

CHAPTER ONE

The Early Years

THE LELAND STANFORD JUNIOR UNIVERSITY has its origins in the Grant of Endowment executed November 11, 1885. That Grant followed an Endowment Act of the State of California, passed by the California Legislature and signed by the Governor of the State, George Stoneman, on March 9, 1885. The cornerstone of the University was laid on May 14, 1887, with the expectation that the University would open on May 14, 1888, exactly twenty years after the birth of Leland Stanford, Jr. That expectation was frustrated by a series of delays, and Stanford University actually opened its doors to students on October 1, 1891.

Before the University ever opened, President David Starr Jordan had determined on a number of policies which set a style for Stanford. One which has a bearing on this account was the decision to have the University organized on a departmental basis. (The basis of a School structure came considerably later.) In marked contrast to what was the current mode in most other U.S. colleges and universities of the time, Stanford's faculty was to be built around the concept of autonomous departments. Jordan put into practice a notion that he had long held: "Each Professor Sovereign in his own Department". Although that slogan contained more hyperbole than actual policy, it nevertheless reflected Jordan's conviction that the age was past when all college instructors received pretty much the same training. The specialization of academic disciplines had by this time proceeded so far that the Professor of Latin could no longer comment intelligently on what a Professor of Chemistry should be doing, and conversely. Accordingly, when Stanford welcomed its first students there were twenty-five departments — all of them necessarily small. This brief account deals with one of those Departments - the Department of Chemistry — and the story of its growth and changes from 1891 to 1976.

During the first decade after the opening of the University, the Department of Chemistry was housed in the building now known as Building 60, immediately to the west of Memorial Church. Figure 1 is a reproduction of a portion of the original blueprint for the buildings in the Inner Quad, showing the location of the building and the ground floor layout. This building and its location were never very satisfactory, and within a few years of occupation the members of the Department were pressing for more suitable quarters. There was, quite naturally, some reluctance on the part of the University to construct additional buildings so early in its existence, and for some time the request for new accommodation fell on deaf ears. There is a story, of quite uncertain authenticity, that the decision to erect a new building was forced on Mrs. Stanford by stratagem. It was her custom to drive up to the Sunday services in Memorial Church in her carriage, stopping immediately in front of the Church. One Sunday a tank of hydrogen sulfide was reported to be "accidentally" opened just prior to Mrs. Stanford's arrival, and that circumstance, it is said, was quite enough to persuade her that Chemistry should be rehoused as far as possible from the Inner Quad.

Interesting though that story might be, the truth is likely to be less comical. Professor Stillman was well known to Senator Stanford, and it seems more than probable that Stillman had spoken to him about a new building. After the Senator's death, Mrs. Stanford, who determined to implement her husband's wishes, provided funds from her own private resources for the new building and expressed concern and interest in the construction of a new laboratory.¹ The architect chosen to design the new laboratory was Clinton Day of San Francisco, who also was architect for the first, ill-fated University Library. Professor Paul V. Turner has provided evidence² that Mrs. Stanford considered Day to be wasteful of money. In spite of the fact that the Main Chemistry Building and the outlying Assay Laboratory were constructed at a cost of \$233,664 for some 60,000 square feet of space, she commented, in reference to the new Library plans: "There must be no extravagance for foolish arrangements. . . Mr. Day is in the minority always when he undertakes to put any useless things in the interior such as I do not approve of, such as he did in the chemical building, fancy door knobs and fancy springs costing \$3 each when he could have done them for one dollar (\$1). I have never forgotten this."

¹ G. Nagel. "Letters of Jane Stanford."

² P. V. Turner. "The Library That Never Was". *The Imprint of the Stanford Library Associates*, Vol. 11, No. 1, April 1976.

Construction of the new building proceeded more slowly than anyone expected. Some small glimpse of the frustrations experienced by those who plan and oversee the construction of university buildings may be caught from the following quotations. "The new Chemistry Building will probably be ready for occupation during the year 1901-02."³ "The Chemistry Building will be occupied sometime during the year 1902-03."⁴ These plaintive notes disappear in 1903, when the building was finally occupied.

The Main Building still stands, but the Assay Laboratory, which in its later years did duty as the first home of Chemical Engineering, was pulled down to permit construction of the John Stauffer Physical Chemistry Laboratory. The Assay Laboratory stood on the spot now covered by lawn, directly in front of the physical chemistry laboratory. The Main Building has been modified only slightly since its construction. In the early 1960s Room 20 was remodeled, and the area which formerly comprised a small classroom and the author's office and laboratory was converted into the Swain Library. All in all, in spite of some inconveniences, the Main Building served the needs of the Department well for nearly seventy-five years. Some damage was done to the Building during the 1906 earthquake. Chimneys through which fume hoods discharged fell to the ground, and some of the outer walls were badly shaken. The rather careless filling-in of the walls only became evident during the remodeling mentioned above. When the plaster was stripped from the walls of Room 20 several large areas could be seen in which brick rubble had been packed with cement to patch up the earthquake damage!

The first person to occupy a post in the Chemistry Department was John Maxson Stillman, appointed Professor in 1891. Stillman was born in New York City on April 14, 1852, but spent most of his early years in Sacramento and San Francisco. He graduated from the University of California in 1874. After two years of further study at the Universities of Strassburg and Wiirzburg, he returned to the University of California as an instructor in organic chemistry and general chemistry. In 1882, seeking better prospects than were presented to him in Berkeley, he accepted the position of chemist with the Boston and American Sugar Refining Companies in the city of Boston. The account of Stillman's appointment to Stanford is best told by one of his closest friends: "When Stanford University

³ Stanford Register, 1900-01. Leland Stanford Junior University, (April 1901) p. 123.

⁴ Stanford Register, 1901-02. Leland Stanford Junior University, (April 1902) p. 118.

was proposed by Senator and Mrs. Stanford and Doctor Jordan had been selected by them to put the institution into operation, Senator Stanford asked Doctor Jordan to look into the qualifications of one man and only one, for a position on the faculty of the university that was to be. That man was John M. Stillman, the son of his old-time friend, associate, and family physician in Sacramento and later in San Francisco, Dr. J. B. D. Stillman.”⁵ Needless to say, following such a request from the founder, Jordan appointed Stillman, who remained in active service with the University until 1917 and died in 1924.

There is always a risk that appointments made at the behest of the mighty may turn out badly, but Stillman’s appointment was a good one. Even after making allowance for the fact that memorial volumes tend to be tinged with the fulsome, Stewart Young’s account⁶ leaves an impression of Stillman as a man out of the ordinary. “He had, first of all, a profound respect for sound scholarship, and this not only led him to equip himself as thoroughly as possible in matters of learning, but it also became a living influence upon those with whom he came into contact, an influence which awakened in others aspirations for self-improvement and carried with it a realization of the value of knowing things well. . . . Stillman’s participation in all things having to do with the day’s work was always very active and very effective, and he was frequently called upon to do more than his share. But he never stinted himself. A rigorous honesty with himself and an unusually keen instinct in divining the possible and probable results of an administrative policy, combined with a fine idealism and a high sense of duty and responsibility to his superiors in administration, made his counsel and executive skill invaluable during the formative period of the young university. He gained much pleasure from this general administrative work, and was by nature well constituted for it, being able, on occasion, to enforce an unpopular ruling with so much of diplomacy as to arouse a minimum of antagonism. He was for several years vice-president of this University,⁷ and often acting president. . . . As a department executive, where his authority was almost autocratic, his attitude was always forbearing, kindly, conciliating, and helpful, but he was nevertheless a jealous

⁵ G.C. Edwards, “Words of *Appreciation*” Collected pieces in a Memorial Volume, *John Maxson Stillman*. (Stanford University), 1924.

⁶ S. W. Young, “Biographical Sketch”. *Ibid.*

⁷ The chairmanship of the Committee on Ways and Means and the vice-presidency of the University were vested in the same individual. For many years Stillman and John Casper Branner held those posts on a rotating basis.

guardian of his rights and prerogatives. His willingness to freely discuss questions of policy, to listen patiently to opposing views and his always unruffled, dignified, and gentlemanly bearing were largely responsible for an almost ideal atmosphere in the faculty of which he was the chief. . . . There was something in Stillman's art as a teacher that almost invariably commanded the respect, admiration, and devotion of his pupils. It was not merely that he lectured well and taught well in the laboratory; nor was it merely that he was painstaking, patient, and generous to a fault of his time and energy. . . . If it is to be explained at all, I think it was due to a fine power that was his, of keenly discerning the deeper spiritual characteristics and mental traits of each of those with whom he came into contact. . . ."

It is a spectacular reflection of both the changing times and changing values that Stillman should have been not only a valued, administratively hard-working citizen of the University, holding the chairmanship of the Department, but that he should also have had some reputation as a chemist beyond the confines of Stanford. For, discounting a considerable number of "public service" speeches and the like, Stillman's total scientific work consisted of some nineteen papers⁸ and one book, of which the book and seven papers dealing with medieval chemistry were the work of his retirement years. He was formally appointed Executive Head of the Department in 1904.

Two additional teachers were appointed in 1892, George Mann Richardson⁹ and Lionel Remond Lenox. Richardson began his academic life at Lehigh University but transferred to Johns Hopkins, where he was awarded the Ph.D. degree in 1890. For two years before coming to Stanford he taught analytical chemistry and organic chemistry at Lehigh. Richardson's career as professor of organic chemistry at Stanford was relatively short. He took leave of absence from the University in 1902 and died on July 26 of that year.

Lenox took his Ph.D. degree at Columbia University in 1888, following which he served as instructor in chemistry at Lehigh for two years. During 1890-92 he was a chemist in the Ordnance Department in Washington, D.C. Like Richardson, Lenox died while still an active member of the Stanford faculty.

⁸ Several of Stillman's earliest papers dealt with the extract of the California bay tree—a subject on which Professor R. H. Eastman carried out researches some seventy years later.

⁹ Richardson's grandson has been for many years a member of the chemistry faculty of the California State University at San Jose.

In 1893 Stewart Woodford Young was appointed instructor in the department. After taking his B.S. degree at Cornell in 1890 he taught for one year at that university. Following a two-year appointment as instructor at Swarthmore he joined the Stanford faculty, where for many years he taught physical chemistry. Some of Young's friends described him as "brilliant", though in fact his researches were sparse. Emeritus Provost F. E. Terman remembers Young's lecture as being uninspiring, though he sparked interest in a few students from time to time.

Until 1899 the four men, Stillman, Richardson, Lenox, and Young, comprised the entire Department. Even by 1893 the curriculum had been developed to include eight lecture courses, including elementary and advanced inorganic chemistry, elementary and advanced organic chemistry, industrial chemistry, and the history of chemistry. There were laboratory courses in organic chemistry, organic preparations, and qualitative and quantitative analysis. At the same time the Department of Chemistry cooperated with the Departments of Civil and Mechanical Engineering in the education of students for the advanced degree of Engineer in Chemical Engineering.

In the early years of the University many students entered Stanford with recognized high school credentials, but there was provision for admission with special standing for those students who demonstrated promise but were lacking in some requirements, which they later satisfied by study after admission. In the early years, also, it was not uncommon for students with baccalaureate degrees from other institutions to take undergraduate work in chemistry at Stanford. Two such students were Charlotte M. Wray (B.S. Swarthmore) and Allyn Heald Cooke (A.B. Willamette). Charlotte Wray had the distinction, in May 1894, of being awarded the first degree earned as a chemistry major. In January 1895 three more students of the Department were awarded A.B. degrees—Maxwell Adams, Frank R. Dray, and Alfred S. Miller (who received the A.M. degree at the same time).

The story of the early years of the University would be incomplete without an account of two men who, though not members of the original pioneering faculty, nevertheless came to represent continuity with that group. The two men in question were Robert Eckles Swain and John Pearce Mitchell.

Robert E. Swain, born in Hollister on January 5, 1875, entered Stanford in the Autumn of 1894 as a student with special standing, i.e. with academic "holes" to be made up at Stanford. In his remarks on Stillman (see ref. 5), Swain speaks of the gentle sympathy

with which Stillman treated him and encouraged him to take up chemistry as a major subject. Swain duly received the A.B. degree in 1899, having served as a teaching assistant in his senior year. Upon graduation he was appointed instructor but was immediately granted leave to proceed to Yale, Strassburg, and Heidelberg for further study. After receiving the Ph.D. degree from Yale, Swain returned to Stanford in 1902 and remained in continuous association with the University until his death in 1961.

In the year in which Swain graduated A.B. at Stanford, John Pearce Mitchell enrolled as a freshman. Mitchell was born in Providence, Rhode Island, on June 4, 1880. The son of a physician, Mitchell had an early ambition to study medicine also, but he was frustrated in that ambition by the circumstance that, in his youth, an attack of scarlet fever left him with a serious loss of hearing. He took his A.B. degree in 1903 and his A.M. in 1904, leaving thereafter for a year's study at the University of Leipzig. Mitchell returned from that year in Leipzig with what must have been one of the earliest samples of radium to be brought to the U.S. He was destined never to carry out research on radium compounds, however. The sample disappeared, and it was found again only many years later in E. C. Franklin's office. Since the latter had some strongly developed magpie proclivities, there is a strong presumption that Franklin took the sample from Mitchell's office.

Mitchell began his teaching career as an instructor in the year 1905. He was awarded the Ph.D. degree in 1909—an Occurrence which was possible since, as instructor, Mitchell was not a member of the Academic Council. In 1925 he was appointed Registrar, and during the period 1925-45 he was the second-ranking officer in the University, exercising the role of Vice-president for academic affairs in all respects except title.

Although the contributions of an academic department are, and doubtless should be, reckoned in terms of the additions made to knowledge, the Department of Chemistry at Stanford has made unusually large contributions to what is best described as parochial University service, by providing members of the faculty to serve in administrative positions.

One of the earliest and most important University bodies was the Committee on Ways and Means. It was customary for the Chairman of the Committee on Ways and Means to serve as Acting President when David Starr Jordan was away from the campus, as he frequently was. Stillman was Chairman of Ways and Means for a number of years. He was Acting President in 1904—a particularly important year, since during 1904 Stillman, with Trustee Horace

Davis, had a large hand in drafting the Articles of Organization of the Faculty as a check on the then almost unlimited powers of the President of the University.

Swain resembled his mentor, Stillman, in many respects. He followed Stillman as Executive Head of the Department in 1917, and he, also, was a prominent member of most of the important committees at Stanford. During the period 1929-33, when President Ray Lyman Wilbur was serving as Secretary of the Interior, Swain was Acting President of the University.

Mitchell's twenty years of service as Registrar set many of the patterns in which Stanford functions, and it would be difficult to overestimate his deep administrative imprint.

In recent years the author of this history has served as Academic Secretary, and Professor D. M. Mason served as Associate Dean of Undergraduate studies from 1972 to 1976.

Academic departments, like academic persons, do not lend themselves to facile analysis. Any assessment of a department, or of an individual scholar, is inevitably incomplete. It is essential that the analysis be made after a sufficiently long time has elapsed, in order to provide perspective to the analyst. But—and this is what makes history such a tantalizing challenge—no analysis is ever final, because perspective itself changes with time: it is inconstant and mutable. Fashion in scientific activity is as easy to detect as in any other human activity, and is often just as fleeting and insubstantial. Significance, even for the short run, is a much harder quality to determine. Importance for the long run may be so elusive as to be undeterminable by the contemporary analyst.

The historian of science accordingly faces peculiar hazards in trying to assess the contributions to learning made by a department over an eighty-year span. The hazard is large even if attention is restricted to what might be called the *physical product*, i.e. the published accounts of researches carried out by a department. But the hazard is still greater if one tries to assess the contributions of what is not simply a lifeless building and its laboratories but, rather, is a chain of scholars, affecting the minds and ideas of other scholars. The *human product* of a department (if the lifeless word product may be excused here) extends, like a family tree, outwards and upwards. A single example serves to illustrate the effect which stretches over generations.

W. D. Harkins, a local Menlo Park youth, was the first graduate student awarded the Ph.D. degree at Stanford (1907). He went on to establish a distinguished career in the chemistry department at the University of Chicago, where he made very important con-

tributions in the fields of colloid chemistry and monomolecular films, training scores of students in those subjects and making Chicago an internationally acclaimed center for such studies. Many of Harkins' students went on to other universities where, in turn, they expanded knowledge in colloid and surface chemistry.

The direction taken by Harkins' work could in no way have been predicted on the basis of his graduate work at Stanford, but are we to say, on that account, that Stanford was unimportant in rearing a distinguished school of colloid chemistry?

Stillman's case presents yet another example. Disregarding his papers on subjects other than science, Stillman published a total of nineteen papers and one book — and, even so, managed to acquire a good reputation as a chemist. Of those publications, seven papers and his book on the history of alchemy were the product of his retirement years. Yet, slender as Stillman's output may seem by modern standards, what he did write was marked by scholarship of a high quality. In spite of the fact that he was not a strong classical scholar, and in spite of the meager resources of early California libraries as regards medieval manuscripts, Stillman's studies in the history of science are carefully researched and clearly written.

Nevertheless, Stanford's earliest chemistry professors were more distinguished for their dedication and loyalty to the young, growing institution than for their contributions to scientific knowledge. I have already mentioned the contributions made to University administration by early faculty members from the Department of Chemistry. An example of service to, and within, the Department is provided by William Henry Sloan. Sloan received his A.B. and A.M. degrees at Stanford in the years 1903 and 1904, respectively, but he never proceeded to the Ph.D. degree. Appointed instructor in 1906, following a period of study with W. Ostwald, Sloan spent the next thirty-six years in painstaking devotion to the effective teaching of analytical chemistry. Though his scientific career may appear dull and uninspiring to some, and though to the ambitious his excruciatingly slow promotions (he was associate professor until just a few years before his retirement) might be accounted the mark of near-failure, his love for Stanford and his dedication to her interests survived what might appear to some people unendurable frustrations. Sloan was remarkably shrewd as a businessman. Born in Mayfield, thoroughly familiar with the local area, he made very profitable investments in real estate. After retirement he turned over to the Department of Chemistry much of his fortune to endow the David L. and Lavinia E. Sloan Memorial Scholarships for the support of graduate students in chemistry.

A totally different kind of individual entered the Department of Chemistry in 1903, in the person of Edward Curtis Franklin.

Born on March 1, 1862, in Gary City, Kansas, E. C. Franklin had a varied youthful existence as a druggist's assistant, a jobbing printer, and cornetist in a brass band before he entered the University of Kansas at the age of twenty-two. On graduating he was appointed assistant in chemistry, in 1894 he was promoted to associate professor, and in 1898 he was appointed professor of physical chemistry. From 1903, when he joined the Stanford faculty, to 1906, Franklin was associate professor with responsibilities for organic chemistry (succeeding Richardson, who died in 1902). In 1906 he became Professor of Organic Chemistry.

Franklin possessed an iconoclastic nature, and he was given to what at times amounted to an over-frank expression of opinions. As mischievous as a child, in some respects, he nevertheless had a first-rate mind: on many occasions a shrewd question from Franklin deflated a seminar speaker carried away on the wings of hypotheses. Within the Department of Chemistry he generated untold anecdotes and legends.

The name of E. C. Franklin, it is safe to say, will always be linked with the chemistry of ammonia and with the chemistry of substances dissolved in liquid ammonia. It was characteristic of the chemistry of Franklin's time—as it is beginning to be once again at the present time—that although one might label oneself as an organic chemist, there were no inhibitions, internal or external, to prevent a person from taking the whole realm of chemistry as one's province. In Franklin's work, accordingly, we find many experiments on physical properties of solutions in liquid ammonia and methylamine, as well as preparative methods for a wide variety of inorganic ammonia compounds. The quality of Franklin's work received widespread recognition: honorary degrees and medals were awarded to him, and he remains the only "in-house" member of the Stanford faculty ever to have been elected President of the American Chemical Society.

Imaginative and ingenious himself, Franklin stimulated imagination and ingenuity in his students, many of whom went on to distinguished careers. From Franklin's University of Kansas period, H. P. Cady and C. A. Kraus became outstanding chemists. One of Franklin's Stanford students who maintained close relations with the Department of Chemistry by his presence in the Carnegie Institution Laboratory on Governor's Lane was H. H. Strain, whose work on plant pigments and chromatographic separation brought well deserved acclaim.