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ARMIN O. LEUSCHNER AND THE BERKELEY ASTRONOMICAL DEPARTMENT

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Armin O. Leuschner, the founder and head for forty years of the Berkeley Astronomical Department of the University of California, was born in 1868 in Detroit, Michigan, of German-speaking parents. His immigrant father died when Armin was less than a year old and his mother, who had been born in America, took him back to Kassel, Germany, where he was educated through the Gymnasium (academic high school). He and his mother then returned to the United States, and he was able to earn his baccalaureate degree after only two years at the University of Michigan, in 1888, at the age of twenty (Herget 1978). His teacher at Michigan, John M. Schaeberle, went to Lick Observatory when it opened in June 1888, as a member of its initial staff, and Leuschner followed him and became the first Lick graduate student in September 1888. There was no graduate program and he took no courses; he simply went to work as an assistant on Mount Hamilton and started a thesis on photometry under Director Edward S. Holden. It was an important topic, but Holden had never worked in it, nor had he ever done any significant creative research. He had a good grasp of what the important problems were, but only the vaguest ideas of how to go about solving them observationally. He was quite incapable of advising Leuschner, who soon recognized his mentor's weaknesses. [2]

By the next year Holden and the university officials had worked out a program for Leuschner. Under it he spent the fall semester of 1889 taking graduate courses in mathematics and physics at Berkeley, and he found that

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[1] Normally at Lick Observatory, University of California-Santa Cruz. Prof. Osterbrock is currently spending a sabbatical year at the Institute for Advanced Study, in Princeton, NJ, as the Otto Neugebauer Fellow in the History of Science.

[2] Holden to Leuschner, 9 September 1888; Leuschner to H. Davis, 15 October 1888.

he liked it there. He was back at work on Mount Hamilton for the second semester and summer; in the fall of 1890, against Holden's advice, he accepted an appointment as an instructor in mathematics (much like a modern teaching assistant) in Berkeley, where he continued working on his thesis. [3] The following summer he traveled to Harvard, where he discussed photometry with Director Edward C. Pickering, and to Germany, where he worked with astrophysicists Heinrich C. Vogel and Julius Scheiner, and then returned to Berkeley. [4] In 1892 Leuschner was appointed assistant professor in mathematics, with the understanding that he would gradually take over teaching the undergraduate astronomy courses, which up to then had been handled by an elderly professor of engineering. [5] From this point on Leuschner's relations with Holden deteriorated badly, and broke out in several public quarrels. Leuschner never finished his thesis with Holden; instead, he did a completely new thesis on celestial mechanics in one year of leave in Berlin, and returned to Berkeley with his Ph.D. in 1897 (Osterbrock 1984).

Even before that time Leuschner had had his first graduate students at Berkeley. In 1894 he had become assistant professor of astronomy and geodesy, and took over teaching practical astronomy to civil engineering students, as well as the liberal arts courses. His first graduate student was William H. Wright, who had earned his undergraduate degree in civil engineering at Berkeley. After that he became a graduate student in mathematics for one year, and then in astronomy for two years with Leuschner. In 1896 Wright went east and worked for one year with George Ellery Hale, helping him get Yerkes Observatory into operation, and then returned to a lifetime at Lick Observatory, becoming its director from 1935 to 1942 (Shane 1979).

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[3] Holden to Academic Council, 25 May 1889; Leuschner to Holden, 3 October 1889, 1 January 1891; Holden to J. Le Conte and I. Stringham, 10 January 1891.

[4] Leuschner to Holden, 15 July and 19 September 1891.

[5] Leuschner to Holden, [5 May] and 18 May 1892; Leuschner to Schaeberle, 23 May 1892.

Leuschner's second graduate student was Frederick H. Seares, who was an assistant at the Berkeley Students' Observatory as a civil engineering senior, and then a graduate student in astronomy from 1895 to 1898. After those three years, Seares continued his studies in Paris and Munich, and then became a professor at the University of Missouri from 1901 until 1909. From there he joined the Mount Wilson Observatory staff, and he remained on it until he retired (Joy 1967). Neither Wright nor Seares ever got an earned Ph.D.; they were at the end of the time when a research career in astronomy was possible without one. Nevertheless, Leuschner always counted them as the first two products of his department.

In 1898 when James E. Keeler replaced Holden as the director of Lick Observatory, he set aside funds in its budget for three Lick Fellowships, which soon were fixed at $600 a year. With Leuschner he started a joint program under which these Lick Fellows were to spend the summer and the fall semester at the observatory on Mount Hamilton, and the second (winter-spring) semester at Berkeley taking graduate courses. The first group, which started in 1898, consisted of Frank E. Ross, R. Tracy Crawford, and Harold K. Palmer (Osterbrock 1983); all three were Berkeley graduates.

Ross, who actually completed his Ph.D. in mathematics, became Simon Newcomb's chief assistant and continued at the Nautical Almanac Office after Newcomb's death. He then went on to Eastman Kodak as a researcher on photographic processes and lens designs, and then joined the Yerkes Observatory faculty. Ross often visited Mount Wilson and Lick Observatories for long observing sessions, and after his retirement moved to Pasadena. He originated the Ross wide-field photographic lens system, and the Ross corrector lenses used on the 200-inch and other large reflecting telescopes (Nicholson 1961; Morgan 1967).

Crawford became the first Berkeley astronomy Ph.D. in 1901. Very soon afterward he started his career as a long-time Berkeley faculty member; he ultimately succeeded Leuschner as chairman of the Berkeley Astronomical Department, from 1936 to 1941 (Makemson 1959).

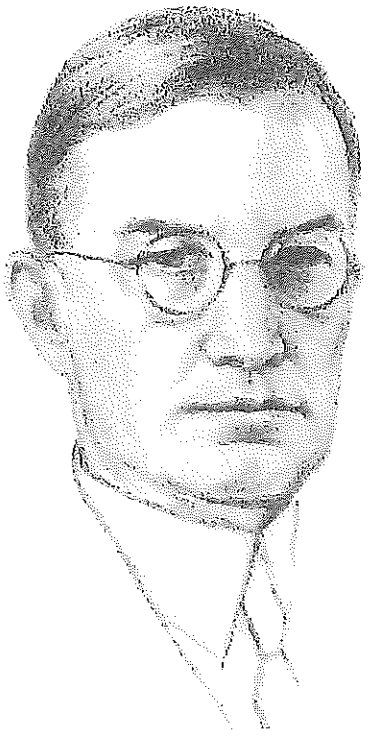

Figure 1. Two Berkeley Astronomical Department faculty members.
a) Top: Robert J. Trumpler; b) Bottom: Russell T. Crawford.
Both drawings are by Berkeley artist Peter Van Valkenburgh.

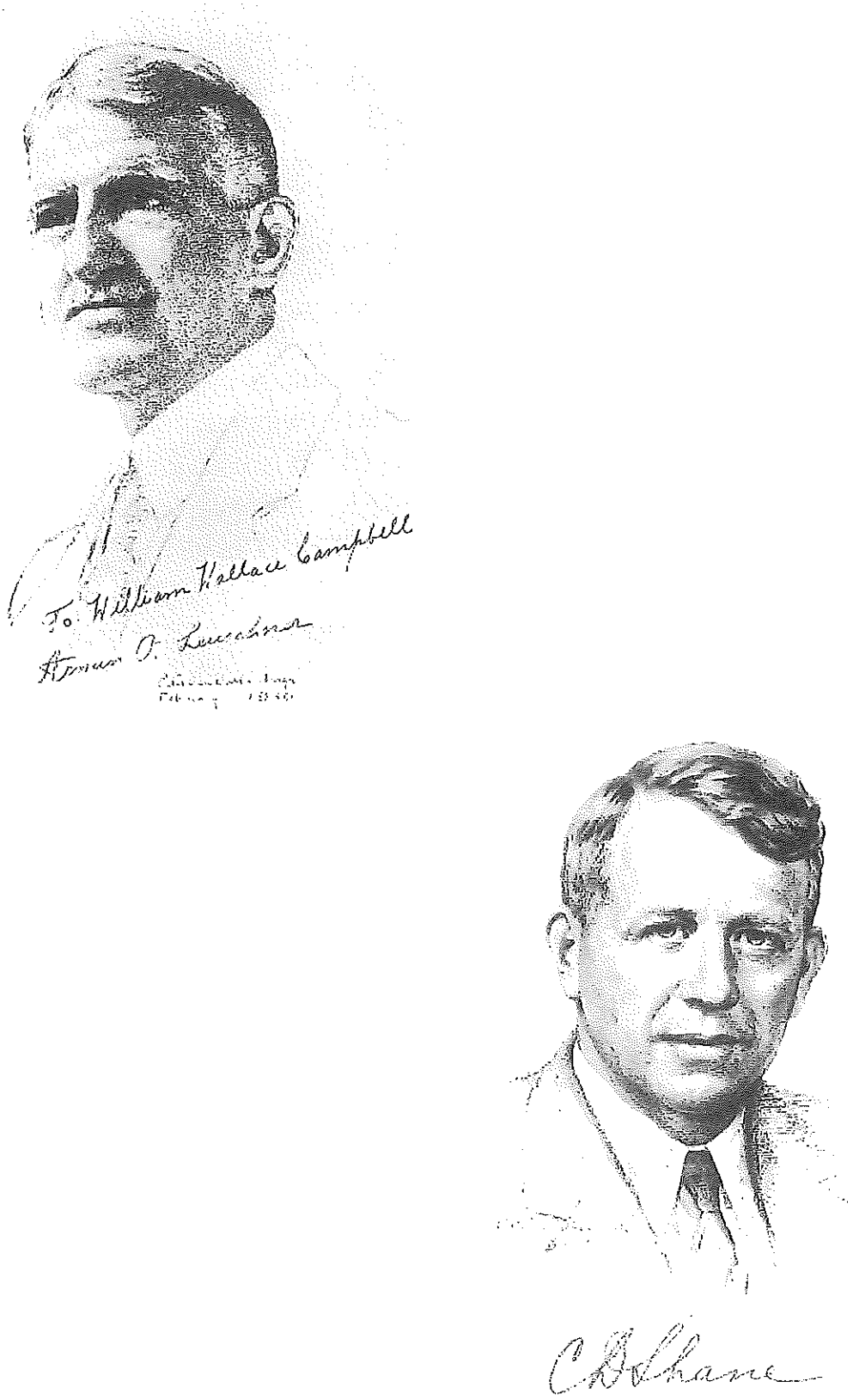

Figure 2. Two Berkeley Astronomical Department faculty members.
a) Top: Armin O. Leuschner; b) Bottom: C. Donald Shane.
Both drawings are by Berkeley artist Peter Van Valkenburgh.

Palmer worked with Keeler at Lick Observatory, and after receiving his Ph.D. in 1903, assisted Wright at the Lick southern observing station in Santiago, Chile. Palmer was then briefly at Mount Wilson but he had burned out in the many long hours he had spent at the telescopes. He quit astronomy and became a sanitary engineer in Los Angeles, but he returned frequently to Berkeley and to Mt. Hamilton for reunions with his friends (Osterbrock 1983).

The long-term home of the Berkeley Astronomical Department, the Students' Observatory building, was dedicated on January 30, 1904, during an Astronomical Society of the Pacific (ASP) meeting. Located near Northgate, the Hearst Avenue entrance to the campus, it was in fact an addition to an older building (Leuschner 1904). University of California President Benjamin Ide Wheeler was present for the dedication, as was W. W. Campbell, by then the director of Lick Observatory. Campbell gave an address about how great the astronomy program already was at the University of California, and how much greater it would become. No other American university taught "real astronomy" (celestial mechanics) so extensively as Berkeley, he said. Taking into account also astrophysical work and the opportunities (assistantships) of the Department of Physics, and the other opportunities and fellowships at Lick Observatory "the astronomical advantages of the University [of California] seem to be unsurpassed," he boasted (Campbell 1904).

Papers were then presented by Leuschner, Crawford, Burt L. Newkirk (an instructor) and Allen F. Gillikan (an assistant), all of the Berkeley department. [6] The equipment of the Students' Observatory at that time included a 6-inch refractor, a 5-inch refractor, an 8-inch Newtonian reflector, and a 5-inch lens mounted as a camera.

Leuschner discovered a prime source of financial support for his students in the Watson Fund, left to the National Academy of Sciences by James Watson's will to support the study of "his" asteroids. Leuschner milked this fund assiduously, and many budding astronomers -- from Ross

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[6] "Minutes of Special Meeting of the ASP", *Publ.Astron.Soc.Pac.*, 16, 46 (1904).

and Crawford right down to graduate students nearly fifty years after them -- were supported by grants from it (Leuschner *et al.* 1922). [7] Leuschner demanded that all the astronomy graduate students take many celestial mechanics and orbit-determination courses. Campbell insisted that all the good ones take physics and especially spectroscopy. [8] The university required that they also take mathematics. The result was a heavy load. Thus, for instance, Joel Stebbins came to the University of California in 1901, after two previous years of graduate study at Nebraska and Wisconsin. He started work immediately on his thesis at Lick Observatory, taking spectra of the variable star Mira throughout its period. After one and a half years on Mount Hamilton, Stebbins went to Berkeley for his last semester as a student. There he took four graduate courses, Dynamics of Rotation, Celestial Mechanics, Spectroscopic Laboratory, and Elliptic Functions; in addition, he was expected to do some reading in Theoretical Astronomy (orbit theory) and Differential Equations, and to write up his thesis. Leuschner reported to Campbell that Stebbins was "doing good work as usual"; Stebbins completed his dissertation and got his degree in May of that year. [9]

Edward A. Fath had an undergraduate degree from Carleton College, and then had taught in two small colleges for three years. Next he had one year of graduate study at Illinois before coming to California. In his first semester at Berkeley in 1907 (after one full year at Lick), Fath took courses in Theoretical Astronomy, Interpolation and Mechanical Quadrature (computing), Spectroscopy, Analytical Mechanics, and Theory of Functions of a Complex Variable. He reported to Campbell after the first week:

> "Judging from the taste of the work I have had up to date it will be sufficient to keep me out of mischief."[10]

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[7] B.L. Kropp to Leuschner, 16 March 1945; G.D. Mead to Leuschner, 15 October 1946; Seares to Leuschner, 18 October 1947, *BL*.

[8] Campbell to Leuschner, 8 July 1903.

[9] Leuschner to Campbell, 22 January 1903.

[10] Fath to Campbell, 1 September 1907.

Then, after another year at Lick, Fath returned to Berkeley for a second semester in which he took courses in Polarized Light, Thermodynamics, and Partial Differential Equations. Campbell got him out of taking General Perturbations that semester, also, so that he could finish writing his thesis on the spectra of spiral "nebulæ," which proved that they actually consist of stars.

In 1913, at the fiftieth anniversary commencement of the University of California, six PhD's were awarded in astronomy, the largest number given in any year until after World War II. The recipients were Sturla Einarsson, A. Estelle Glancy, Eli Haynes, Carl K. Kiess, Paul W. Merrill, and E. Phoebe Waterman. There were only three other Ph.D.'s and one Sc.D. awarded in *all* the other departments of the University of California that year. [11]

Many outstanding American astronomers came from the University of California. For years it was the largest and, by general consensus, the best graduate astronomy department in the United States. For instance, in his collective biography of American astronomers from 1859 to 1940, Professor John Lankford has collected data on 339 Ph.D.'s. Nine U. S. schools produced 231 of them, with the University of California contributing the greatest number, 64, followed next by the University of Chicago with 36 (Lankford 1990). In a study of graduate schools in America carried out and reported upon by R.M. Hughes (1925), then president of Miami University, a panel ranked California the best in astronomy in the nation, with 17 first-choice votes, and Chicago second with eight, while the University of Michigan and Princeton University were tied for third place, with three first-choice votes each. In fact in a letter to Hughes, Edwin B. Frost, director of Yerkes Observatory and chairman of the University of Chicago's Department of Astronomy, stated that although he advised its undergraduates to go on to graduate work at Chicago, and considered it his duty to do so, he ranked California first, Chicago second, and Michigan third. [12]

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[11] *Univ. of Cal. Register*, 1913-14.

[12] Frost to Hughes, 10 November 1924; *YOA*.

The first ASP meeting in Berkeley was not the 1904 dedication of the Students' Observatory, but an earlier meeting on February 21, 1902 in the original Hearst Hall on the campus. This meeting was essentially a lecture by Campbell, reporting on a meeting of the Astronomical and Astrophysical Society of America (later renamed the "American Astronomical Society") which he had attended in Washington, and repeating the talk he had given there on current research at Lick Observatory. [13]

The first American Astronomical Society (AAS) meeting on the West Coast, which was also the first one held west of St. Louis, was a joint AAAS (American Association for the Advancement of Science), AAS, and ASP meeting in August 1915. It was held in connection with the Pan-Pacific International Exposition in San Francisco, of which the Palace of Fine Arts, which houses the present-day "Exploratorium", is the sole remaining building. The opening joint session of all three societies was held at the Scottish Rite Auditorium in San Francisco, where Campbell, then president of the AAAS, gave an address on "Science and Civilization." His view was that the science of astronomy was one of the most important aspects of any civilization. One day of the meeting was devoted to a visit by all three societies to the Stanford campus at Palo Alto. All the smaller, purely astronomical sessions were held at the Students' Observatory on the Berkeley campus. Leuschner, the Vice-President of Section "A" (Mathematics & Astronomy) of the AAAS, presided at the session at which George Ellery Hale, the reclusive director of Mount Wilson Observatory, gave an address on "The Work of a Modern Observatory". [14]

In the years 1914-1915 the ASP held three other meetings on the Berkeley campus, each of them actually an evening public lecture by a local astronomer. The three were Sidney D. Townley, Stanford professor,

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[13] "Minutes of the Special Meeting of the ASP", *Publ.Astron.Soc.Pac.*, 14, 69 (1905).

[14] "The First Pacific Coast Meeting of the AAAS", *Publ.Astron.Soc.Pac.*, 27, 195 (1915); "Eighteenth Meeting", *Publ.A.A.S.*, 3, 107 (1918).

lecturing on variable stars in March 1914 [15], Crawford, on European observatories, in July 1914 [16], and Joseph H. Moore, of Lick Observatory, on nebulæ, in June 1915 [17]. The University of California Summer Session sponsored the latter two of these meetings.

Leuschner's specialty was celestial mechanics, and all the Berkeley graduate students had to learn it. He spoke with a pronounced German accent all his life, and his disorganized lectures, during which he frequently smoked cigarettes, were difficult to follow. Nevertheless, his knowledge of the subject shone through. He prided himself that the Berkeley students could turn out an orbit for a newly discovered comet or asteroid faster and better than anyone else. All the students had to do these orbit calculations. They worked in pairs, with a first team of senior students who were expected to get the answer first, and a second team whose work was available as a check. The students would usually get the last measured position of the object from Lick Observatory by telephone in the evening, stay up calculating all night, and telegraph the results to Harvard College Observatory for distribution in the morning (Herget 1978). [18]

One of their triumphs was the discovery by Seth B. Nicholson, then an instructor at Berkeley, of Jupiter's ninth satellite with the Crossley reflector at Lick in 1914 (Nicholson 1915, 1916). Nicholson was at Mount Hamilton for the summer to take plates to measure positions of Jupiter VIII, whose orbit was to be his thesis; when he discovered the fainter Jupiter IX,

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[15] "Minutes of Meeting of the ASP", *Publ.Astron.Soc.Pac.*, **26**, 117 (1914).

[16] "Minutes of Meeting of the ASP", *Publ.Astron.Soc.Pac.*, **26**, 221 (1914).

[17] "Minutes of Meeting of the ASP", *Publ.Astron.Soc.Pac.*, **27**, 206 (1915).

[18] C.D. Shane, *Autobiographical Notes*, Chapters 3 and 6; Shane wrote these notes, subsequently referred to herein as "*Shane*", by hand in the last decade of his life, and deposited them in the Mary Lea Shane Archives of the Lick Observatory, University of California, Santa Cruz.

Figure 3. American Astronomical Society meeting, Berkeley, August 1915. In the "power row", seated in the first row of chairs, are, from left, Robert G. Aitken, R.H. Tucker, Edward A. Fath, Elizabeth B. Campbell, Frank Schlesinger, W.W. Campbell, George Ellery Hale and Armin O. Leuschner. Seated on the ground in front are, second, third and fourth from left, Sidney D. Townley, R. Tracy Crawford and H.D. Curtis. The bald-headed man at the right, seated on the ground, is Joel Stebbins.

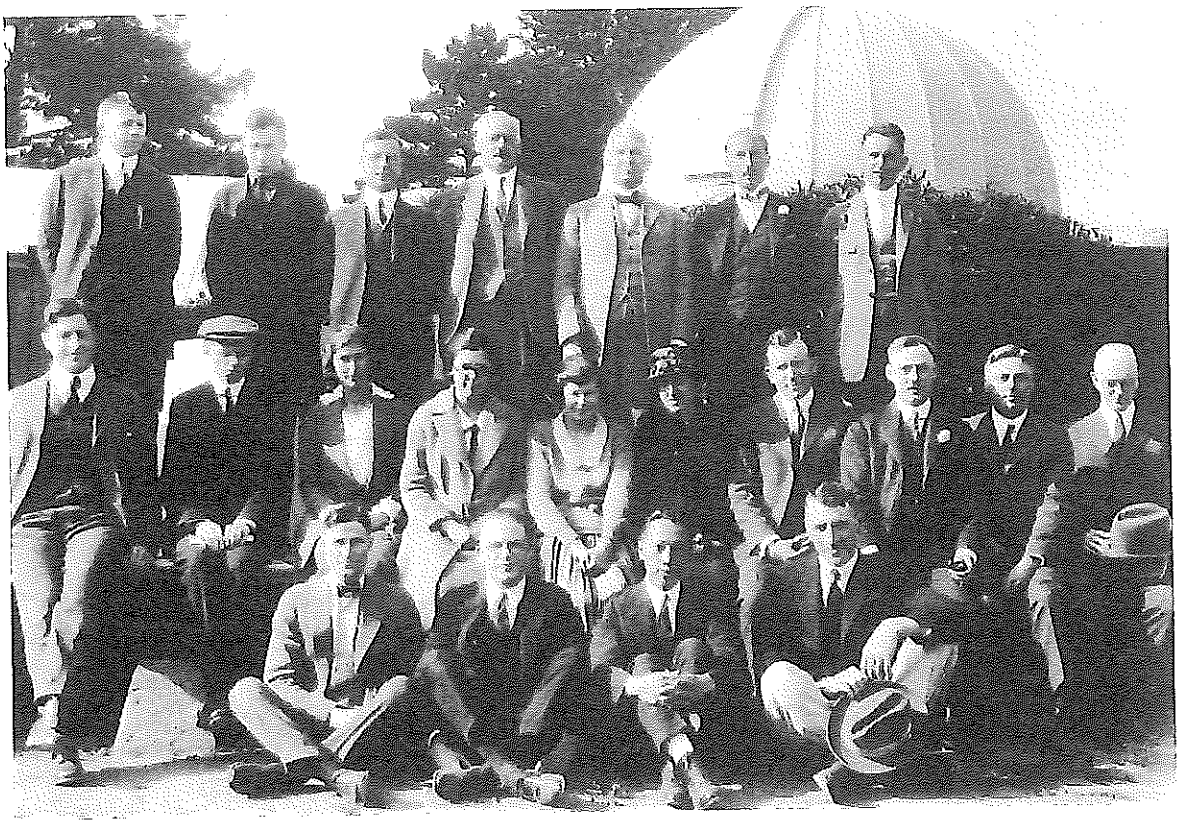

Figure 4. Group outside the Students' Observatory, Berkeley, April 1923. Standing in rear, C. Donald Shane is at far left, and R. Tracy Crawford, Ernest W. Brown (visiting from Yale) and Armin O. Leuschner are third, fourth and fifth from left. In second row, seated on bench, Mary Lea Heger Shane, Sturla Einarsson and William F. Meyer are sixth, seventh and ninth from left.

it became his new thesis topic instead. Nicholson had to leave Mount Hamilton to return to Berkeley to start teaching on August 15, but he came back to the observatory on weekends, traveling by street car, train and stage. After taking his final plate on Sunday night, he would develop it early in the morning, then hike down the mountain to the end of the Alum Rock streetcar line in San Jose, return to Berkeley by streetcar and train, and give his Monday afternoon lecture before going to bed! [19]

In 1930 when Clyde Tombaugh discovered Pluto, the Lowell astronomers held back their early positions of the new "Planet X" so that they could calculate the first orbit for it. However, they were no experts in this field, and with Lick positions and others from Yerkes and Mount Wilson, Ernest C. Bower and Fred L. Whipple, the "first team" of Berkeley graduate students, beat the Lowell group and got out the orbit first (Bower and Whipple 1930a, 1930b).

Nicholson was, by then, on the Mount Wilson staff. He and Nicholas U. Mayall, who had finished his graduate courses at Berkeley and taken an assistantship at Mount Wilson, used that preliminary orbit to find earlier pre-discovery positions on plates that had been taken there, and with them calculated a much improved orbit (Nicholson and Mayall 1931). Finally Bower, at Berkeley, using these and other still earlier positions, derived the first definitive orbit of Pluto in 1931, as his Ph.D. thesis (Bower 1931).

Bower was a re-entry student, who had earned his baccalaureate degree at Berkeley in 1912 and started graduate work; after one year, he left for a job at the Naval Observatory in Washington. He worked there for thirteen years, and then taught astronomy for three years at Ohio Wesleyan University. But in 1919, at the age of 39, with a wife and three children, Bower had come back to graduate study at Berkeley. By 1931, when he completed his Ph.D., the Great Depression made it very difficult for anyone to find a job. Although Bower was an outstanding orbit calculator, there was no room for him at the Nautical Almanac Office in Washington, and

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[19] *Shane*, Chapter 5; Nicholson to R.H. Tucker, 13 August and 17 September, [22 September] 1914; Tucker to *San Jose Mercury*, 12 September 1914.

he had to keep his family alive with his salary from various poorly paid research positions in Berkeley, until he got a permanent position as a lecturer at Griffith Planetarium in Los Angeles in 1935. [20]

Leuschner, meanwhile, had written an article on "The Astronomical Romance of Pluto," which (Leuschner 1932), despite its title, was more mathematical and numerical than poetic. Its lists of orbital parameters undoubtedly put more than one of his listeners to sleep when he presented it as a talk at Berkeley in 1932.

Leuschner chose the Berkeley Astronomical Department faculty members primarily for their abilities as teachers. The normal teaching load throughout the University of California in his time was six class hours for professors, eight for associate professors, nine for assistant professors, and twelve for instructors. All the astronomy faculty members were Berkeley Ph.D.'s, products of Leuschner's own department, beginning with Crawford, who was "excellent" in the elementary course but "dull and uninspiring" in the graduate courses he taught.

Sturla Einarsson, who received his degree in 1913, was a good teacher, who specialized in astronomy for civil engineers. He became the long-time Secretary-Treasurer of the ASP.

William F. Meyer, who finished his Ph.D. in 1919, was a very good, enthusiastic teacher in the elementary courses, but knew little astrophysics.

C. Donald Shane, a Ph.D. in 1920, taught everything, but was also the best in the department in astrophysics. He set up a high-dispersion solar spectrograph, fed by a cœlostat, on the campus and did some research on spectral line profiles with it. One graduate student, Ernest H. Cherrington, Jr., did a thesis with this instrument under Shane's tutelage. Near the end of his life Shane reflected that although his teaching had been "adequate",

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[20] Bower to R.G. Aitken, 13 November 1924; 21 May and 29 May 1929; 29 July 1930; [R.G. Aitken] to [H.A. Moe], 12 December 1935; Wright to U.S. Civil Service Commission, 11 November 1939; Leuschner to E.B. Frost, 29 October 1930, *YOA*.

both it and his research would have been better if he "had acquired a broader experience" at another "outstanding" graduate school in addition to the University of California. [21]

During World War I, Leuschner and Crawford served as officers in the Chemical Warfare Service and Signal Corps respectively, and Einarsson, Meyer and Shane all taught in navigation schools. William H. Wright and Heber D. Curtis came down to Berkeley from Lick Observatory and helped out with the undergraduate teaching on the campus during this period. Leuschner served as Dean of the Graduate School from 1913 until 1923, and as Chairman of the Board of Research from 1916 to 1935. In both these posts he worked actively to build up the University of California to the great research university it became, with outstanding departments of mathematics, physics and chemistry, the fields most important to Leuschner outside his own astronomy (Herget 1978).

One Berkeley student, whose name we would probably know today had she not died at an early age, was Elizabeth H. Gillespie. She had received an A.B. at UCLA in 1931, and then came to Berkeley, where she was a graduate student until 1935. She had a Lick Fellowship in her last year, and was recommended by Wright, who was not given to overstatement, as "one of the best students we have ever had --- man or woman." She had nearly completed her thesis, on the continuous spectra of early-type stars and the effects of interstellar reddening, when she died of leukemia in February 1935 (Aitken 1935).[22] She was doing this thesis with Robert J. Trumpler, who had moved down from Lick to Berkeley in 1935; he was the outstanding research worker in the Berkeley Astronomical Department for many years (Weaver and Weaver 1957).

Another eventual Berkeley student, Lawrence H. Aller, grew up in a very poor family. He had to drop out of high school to work with his

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[21] *Shane*, Chapters 3, 6.

[22] Gillespie to R.G. Aitken, 18 June 1933, 11 May 1934, and 31 January 1935; [Wright] to A.[H. Reinhardt], 1 February 1935; R.J. Trumpler memo, 18 February 1935.

father in a gold mine which never proved successful, but he was fantastically interested in astronomy. Young Lawrence joined the ASP at the age of fifteen, and corresponded often with several astronomers, including Nicholson and the famous George Ellery Hale [23]. Aller came to Berkeley on a long visit in 1931 and met Donald H. Menzel, who was on the campus that semester in an ex-change from his regular Lick faculty position. Menzel had Aller take the examination in a course he was teaching, and the young man did so well that the Lick professor got him admitted as a special student. Leuschner paid Aller from his own pocket to work on his yard, and helped him get a better job on student aid, then later a scholarship. He graduated in 1936, and stayed for one year as a graduate student at Berkeley. In 1937 he followed Menzel to Harvard and completed his Ph.D. there (Goldberg and Aller 1990). [24]

Olin C. Wilson was another Berkeley undergraduate who had worked earlier with Menzel on the campus and one summer at Mount Hamilton. Like Aller, Wilson wanted to do astrophysics, not orbit theory, and after he had completed his B.S. in 1929 he had gone on to Caltech for his graduate studies.

At the end of 1936 Leuschner, by then long known in the department as "the Chief", prepared a report summarizing the careers of the astronomers it had turned out. Counting Wright and Seares, who did not get earned Ph.D's, and Ross and Charles W. Smiley, who had mathematics Ph.D.'s but had worked in astronomy, there were sixty-three graduates, fifty-one men and twelve women. All but one of them were still alive. Only two of the women had given up their professional careers; eight of them had regular positions and two more, Priscilla Fairfield Bok and Mary Heger Shane, were doing some astronomical research with their husbands. One of the women and three of the men had switched to other fields than astronomy. Five of them had been elected to the National Academy of Sciences, ten of them were starred as "most distinguished astronomers" in *American Men of Science*, and fourteen of them were directors of

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[23] "New Members of the ASP", *Publ.Astron.Soc.Pac.*, 41, 392 (1929).

[24] *Shane*, Chapter 6.

observatories. (In both the latter totals Leuschner counted Ralph H. Curtiss, the 1903 graduate who had died in 1930.) All of them were "creditably accounted for," in Leuschner's words, productive research workers, active teachers or effective managers, "with practically no loss in the University's intellectual investment." In a survey of departments by the American Council of Education the previous year, seventy-six of the seventy-seven voting astronomers had designated the combined Berkeley-Lick departments as "distinguished," and only one maverick had called them merely "adequate." It was a record of which Leuschner was proud. [25]

To show off some of the products of his department, Leuschner arranged a special ASP meeting at the Students' Observatory one Saturday in February 1937. Twelve papers were given, all but two of them by Berkeley and Lick junior faculty members and graduate students. They included Gerald E. Kron, Horace W. Babcock, Dorothy N. Davis (now Locanthi), Aller, Mayall, and Daniel M. Popper. After the afternoon session for papers, they had a group dinner in the Faculty Club, at a cost of 75 cents each plus tax. Leuschner in his after-dinner remarks extolled the successful careers of the University of California astronomy Ph.D.'s. He stated that "the success of the graduates was largely due to the policy of the Lick and Berkeley Astronomical Departments to permit only the best candidates to prepare for an astronomical career." Dorothy Klumpke Roberts, the internationally known "woman astronomer" who had come home to her native San Francisco, also made a few remarks, and then they all went back to the Students' Observatory to look at the stars (Moylan 1937).

The AAS held its second Bay-area meeting in Berkeley in August 1939, the year of the San Francisco Golden Gate Exposition at Treasure Island. Many of the members attended the Exposition before the meeting began. The Society president, Robert G. Aitken, retired director of Lick Observatory, was then living in Berkeley and had an office on the campus. The meeting was held at International House, with 70 members in attendance, plus 40 guests, mostly spouses. There were three sessions for

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[25] Leuschner to M.E. Deutsch, 19 December 1936.

scientific papers, plus a business meeting. In addition to the Society banquet at which three speeches were given, one of them by Leuschner, the social events included a lunch at the Claremont Country Club at which all the AAS members were the invited guests of the Berkeley professors. [26]

In 1941 when Crawford retired, Shane became the third chairman of the department. He had been the faculty member who taught all the graduate students of the 1930's their astrophysics. However, soon after World War II began, Shane joined the staff of the Berkeley Radiation Laboratory to work on the Manhattan Project (atomic bomb), and then went on to Los Alamos. After the war ended he became director of Lick Observatory (Vasilevskis and Osterbrock 1989).

Einarsson, who by the end of his life had been a member of the ASP for seventy years, succeeded Shane as chairman of the Berkeley Astronomical Department. He considered it his task to rebuild it (Phillips 1975) [27]. In 1947 he brought in astrophysicist Louis G. Henyey from Yerkes Observatory, the first outsider to get a real faculty position in the department.

Then, in 1950, Otto Struve came from Yerkes as chairman of the Berkeley Department. Henyey and Struve, with John G. Phillips, also from Yerkes, and Harold F. Weaver, led the Berkeley Astronomical Department into becoming a modern astrophysics-oriented research center as well as an outstanding astronomy department, as it is today. [28]

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[26] *Publ. AAS*, 9, 241 (1939).

[27] Einarsson to Shane, 3 July, 18 July, and 23 August 1946.

[28] "Reports of Observatories, Leuschner Observatory, Berkeley, California", *Astron.J.*, 62, 399 (1957); *Astron.J.*, 63, 359 (1958); *Astron.J.*, 64, 287 (1959); *Astron.J.*, 65, 528 (1960); *Astron.J.*, 67, 36 (1962); "General Notes", *Publ.Astron.Soc.Pac.*, 82, 367 (1970).

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All the figures are published with the kind permission of the Mary Lea Shane Archives of the Lick Observatory. All the letters quoted are from the Mary Lea Shane Archives of the Lick Observatory, University of California, Santa Cruz, except for those marked *YOA*, which are from the Archives of the Yerkes Observatory, in Williams Bay, Wisconsin, and those marked *BL*, which are from the Bancroft Library, University of California, Berkeley.

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