussey, grateful in the knowledge that he would have a job to fall back on no matter what happened, agreed with the president that his fight with Holden was an important matter of principle. “The condition of affairs here will never be settled so long as the present Director is retained, and the sooner he goes the better”, he wrote. In reply Jordan attacked the Lick director once again, saying, “It is a perennial disgrace to the University of California that a man of that character is allowed to flatten out the work of a splendid observatory”.177

Thus encouraged by the president of a rival institution, Hussey continued to undermine Holden. In early May the director instructed him, in writing, to test the Crossley thoroughly by using it for visual and photographic work. He was to do this in the Newtonian mode, in which a small flat mirror brings the image formed by the large primary parabolic mirror out to the side of the tube. Hussey went to the Crossley telescope, apparently for the first time in weeks, and found that the silver reflecting surface had been rubbed off the flat. He took it out of the telescope, brought it to Holden’s office, and left it with a note saying the telescope could not be used until the flat had been resilvered. This was definitely an attempt to create a problem, not to solve one, and it succeeded. Holden sent the flat back to Hussey with a note telling him to resilver it. Hussey told the messenger, Schaeberle, that he did not have the necessary chemicals for the silvering process. According to Hussey, Holden then “in an angry and dictatorial manner” told him, “I order you to silver that flat and do the best you can with it”. Hussey shot back, “Please put your order in writing”. Holden “angrily” responded, “I shall do nothing of the kind”, and repeated his order. Hussey, who at least by his own account always spoke coolly, replied, “When your order is in writing, then I will consider it”, and walked away.

Evidently Schaeberle resilvered the mirror to end the impasse, but then Hussey found more problems with the Crossley telescope, this time in its new
driving clock that Emil Zengeler, the instrument maker, had just completed. Hussey informed the director, in writing, that he needed Zengeler for further work on the clock. Holden sent him at once, but Zengeler told Hussey he was due for a few days off, and asked him if the work could not wait. Hussey said as far as he was concerned it could, and Zengeler, thus encouraged, left the mountain for a week. The Crossley continued to sit idle. 178

Finally, on 22 May two of the regents, Phelps and Judge Charles W. Slack, both members of the Lick Observatory Committee, came up Mount Hamilton to interview the principals in the case. Bits and pieces of the story had started to come out in the San Francisco newspapers, and a reporter from the Chronicle appeared at the mountain with the regents. She was not allowed to attend the hearing, but she knew how to locate sources, starting with Aitken’s wife Jessie, who happened to ride up from San Jose on the same stagecoach with her, and who was reputed to have “the readiest tongue on the mountain”. Long and fairly accurate news stories now appeared in all the Bay Area dailies, mostly sympathetic to Hussey and the other astronomers on his side. 179

At Mount Hamilton Phelps and Slack first interviewed Holden, then Schaeberle, then Hussey, and finally Campbell. The conferences took all afternoon, and after inspecting the Crossley the regents had to leave the mountain without seeing Perrine, who had wanted to be heard also. Hussey kept up a brave front, and said he thought they would decide in his favour, but the following Monday he at last got down to serious work on the reflector, resilvering its mirror and cleaning up the darkroom for photographic work. In early June the regents called Holden to San Francisco for further conferences; by then Hussey had brought the Crossley into good enough condition to observe with it. His whole attitude toward the reflector had changed drastically after the regents’ visit.

Also, while Holden was gone from the mountain, Hussey, according to his diary, while passing through the Main Building, “noticed a door” and it “occurred to him to see where it led”, so he “opened it from curiosity” and it turned out to be a closet for general rubbish. A newspaper “fell at his feet”, and picking it up he “noticed” a sheet of Lick Observatory stationery folded within it. The sheet, he discovered, was part of a memorandum in Holden’s characteristic handwriting. In plain ordinary language Hussey was taking advantage of the director’s absence to snoop through his trash. Hussey dug further and found the rest of the memorandum, which he maintained was a completely false statement by Holden to the regents. At that time Hussey and Holden had not spoken directly to each other for over a month.

Davidson, in San Francisco, constantly encouraged Hussey to keep up his struggle with the director. The elderly West Coast scientist stirred up more trouble for Holden with Payne, the editor of Popular astronomy, and gleefully reported “the frightful condition of affairs” on Mount Hamilton to Burnham and Barnard. 180 Finally, in mid-June, the Lick Observatory Committee reached their decision and issued a report, which quickly found its way to the mountain. They completely supported Holden. He had the authority, under the rules of the university, to direct all the work of the observatory and to assign necessary duties to the astronomers or its staff. Furthermore, he had consulted the regents’ committee, and they had approved in advance his plan to assign
to Hussey the task of bringing the Crossley into operation and giving it a trial in use.\textsuperscript{181}

Hussey was crushed but did not give up.\textsuperscript{182} The order of the regents had its effect, and on 2 July he at last actually observed with the Crossley on a night of good seeing. He tested the telescope visually on Saturn, comparing the image of the planet he observed with it with the image of the same object as seen with the 12-inch refractor a few moments later. He concluded, “I believe the 12-inch refractor is as much superior to the Crossley reflector in its present condition for the visual study of the planets as is the 36-inch refractor superior to the 6-inch comet seeker”. This report, although overdrawn, was basically correct; the 12-inch is a superb instrument for visual work, but the Crossley’s much larger aperture, shorter focal length, freedom from chromatic aberration, and high transmission of violet and ultraviolet light, all of which make it far superior for photographic work, were not tested at all.

A few days later, Hussey, “not having felt well for some time, yield[ed] to Mrs. Hussey’s urgency and applie[d] for leave of absence”. He asked for a month’s vacation with pay. Holden, still a hard fighter, tried to block this request, on the ground that the summer was the good observing season, when the Lick astronomers were expected to be at work. Hussey could wait until winter for his leave, in the director’s opinion. Hussey, no shrinking violet, immediately informed President Kellogg and the regents that the previous summer at this same time four astronomers had in fact been on leave, one of them Holden himself. Furthermore, Hussey said, the “continued harrassment” of the past few months had told upon his health so much that “a short period of recreation” seemed imperative to him. At this point Regent Crocker intervened, gently telling the director that as Hussey had suffered in “the recent controversy”, it might be better to let him take the month’s vacation in the hope it would lead to better co-operation in the future, rather than to push his nose to the grindstone all summer long.\textsuperscript{183}

Before the leave came through, Schaeberle, no doubt encouraged by Holden, offered to help Hussey test the Crossley once again for visual observing. The older man was the only member of the Lick staff who had previous experience with reflectors. They observed Saturn again. Schaeberle immediately noticed that the image of the planet was vibrating, and traced the problem to a poorly designed support system for the flat mirror. Until this defect could be remedied, the Crossley was useless, Hussey reported. Since Zengeler, the machinist, was by now seriously ill and in the hospital in San Jose, all work with the reflector came to a standstill. On 13 July a majority of the regents’ committee approved Hussey’s request for leave (Kellogg and Phelps were both gone on their own summer vacations), and two days later Hussey and his wife left for Santa Rosa, her parents’ home, in the Sonoma Valley north of San Francisco.

The disgruntled astronomer had no intention, however, of relaxing in the sun to regain his health. The regents had made the wrong decision, he believed, and he intended to fight it every inch of the way. He wanted to prepare charges of his own, against Holden. He needed a lawyer, and had asked Davidson to find one for him months before, but had been dissuaded by the old man. After the regents issued their findings against him, Hussey appealed to Jordan for help.
The Stanford president strongly recommended attorney E. L. Campbell (no relation to the astronomer), "one of the cleverest lawyers in the city" (San Francisco). He resided in Palo Alto and was a good friend of Jordan's, and a loyal supporter of Stanford University. The same day Hussey received this letter from the president, he applied for leave. When he appealed to President Kellogg and the regents over Holden's head, he wrote to lawyer Campbell, asking him "to represent me in an investigation of the conditions here". He was not in a position to pay high fees, Hussey said, but had been recommended to seek the attorney's help by a "good friend". "... the case here is so flagrant that as a public duty some one should make an effort to rid the Observatory of its incubus, and I more than any other Astronomer am in a position to make the attempt." Lawyer Campbell discussed the situation with Jordan, and immediately wrote back to Hussey that as "[i]n a matter of this kind the duty of discovery and exposure rests on every good citizen", he would take the case without charging any fee. Hussey received this welcome news the day after his last night of observing with the Crossley, and he left Mount Hamilton less than a week later. He did not notify Holden or Kellogg or Phelps or anyone else that the first thing he was going to do on his much-needed vacation was to stop in San Francisco to meet with his attorney to plan how best to bring the director down.184

After this legal conference Hussey went on to Santa Rosa and occupied himself in writing a lengthy statement on the conditions at Lick Observatory, as he saw them, for E. L. Campbell's use. It was a long list of petty complaints about Holden's administration of the institution, together with vicious attacks on the director's abilities and methods as a scientist. From internal evidence in this document, it is obvious that Perrine had been passing on to Hussey information that he had gleaned in his official duties as secretary of the observatory. W. W. Campbell sent Hussey reports on what he considered Holden's latest misdeeds at Mount Hamilton, and came to San Francisco secretly to meet with his friend and go over the statement with him. Colton, Holden's assistant, contributed what he claimed were "dated memoranda" describing events discreditable to the director that he had witnessed. They included, among other items, the charges that Holden had knowingly not corrected the spelling of Alvan Clark's name in a paper by Mary Whitney that he published in the Publications of the Astronomical Society of the Pacific (evidently the idea was that he was holding her up to ridicule), that he had had a photograph of a decoration he had received developed during a period of severe water shortage on Mount Hamilton (thus wasting a few gallons of the precious fluid), and that he had used alcohol from the observatory paint shop to preserve a dead rattlesnake he gave to a friend. This was the level of pettiness reached in the charges that Hussey listed in the seventy-eight-page memorandum he composed for his attorney.185

Next Hussey wrote what he called a demurrer to the regents' report, which he claimed had done him an injustice and had placed him in an entirely wrong light before the full board, the public, and the judgement of history. He insisted that he had not been unwilling to test the Crossley reflector, as implied in the report. In fact he had always been willing to do so as soon as the telescope was ready for use. This had only been accomplished in June; all the delays were due
to Holden alone, Hussey wrote. He had always been willing to devote two nights a week to the reflector, but not to give up his work with the other telescopes. It was to do research with them that he had accepted the position at Lick, and his appointment implied an agreement that he could use them that the Board of Regents and the director could not now breach. He concluded his letter with the statement that from what little he knew of what Holden had told them "he had grossly misrepresented matters of fact". Although W. W. Campbell advised him not to submit this document to the regents until after he had returned to the mountain, on the grounds that it would not look right to work up his case while supposedly on vacation for his health, Hussey could not wait. He sent it to the regents' committee on 10 August, although he dated it as if he were on Mount Hamilton.  

A few days later the Michigan astronomer reported back for duty at the observatory. He invited his attorney to come to the mountain to collect further information from W. W. Campbell, Perrine and Colton. Hussey's house was near the Crossley dome, a few hundred yards below the summit, and the lawyer could get off the stage there, without Holden or anyone else at the Main Building knowing that he had arrived. However, before E. L. Campbell could make this surreptitious trip, the final blow-up occurred at the observatory.

Colton, Holden's assistant, decided he had taken enough and angrily resigned his position with a blast at the director. This action was quite out of character for the usually meek, inoffensive young man. Colton had been a product of the University of Michigan, where he knew Hussey and probably took courses from Schaeberle or Campbell. He did not specialize in science, but received a Ph.B. degree from the School of Literature in 1889, and a B.A. in 1890. Colton was an expert amateur photographer and darkroom technician. He was hired at Lick Observatory in 1892, originally as assistant astronomer and secretary in the vacancy created by Augustus Burnham's departure. A few months later Perrine was hired as secretary (in the slot left open by Crew), and Colton knew the best of the lunar photographs had been taken by himself and Holden with the pictures of the Moon. He was repelled by what he considered the defects in Holden's character, and especially his utter lack of skill in photographic techniques, or even willingness to learn them, but for the first few years he tried to get along with the director. Colton had vague plans to go back to school, earn a Ph.D., and become an independent investigator, but lack of funds and his own inertia kept him from ever taking the first step on this path. He became especially good friends with Barnard and with Hussey, and complained more and more frequently to them about life on Mount Hamilton and working with Holden.  

Colton could see that the Moon photographs that were the director's chief research result were not of very high quality. They did not have the superb definition—that is, they did not show the finest detail on the Moon—that the site and the telescope made possible. Holden had not mastered the art of getting the telescope in perfect focus, rating its clock to follow closely the Moon's motion in the sky, and taking the exposures exactly at the moments of best seeing, without shaking the telescope and thus blurring the pictures. Colton knew that the best lunar photographs had been taken by himself and
Perrine, in the autumn of 1895 when Holden was ill. Worst of all, in Colton’s eyes, when Holden had sent these very pictures for exhibit in Europe, he had represented them as taken by himself, Colton and Perrine. Actually, since he was the director of the observatory and in charge of the lunar-photography programme, Holden could feel fully justified in this statement by the standards of his time, but Colton wanted to think of himself as an independent scientist. In the past few months, Holden had become increasingly cynical, according to Colton, and had tried to persuade his assistant to pretend that the most recent pictures were good ones, and not to admit to outsiders that they were poor, as they were.

The hot, dry summers on Mount Hamilton were always the worst times for personal tensions. In July Colton had told Hussey that he could not take it any longer and would resign the following month. Nobody expected him to do it. But the young assistant’s sister, the strongest influence in his life, was on the mountain for a long visit and, perhaps emboldened by her presence, perhaps inflamed by Hussey’s return from Santa Rosa with his seventy-eight-page list of Holden’s misdeeds, perhaps simply fed up with everything he was doing, on 18 August he took the plunge. He resigned in a polite, reserved nine-page letter to the president and Board of Regents, charging Holden with “willfully degrading the quality of an important scientific work in which I have been a co-laborer with him, and because of the unfair treatment which I have received from him”. Holden at once recommended that the resignation be accepted, stating that he was willing to give his side of the case at any time if it were desired. He assured the regents that many astronomers had written that the Moon maps were very valuable. “As to the value of Mr. Colton’s services opinions differ. I have frequently reported to the Chairman of the Lick Observatory Committee that, in my opinion, his work was very unsatisfactory.” At the same time, he leaked derogatory information on his former assistant to the newspapers through Burckhalter, by now his ally in Oakland.189

Soon after Colton’s departure, E. L. Campbell did come up to the mountain and got off the stage at Hussey’s. That Saturday night he had a long conference with Hussey, Campbell and Perrine, and heard all about Colton’s resignation. Then he hurried back to San Francisco, where the ex-assistant was staying, and had several long interviews with him. From Colton he learned of Davidson’s interest in the case, and soon met the old man. Hussey and W. W. Campbell had been trying to keep him out of it, because they did not trust his discretion, nor respect him as an astronomer. The attorney had no such scruples, and in a long conference with Davidson he collected more derogatory information concerning the Lick director.

Colton’s resignation provided E. L. Campbell with just what he had been seeking, a new avenue of attack on Holden. The San Francisco lawyer feared that the regents’ committee would simply file and ignore Hussey’s letter since they had already ruled on his case and, legally speaking, no appeal mechanism existed. Colton’s letter of resignation opened a new issue. It contained charges against Holden which the lawyer pithily summarized as “Professional ignorance; Professional dishonesty; Administrative incapacity; Inveterate laziness and general unfitness to perform the duties of his office”. The attorney’s strategy was to get one of the regents to demand an investigation
of these charges. Through Davidson he found his man in Ernst A. Denicke, Leuschner's father-in-law, who by virtue of his office as president of the Mechanics Institute in San Francisco was an *ex officio* member of the regents. E. L. Campbell described him as "a good fighter, aggressive, tenacious, and never knows when he is whipped". Denicke saw Holden through Leuschner's eyes, and hated him. He agreed to press the case against the director. Attorney Campbell, through Colton and Davidson, appealed to Holden's old enemies Burnham, Barnard and Crew for still more evidence. ¹⁹⁰

Meanwhile, Hussey and the other residents of the little-Mount Hamilton community saw increasing signs that Holden intended to leave the observatory. He was having his household goods boxed for shipment, was removing his diplomas and personal books from his office, and was selling many of his books to the observatory library. It looked like a permanent departure, but no one was sure. Holden told Aitken that he was planning to take a leave of absence but he kept up the fiction that he intended to return soon. Perrine knew the director was sending and getting telegrams, but he could not find out what they said, for Holden was always in the office to receive them by telephone personally. Hussey fretted that the director might really only be going to take a vacation, to avoid the damaging testimony of W. W. Campbell, who was about to leave for India to observe a solar eclipse, and would be gone from California for almost a year. Attorney Campbell bustled around and politicked with as many of the regents as he could, urging them to take up Colton's letter of resignation at their next meeting, on 14 September. He wanted a full investigation of Holden's administration, and he predicted that if he could get it, the director would be forced out. ¹⁹¹

Holden in fact by this time had long since made up his mind to leave. At their meeting in May, the Board of Regents had reduced his salary from $5,000 to $4,000, and President Kellogg's from $10,000 to $8,000. It was billed as an economy move, and their two salaries were the largest on the university payroll, but in part, Holden knew, the cut represented the regents' growing lack of confidence in both of them. ¹⁹² By July he had decided definitely to go just as soon as he could find a suitable position. There were no such things as retirement pensions for university professors or observatory directors in those days, and Holden had no savings of his own; he did have three children, all young adults, who were completely dependent upon him. The job Holden wanted was the presidency of the Massachusetts Institute of Technology, vacant since the unexpected death of Francis A. Walker the previous January. Holden enlisted the aid of his friends in the East to help him get it. To them he mentioned nothing of his troubles with his staff and the regents, but said only that he had had a long exile in California, and had accomplished all that he had set out to do at Lick Observatory, but now felt that he was entitled to return to a more civilized part of the country. Pickering, at Harvard, worked especially hard on Holden's behalf, but warned him, "Pray do not resign until you have an assured place elsewhere. Unfortunately the number of astronomers exceeds the number of good positions." He was indignant when he heard of the Lick staff's criticisms of their director, sympathizing with him in the words, "I never did want to go to sea in a ship in which the coolies are captains, although many perhaps think that is the way to run an observatory. I find that I can
get more work out of assistants who think that they know less, and not more, than I do.”

When the Board of Regents finally met in San Francisco on 14 September, they spent most of their time in executive session debating the relations between homeopathic physicians and the doctors of their School of Medicine. Attorney Campbell believed that Holden’s supporters were dragging out the discussion to avoid the Lick issue. But before they could adjourn, Denicke got up and demanded to know whether the chairman of the Board of Regents, Governor James H. Budd, had received a letter of resignation from Colton. He had not, and Denicke began to speak on the subject of suppression of official documents, when Phelps, the chairman of the Lick Observatory Committee, admitted that he had the letter in his pocket. He had been trying to keep the whole matter quiet. The governor, who believed in keeping the university on a short tether as a matter of principle, could see that Phelps was covering up for Holden and Kellogg, and he was furious. Denicke, after doing a little further goading, moved that the meeting be adjourned until the following week, when the first order of business would be the Colton resignation.

On the mountain, Holden now accelerated his preparations for departure. He had his office and his apartment stripped clean; everything was packed. He still said that he was going on leave, but it was clear to all that he would never return. Finally, on Saturday 18 September he left farewell cards in everyone’s mailbox, “and shortly after the Observatory conveyance is seen driving down the Mountain Road”, as Hussey wrote exultingly in his diary. “It is Edward S. Holden leaving Mt. Hamilton forever.”

Under the circumstances the continuation of the regents’ meeting the following Tuesday was something of an anticlimax. Although Phelps and Andrew S. Hallidie, the inventor of the San Francisco cable-car system and a long-time supporter of Holden, defended him on the floor, most of the other regents were clearly tired of hearing about him. Phelps insisted that Holden had not asked for a leave of absence, but that he did intend to resign. Taking him up on this, Arthur Rodgers, another regent who had often locked horns with the director, moved that his resignation be accepted at once. This motion was only barely defeated, but instead a committee was set up to investigate the charges against Holden. At this point Phelps moved that Holden be granted three months leave of absence with pay, and stated that the director would resign, and needed the time to wind up his affairs. This motion passed, and the next day the governor, as chairman of the board, appointed the members of the investigating committee. A majority of them were strongly opposed to Holden and would almost certainly vote against him. Hussey’s lawyer knew he had the director on the run, but he insisted that his client and all the other astronomers should prepare their testimony that would finish him off for once and for all. He made sure that the reporters got the text of Colton’s damaging letter, and they published it in full.

A few days later, Holden slipped away from San Francisco, where he had been hiding out. He left for the East, and vowed never to return to California. Hussey felt sure he had won, although he had occasional momentary doubts, and began to express reservations about appearing in an open tribunal against the director. President Jordan and Professor J. C. Branner, his right-hand man
at Stanford, congratulated Hussey for ousting "The Pretender" and ending the
"occultation of Mount Hamilton". Everyone on the mountain wanted to forget
the case, and get back to work. Schaeberle, as the senior astronomer on the
staff, had a long heart-to-heart talk with Hussey. The older man assured him
that Holden would never try to come back to his job, and that it was time to halt
the investigation and all the unpleasant publicity the observatory was receiving.
Only Attorney Campbell wanted to press the case to a conclusion, and force
Holden's resignation or dismissal.197

The implacable advocate drew up a long document, listing fifty-three specific
charges which he made in the name of Colton against the director. The former
assistant had long since left California with his sister, bound for his home in
Michigan, but E. L. Campbell had a power of attorney to act for him. The
charges detailed in legal language all the grievances that the lawyer had raked
up from Hussey, Campbell, Perrine, Colton and Davidson. Individually,
neither one of them is petty, but their cumulative effect is damning. No
director whose staff disliked and distrusted him so much could remain in his
post. The lawyer sent the list of charges to Phelps, with the threat that they
would be signed and filed with the Board of Regents, and thus become public
information, if Holden did not deliver his final resignation before the next
meeting. Neither the old politician nor any of Holden's other supporters had
any stomach for continuing the fight. They telegraphed him, by this time across
the continent in Washington, that they had no recourse but to present his
resignation, which he had evidently written and left with them before departing
for the East. This letter, a long and self-serving document which made no
mention of any of his troubles, was read aloud at the regents' meeting. It was
met with complete silence. Then the regents voted unanimously to accept it,
effective 1 January 1898. Holden would remain on leave and draw his pay until
then. They placed Schaeberle in temporary charge of the observatory as acting
director. A few weeks later an auditor came up the mountain and checked the
books; he found everything in order. Holden had the last word. As chairman of
the Publications Committee of the Astronomical Society of the Pacific, a post
he still held in spite of Hussey's efforts, he had his letter of resignation printed
in full in its journal. Anyone reading it without other knowledge would have
believed that Lick Observatory was almost entirely his own creation. No doubt
it seemed that way to him.198

So in the end they brought him down. It was a group effort. Hussey was the
main force. He had provided the issue, and had supplied the persistent drive
and the strong combative spirit. Afterward in his private correspondence he
gave himself credit for ridding the observatory of its first director, but he did his
best to keep his name out of the newspapers in connection with the case. He
had pushed Colton forward, and the weak young assistant had furnished the
immediate issue that led to Holden's forced resignation. Colton had no safe
haven to which to retreat, and his career was shattered by the event. Campbell
had supplied the scientific credentials and deep commitment to Lick Observ-
atory that made the whole cabal respectable. Publicly he never allowed his
name to surface as a participant, but potentially he was the strongest witness
against the director, and Holden was well aware of this. Perrine had provided
inside information from the observatory's records and letter books. Away from
Mount Hamilton, Jordan, the president of the most prestigious private university in the state, had taken it upon himself to rid the public university of the man he considered its shame. Jordan kept his own name completely hidden, insisting that Hussey not reveal it even to the other participants in the battle. The lawyer he put on the case, E. L. Campbell, provided the knowledge, skill and experience to bring it to a successful conclusion. Davidson had been barking ineffectually at Holden’s heels for years, but put together with the attorney, he provided the final connection with Denicke, the regent who was willing to go out into the open and fight for Holden’s dismissal. They thought they had released the observatory from the director who was keeping it from its greatness.199

Probably a fairer verdict was penned by Tucker, who remained scrupulously neutral and took no part in the fight. From the perspective of three years he wrote:

The trouble with Holden was that his personal traits offended and antagonized everyone that he had to deal with intimately. They had always done so. He was never a first class observer; but I think an unusual executive manager. If his relations could have been confined strictly to official business he would have got on with men. But he always encouraged the personal side as well: this went swimmingly until a disagreement arose—then there was the “due to play” always.147

By the time Holden left California, he feared he would not get the presidency of “Boston Tech”. He was right. Newcomb and especially Pickering had worked effectively for him, but Davidson and Burnham had worked even more effectively against him. Over twenty years before, Davidson had headed the small group of Americans who travelled to Japan to observe a transit of Venus; one of his volunteer assistants had been Francis H. Williams, then a young M.I.T. graduate on a trip around the world before starting Harvard Medical School. Now Williams was the secretary of the Corporation of the Institute, its governing body. Davidson wrote to his old friend, denouncing Holden as the man who had wrecked Lick Observatory and should not be allowed to do the same to the eastern technical school. Burnham wrote Percival Lowell, the Boston gentleman astronomer with whom he was on friendly terms, to give him his vitriolic views on Holden. Lowell, a member of the M.I.T. Corporation, must certainly have passed the information on to his father Augustus Lowell, a member of its small Executive Committee. With two such powerful figures as Williams and Augustus Lowell opposed to him, and with clippings from the San Francisco newspapers outlining the charges against him arriving daily in Boston, whatever chances Holden had soon evaporated. Small wonder the Corporation chose James M. Craft, a senior professor who as chairman of the faculty had been running M.I.T. since Walker had died, to succeed him as president.200

Next Holden tried to get the position of head of the United States Coast and Geodetic Survey. Again he received help from Newcomb and Pickering; by this time he also had his friends in the Washington scientific establishment, including John Wesley Powell, the head of the Bureau of American ethnology, working for him. Again, no doubt, Davidson was working just as hard against him. The opinion of neutral observers was probably best expressed by
Mendenhall, himself a previous head of the Survey, who had visited Holden at Mount Hamilton years before. He wrote to Newcomb confidentially, "I will say frankly that I have always admired [Holden], and thought him to be a man of exceptional ability—[but] it appears that he has never shown that tact in getting on with his associates which is essential to success in a Bureau like the Coast Survey. All things considered there would be a degree of doubt as to the wisdom of selection." This time Henry S. Pritchett, the Washington University astronomer, got the job.201

Desperate for a place, Holden turned to his old friend Langley, now secretary of the Smithsonian Institution. Surely, the former Lick director thought, somewhere in that vast educational and scientific complex there was a position for him, perhaps as a bibliographer or a cataloguer. He believed that Langley had promised him one. The secretary, however, had grown away from his former colleague. He had been a fervent admirer of Mary Holden, but now she and her husband were separated. Langley's scientific standards had always been very high. Undoubtedly he did not want to waste his precious stores of energy and prestige defending a former director who had been ousted by his fellow research workers. Nothing succeeds like success, but nothing fails like failure. Langley was coldly distant, and informed Holden that he "could not officially make any promises, or even hardly hold out a hope in the matter". Holden, bitterly disappointed, denounced his old friend as "a liar, a coward, & the most profoundly selfish creature I've ever known". But he did not get the job.202

Then the head of the Harvard College Library died suddenly, and Holden tried for that position. Pickering was surprised, as Newcomb had been previously, that the former Lick director considered himself a librarian, but he promised to do what he could to help him. Holden also tried to get himself a job in the nonexistent but projected national university in Washington, a dream of Gilman, the president of Johns Hopkins, that would clearly take years to materialize, if it ever did. Holden was becoming increasingly desperate, but none of his ships came in.203

Nothing was left for him but to support himself and his children by his pen. Holden was a facile writer who had a wide range of knowledge. He ground out magazine articles on science and an elementary textbook on astronomy. He finished his book on heraldry and got it into print. A long review of the translation by Edward Fitzgerald of the Rubaiyat of Omar Khayyam became the basis of a third book. Still another book was a collection of translations of poems, published under the title Flowers from Persian gardens. He wrote so many articles for the Cosmopolitan magazine that some of them, such as "What is a Gentleman? A Lady?" were published under his pseudonym, Adam Singleton. In all his writings, Holden displayed a lively, vigorous style, but a conventional, conformist philosophy.204

The writing kept him busy; he had to work hard to turn out enough material to keep alive. He lived in New York, and enjoyed being closer to his children than he had been in California. Vacations on Cape Cod were especially pleasant times. Authorship was interesting, but he felt it was a temporary haven, rather than a life occupation. Finally he was reduced to writing a series of textbooks on science for children.205 Even though he was completely out of
astronomy, his enemies would not leave him in peace. Barnard asked Colton to send "all the information [he] could" on Holden to John K. Rees, the professor of astronomy at Columbia University. The former assistant, now back at Ann Arbor, complied in spite of his "miserable health" and insomnia. Someone in New York even spread the rumours that Holden had kept a mistress during his entire period on Mount Hamilton, and that he had illegally collected two salaries as director. These stories could not have been true, for no surviving contemporary account by Barnard, Burnham, Colton, Davidson or Hussey mentions such charges, and they were doing their best to dig up every bit of dirt they could that might be used to injure him. The facts on which they were based were that Holden was separated from his wife and that his salary had been the highest in the University of California except for the president's. Nevertheless, the rumours doubtlessly damaged his chances for the high-level jobs he was seeking, and he certainly feared them.  

Finally, in 1901, Holden's deliverance came. His membership in the Long Gray Line saved him. His friends from West Point, led by Samuel E. Tillman, a fellow cadet and later a long-time instructor at the academy, managed to get Holden appointed its librarian. It was just the kind of a job he wanted, and he fitted into it admirably, reorganizing the West Point Library and putting it on a sound basis. One of his first acts was to draw up a complete new catalogue of every item in the library. A generation of cadets learned how to research topics and how to use indexes from him. He personally edited and supervised the production of a two-volume set of books commemorating the centennial of West Point in 1902. Holden himself not only contributed a chapter on the origins of the academy plus a list of all the textbooks that had been used in the first hundred years of its existence, but also prepared for the second volume a 396-page set of bibliographies of writings about West Point, and by all its graduates. He was home at last.

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A short account of these events is also given in my biography of James E. Keeler (in press). I am grateful to Cambridge University Press for permission to include here passages from that account.
REFERENCES


144. SN to O. Struve, 23 Dec. 1886, LC; ESH to E. F. Hussey, 10 Dec. 1895, BHL; ESH to W. F. Vilas, 2 Mar., 16 May 1896, SHSW; ESH to C. D. Perrine, 10 June 1896, SLO.


146. WWC to B. A. Gould, 12 Jan. 1892, SLO; WWC to GEH, 21 Aug. 1893, 5 Sept. 1894, 7 Sept. 1896, YOA.


149. ESH to WWC, 25 May 1891, WWC to WJH, 23 Nov. 1891 (telegram), WJH to WWC, 23 Nov. 1891 (telegram), ESH to T. G. Phelps, 23 Nov., 24 Nov. 1891 (telegram), WJH to ESH, 11 Jan. 1892, SLO.


152. WJH to D. S. Jordan, 8 Dec. 1894, SUA; JAB to Warner and Swasey, 1 Feb. 1898, HL.


154. AOL to EEB, 9 July 1895, VU; JMS to AOL, 11 June, 28 June, 13 Sept. 1895, EEB to AOL, 11 July 1895, BL; ESH to WJH, 7 June, 14 June 1895, J. H. C. Bonté to WJH, 11 July 1895, BHL.

155. WJH to JAB, 5 Mar. 1897, BHL.

156. ESH to WJH, 10 July 1895 (telegram), ESH to Associated Press/United Press, 18 July 1895 (telegram), SLO.


160. J. Gledhill to ESH, 7 Jan., 20 Feb. 1895; ESH to J. Gledhill, 8 Mar. 1895; ESH to E. Crossley, 8 Mar. 1895, SLO.


162. San Francisco Chronicle, 1 May 1895; UC Regents’ resolution, 30 Apr. 1895, E. Crossley to ESH, 16 Sept. 1895, SLO; C. F. Smurr to ESH, 4 May 1895, ESH to A. S. Hallidie, 16 May, 31 May 1895, UCA.

165. ESH to WJH, 6 June 1895, BHL.
166. ESH to WJH, 4 Sept., 3 Dec., 6 Dec. 1895, BHL; WJH to ESH, 4 Dec. 1895, SLO.
167. ESH, "Program of work at the Lick Observatory during the year 1896", [−1 Oct. 1895], SLO; EEB to GD, 26 May 1897, BL; JEK, "The Crossley reflector of the Lick Observatory", Astrophysical journal, xi (1900), 325–49.
169. E. F. Hussey, "Mens aqua in arduis", 1 Apr.–18 Sept. 1897, BHL. This is the "diary" of Mrs Ethel F. Hussey, which she began on 1 April 1897. However, it goes back to 24 Feb. 1897, and contains references to many events previous to that date. It was not actually written day by day, but often weeks after the fact. Parts of it were written by Mrs Hussey, parts by Hussey himself. They intended it as a record of Holden's "misdeeds". Many of the statements and thoughts attributed to Hussey and his wife throughout the remainder of this chapter, as well as factual statements of events on Mount Hamilton, are taken from this source if not otherwise referenced.
170. WWC to JAB, 18 May 1895, ESH to JAB, 6 Mar. 1896, 19 Feb. 1897, SLO.
171. ESH to Editor [San Jose] Mercury, 4 Apr. 1895, SLO; ESH to C. A. Young, 27 Dec. 1895, DCL.
173. ESH to WJH, 31 Mar. (two letters), 3 Apr. 1897, WJH to ESH, 31 Mar., 3 Apr., 5 Apr. 1897, SLO.
174. WJH to ESH, 10 Apr. 1897, BHL.
175. RHT to MAT, 4 Oct., 25 Oct. 1897, SLO.
177. WJH to D. S. Jordan, 31 Mar., [−29] Apr., 5 May 1897, D. S. Jordan to WJH, 2 May, 7 May 1897, BHL.
178. WJH to ESH, 29 Apr., 7 May 1897, ESH to WJH, 7 May 1897, SLO.
179. San Jose Mercury, 22 May 1897; San Francisco Chronicle, 22 May, 23 May 1897; San Francisco Examiner, 24 May 1897.
180. W. W. Payne to GD, 6 Apr. 1897, GD to WJH, 12 Apr. 1897, WJH to GD, 14 Apr. 1897, WJH to W. W. Payne, 14 Apr. 1897, BHL; GD to SWB, 29 May 1897, GD to EEB, 7 June 1897, VU.
181. T. G. Phelps, C. F. Crocker and C. W. Slack to the Honorable the Board of Regents of the University of California, 15 June 1897, UCA.
182. WJH to D. S. Jordan, 18 June, 21 June 1897, SUA.
183. WJH to M. Kellogg, 5 July 1897, ESH to M. Kellogg, 6 July 1897, C. F. Crocker to ESH, 9 July 1897, SLO; WJH to M. Kellogg, 7 July 1897, BHL.
184. GD to WJH, 22 Apr. 1897, D. S. Jordan to WJH, 3 July 1897, WJH to E. L. Campbell, 7 July, 11 July 1897, E. L. Campbell to WJH, 8 July, 14 July 1897, BHL.
185. A. L. Colton to WJH, 21 July 1897, A. L. Colton, Memoranda, 13 June 1894, 1896, 3 May 1897, [WW]C to [WJH], 1 Aug. 1897, WJH, Statement of conditions at Lick Observatory prepared for information of Attorney E. L. Campbell, [−1 Aug. 1897], WJH to E. L. Campbell, 1 Aug. 1897, BHL.
186. WJH to Lick Observatory Committee of the Regents, 10 Aug. 1897, BHL.
187. WJH to E. L. Campbell, 13 Aug. 1897, BHL.
190. A. L. Colton to President and Board of Regents of the University of California, 18 Aug. 1897, ESH to T. G. Phelps, 18 Aug. 1897, SLO; A. L. Colton to EEB, 22 Aug. 1897, VU; ESH to C. Burckhalter, 18 Aug. 1897, CO.
191. E. L. Campbell to WJH, 1 Sept. 1897, WJH to E. L. Campbell, 7 Sept. 1897, GD to WJH, 7 Sept. 1897, A. L. Colton to WJH, 1897, BHL; A. L. Colton to EEB, 3 Sept. 1897, GD to
EEB, 7 Sept. 1897, VU.

191. WJH to E. L. Campbell, 11 Sept. 1897, E. L. Campbell to H. S. Foote, 11 Sept. 1897, E. L. Campbell to WJH, 13 Sept. 1897, BHL; ESH to E. Edwards, 10 Sept. 1897, SLO.

192. *San Francisco Chronicle*, 26 May 1897; W. A. McKown to ESH, 28 May 1897, SLO; ESH to C. Burckhalter, 5 July 1897, CO.

193. ESH to SN, 7 July 1897, LC; ESH to W. F. Vilas, 8 July 1897, SHSW; ESH to E. C. Pickering, 14 July, 28 July, 5 Aug. 1897, E. C. Pickering to ESH, 29 June, 8 July, 19 July 1897, E. C. Pickering to F. H. Williams, 19 July 1897, HCO.

194. E. L. Campbell to WJH, 15 Sept. 1897, BHL; *San Francisco Call*, 15 Sept. 1897.

195. WJH to E. L. Campbell, 16 Sept., 18 Sept. 1897, WJH to D. S. Jordan, 18 Sept. 1897, BHL.


201. T. C. Mendenhall to SN, 11 Apr. 1897, ESH to SN, 10 Sept., 23 Oct. 1897, LC; ESH to E. C. Pickering, 5 Oct., 9 Oct. 1897, HCO.

202. ESH to SPL, 16 Sept., 6 Nov. 1897, SPL, memorandum, 10 Nov. 1897, SIA; ESH to SN, 8 Nov. 1898, LC.


207. A. L. Colton to EEB, 16 Feb., 25 Feb., 17 Apr. 1898, VU; ESH to SN, 11 Feb., 30 Mar. 1898, LC; J. K. Rees to WWc, 22 June 1898, SLO.

208. ESH (ed.), *The centennial of the United States Military Academy at West Point 1802–1902* (Washington, D.C., 1904); E. G. Davis, *Army and Navy life*, x (1909), 474; ESH to SN, 20 Feb., 24 Oct. 1901, LC.