# SAMUEL PIERPONT LANGLEY: EARLY CONFLICT BETWEEN TEACHING AND RESEARCH AT THE WESTERN UNIVERSITY OF PENNSYLVANIA

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**I** was June 24, 1867. The trustees of the Western University of Pennsylvania had just concluded their meeting and were preparing to leave. A feeling of accomplishment pervaded them, for at this meeting they had formally accepted a plan to merge the Allegheny Observatory into the corporate body of the university.<sup>1</sup> They were satisfied that this merger would not fail to increase the prestige of the university and hoped that the observatory, now at last free of debt, stood on the threshold of scientific accomplishment. An endowed Chair of Astronomy and Physics had been established, and, to avoid confusion, they had changed the title of the Chair of Natural Science to the Chair of Chemistry, Geology, and Mineralogy. A letter of application for the new position had already been received from a James Thompson.<sup>2</sup> On this matter, however, the trustees had demurred, and Thompson's application had been tabled, to be reconsidered at their next meeting.

The trustees were convinced that a progressive step had been made that day, for the university had long suffered from its "western" image. A common opinion of the time was that only the eastern collegiate institutions provided a true classical intellectual experience. Any western institution was, in comparison, an opportunistic sham, "allowing and tolerating," as Bishop George Upfold said in a strong keynote address at the reopening of the university in 1856, "inferior instructions, inferior attainments, and less time and care in the acqui-

Dr. Beardsley published an article on the early years of the Allegheny Observatory in the July 1981 issue of the Western Pennsylvania Historical Magazine.—Editor.

<sup>1</sup> Minute Book No. 1, June 24, 1867, Records, Board of Trustees, Western University of Pennsylvania (hereafter cited as Minute Book).

<sup>2</sup> The identity of this person is unknown today. Consistently spelled with a "p," it would seem unlikely that it was James Thomson (1790-1876), well respected in Pittsburgh for his technical knowledge but at that time already 77 years of age. Thomson did have a friend, Alexander King, a director of the Pittsburgh Gas Company, who was also one of the original Telescope Association members, but it was King who cast the one dissenting vote against merging with the university.

sition of learning, such as it is." <sup>3</sup> In the same speech, Upfold appealed for a vigorous program in classical education: Latin, Greek, mathematics, and English, but the trustees held a broader outlook. Pittsburgh had become a city of industry and business, therefore the Western University of Pennsylvania must assert its obligation to meet practical needs as well as that of classical education. As he accepted the key to the university, Principal John F. McLaren acknowledged this additional goal of the trustees with these words: "The due admixture of classical with scientific studies as a means of mental development, offers the best preparative for usefulness and enjoyment. both to the scholar and the business man." 4 This emphasis on a true classical education, the primary focus of which was instruction, would, within ten years, clash with the ideas of those who considered research to be a vital part of the university's function.

Thus was the stage set for the arrival of George Woods, LL.D., as principal in 1859.5 It was Woods who undertook the task of raising the Western University of Pennsylvania above the stigma of a "western" institution. He exhorted the trustees to endow the university so that its reputation might be uplifted; he urged that a great seat of learning and a scientific institution, desperately needed by Pittsburgh, might be created. Principal Woods envisioned a university in fact, not name, and he pleaded with the trustees for the addition of a normal school and medical and law schools.

To Woods, the new Chair of Astronomy and Physics represented the opportunity he most desired : that is, the furtherance of the technical and scientific aspect of the university curriculum. In the weeks following the merger meeting he most likely sent inquiries to the leading eastern institutions seeking their recommendation of distinguished individuals who might fill the new position. The director of the Harvard Observatory, Joseph Winlock, recommended Samuel Pierpont Langley. When the trustees again met, on August 8, 1867,

<sup>3</sup> Rt. Rev. George Upfold, "The things taught, the way of teaching; an address delivered at the inauguration of the Western University of Pennsyl-vania, Friday evening, December 19, 1856." In Proceedings and Addresses at the Reopening of the Western University of Pennsylvania, Friday evening, December 19, 1856 (Pittsburgh, 1857), (19). Reprinted in Bulletin of the University of Pittsburgh (Catalogue, 1922), June 1922. 4 John F. McLaren, "Reply to address of Hon. Wilson McCandless." In Proceedings and Addresses at the Reopening of the Western University of Pennsylvania, Friday evening, December 19, 1856 (11). Ibid. 5 The Records of the Board of Trustees indicate that McLaren was dis-missed on July 19, 1858, when the trustees became concerned about deteriorating discipline at the university and reports that the students were carrying pistols

discipline at the university and reports that the students were carrying pistols and dirk knives.

Woods was ready. The two names he presented to the trustees were James Thompson and Samuel P. Langley. There was no question as to selection, because Langley's credentials were impressive.

Born in Roxbury, Massachusetts, on August 22, 1834, Langley was a graduate of Boston High School. He had practiced civil engineering and architecture in Boston and Chicago, and for several years thereafter had been employed as manager of the St. Louis, Milwaukee. and Philadelphia offices of R. B. Dun and Company (now Dun and Bradstreet). After leaving Dun, he traveled to Europe visiting observatories, and, in 1865, began his scientific career as an assistant at the Harvard College Observatory. Langley progressed quickly and became assistant professor of mathematics at the United States Naval Academy in 1866, in charge of the small observatory there. In addition to Professor Winlock's endorsement, the trustees read letters of recommendation from such illustrious personages as Admiral David Porter, superintendent of the Naval Academy.<sup>6</sup> and undoubtedly from Edward Everett Hale and Oliver Wendell Holmes, who were close personal friends of Langley. Unanimously elected by the trustees at that meeting, Langley came to Pittsburgh immediately and commenced his duties at the university.

Also at that August 8 meeting, the trustees carefully defined Langley's duties. They decreed that "until the Observatory shall be fitted with instruments for observation, so as to demand the most of his time, the Professor of Astronomy and Physics shall give instruction . . . in those branches which are as nearly as possible connected with his department." 7 In this interesting statement it is possible to recognize the inherent philosophies of both William Thaw, trustee and chairman of the observatory committee, and George Woods.

Thaw envisioned a scientific mission for Langley and the observatory, but he knew that before the observatory could perform any real scientific service, it must be equipped with additional instruments. On the other hand, Woods recognized in this deficiency the opportunity to require Langley to teach technical and scientific subjects, thus fulfilling Woods's long anticipated goal of a technical curriculum for industrial Pittsburgh. Indeed, this set the stage for a clash of philosophical objectives between Thaw and Langley on the one hand and Principal Woods and many of the trustees on the other.

George Woods in many ways was a deeply rooted traditionalist in terms of educational philosophy, but this he tempered with a con-

<sup>6</sup> Pittsburgh Gazette, Aug. 9, 1867.7 Minute Book No. 1, Aug. 8, 1864.

cern for how the university might serve the needs of the community. He was deeply perturbed that so many of Pittsburgh's sons were seeking education elsewhere, and he vigorously defended the current strength of the university's curriculum:

And it ill becomes a city of such wealth and resources as Pittsburgh, to do this [send its sons to seek education elsewhere]. Even were it fitting in other respects, the reputation of our city, the interests of thousands unable to go abroad to obtain their education, and the advancement of our people in a taste and love for learning demand a home institution. The influence of such an institution will be felt in every department of business and throughout every class of society.

Learning will be placed more nearly on an equality with wealth; that which is now regarded as an *inferior* qualification to social standing; will be raised to its true importance — a superior qualification.

In what has already been done to elevate the University, there has been no effort to pander to the false taste, or incorrect views of incompetent judges, as to what education should be. The course of study is severe and thorough, in all respects similar to that in the oldest and best institutions in the country and elsewhere, adopted by wise and learned men.<sup>8</sup>

Woods's contribution to higher education during these early days was this explicitly defined educational mission for the university.

The purposes of a true university are:

- 1. To provide the best possible facilities for the highest and most profound culture in every department of learning.
- 2. To provide the means of thorough preparation for all such pursuits in life as, being based upon established scientific and philosophic principles, are entitled to rank as professions.
- 3. To exert a stimulating and elevating influence upon every subordinate class and grade of educational institutions, by holding up before the multitude of their pupils the standards of the highest scholarship, and by preparing for their administration and instructional work, officers and teachers of a higher grade of qualifications than would be otherwise possible.

<sup>8</sup> Ibid., June 24, 1864.

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4. To enlarge the boundaries of human knowledge, by means of the researches and investigations of other advanced minds, encouraged to a greater activity and led to greater achievements by the influence of the university example.<sup>9</sup>

Or as E. C. McConnel (the editor of *People's Monthly*) stated in an accompanying editorial:

As a manufacturing community, we require special courses, and facilities, as full and complete as they can be found any where in the country. We must have our schools of design, of law, of medicine, and of physics. We must have most thorough courses of instruction by the most competent professors in mining, metallurgy, mineralogy, practical chemistry, natural philosophy, and mechanics, with all the appliances and equipments which are necessary to teach our Pittsburgh youth how best, and most thoroughly to prepare themselves for the busy, practical and industrial life in which most of them will engage. More than this our University should be in easy circumstances enough, and her endowments so ample as to educate freely, or at minimum cost, those among our youth who have the taste, the talent and fitness for these pursuits and avocations, but who are not able to afford a liberal education costing years of the closest and unremitting education.

The foregoing quotations represent the educational philosophy of Dr. Woods, albeit implicitly. The editorial of McConnel is a more direct exposition which can be presumed to be a summary of his interviews with Woods and trustee James King, M.D., chairman of the university's Committee of Investigation. This committee had completed a study of the university's curriculum compared to other universities. The four-part purpose of a university enunciated by Woods is particularly interesting. Concise statements of the mission (or purpose) of a university were seldom formulated anywhere during these early years. Although it may not have been entirely original with the trustees or with Woods, no specific source has been located. The statement appears to emulate closely the famous "Yale Report of 1828" which had a profound influence on almost all college curricula

<sup>9 &</sup>quot;Education — the Western University," The People's Monthly, E. C. McConnel, ed., Pittsburgh, 1871, 1: 35.

throughout the remainder of the nineteenth century.<sup>10</sup> The Yale Report was certainly the backbone of the philosophy of the educational traditionalist of that era, and Woods was a person who clearly embraced traditionalism. To him the mission of the university should be one of teaching, per se, and the classics curriculum, Latin and Greek, represented the strength of education. However, McConnel's editorial implies that Woods's traditionalism had become tempered with a unique concept in education, which for want of a better name, might be termed the Pittsburgh Corollary. Thus Woods the traditionalist foresaw that the Western University of Pennsylvania should also serve the needs of the community from which it drew its students, that is, industrial Pittsburgh, in which a vast need existed for scientific knowledge. Additionally, Woods was moralistic, since he staunchly believed that all students and faculty - especially the faculty - should attend daily chapel exercises, a conviction destined to clash with both Langleys, Samuel and John.

When Samuel Pierpont Langley arrived at the university in 1867, the observatory was not fully equipped, and the trustees had directed that teaching occupy at least a part of his time. Not surprisingly, the task of introducing a curriculum in technical and scientific subjects fell to Langley from the moment he arrived. Just which courses he taught and when is not now known. A clue is provided by the aforementioned investigating committee<sup>11</sup> which reported visiting his classroom and having been impressed as he lectured to his class on the topic of telegraphy. It is known also that he taught physics and astronomy. A glance at the university's catalogue for 1867 indicates that the scientific course was a stringent three-year program leading to the Ph.B. degree. Included were courses in anatomy, mechanics, navigation, acoustics and optics, surveying, hydrostatics and hydraulics, mechanical drawing, geometry, mineralogy, astronomy, geology, and chemistry, besides English, French, history, and philosophy. Presumably Langley was involved in most if not all of these courses. In addition, he was required to assist in the examination of students in all other courses, including classics and humanities.

Most of this instruction was of little interest to Langley. He dreamed of the telescope at the observatory and what discoveries he might make with it. But adding to Langley's initial discouragement concerning the heavy teaching load was the deteriorated condition of

<sup>10</sup> See Richard Hofstadter and Wilson Smith, American Higher Educa-tion: A Documentary History, 2 vols. (Chicago, 1961), 275. 11 "Education — the Western University," The People's Monthly 1: 35.



Samuel Pierpont Langley (1834-1906), Director of the Allegheny Observatory. (Lick Observatory Archives)



The thirteen-inch Fitz refractor of the Allegheny Observatory. (Allegheny Observatory Archives)



The Allegheny Observatory, showing the 1872 addition on the right. (Allegheny Observatory Archives)

the telescope. Unquestionably the instrument had received little use and maintenance during the previous four years while Philotus Dean acted as director and custodian for the Telescope Association. Observatory domes are exposed to the weather on the outside and to humidity on the inside at all seasons of the year, for they are never heated and consequently succumb quickly to rot and rust unless continually maintained. And, as the domes deteriorate, the telescope and their instruments become increasingly subjected to moisture from humidity and leakage. They are prone to corrosion, especially when not regularly used. Langley, accustomed to the pristine condition of the Harvard College Observatory, must have been greatly disheartened and dismayed when he passed through the Allegheny Observatory for the first time. The observatory was empty; nothing existed in it but the telescope, and this obviously needed a great deal of refurbishing.<sup>12</sup> It would be necessary for him to devote much of his time and labor to this.

An immediate appeal to the trustees produced sympathy but little else. They did grant Langley permission "to solicit aid to perfect his department as far as possible" but provided no money.<sup>13</sup> To this end, William Thaw stepped forward. The wealthiest man in Pittsburgh at the time, he had served the Alleghenv Observatory as treasurer and manager during the Telescope Association years. He had personally assumed the major portion of the observatory debt and led the drive to raise the endowment of the Chair of Astronomy and Physics. He had been present at the dedication on January 7, 1862, when the telescope was new and magnificent. Lewis Bradley, who had first excited the imaginations of many of the prominent citizens of Allegheny and Pittsburgh as he explained to them the wonders of the universe, gave a dedicatory address on the future of the observatory and the promise of its new telescope. A teacher by profession, Bradley had the knowledge and skill needed to make proper use of the telescope in addition to doing the necessary adjustments and maintenance. He acted as its custodian and conducted a school on the premises. In his address he had made a strong plea to the members to provide auxiliary instruments such as a transit telescope and clock, but the appeal went unheeded until Langley's arrival. Thaw responded to Langley's re-

<sup>12</sup> Samuel P. Langley to Edward S. Holden, director of Washburn Observatory, University of Wisconsin, Jan. 30, 1885, Archives, Lick Observa-tory, University of California at Santa Cruz. "I passed two years — the hardest of my life — in trying to reconcile incompatible duties, and under such trial and discouragement as I don't like to look back upon." 13 Minute Book No. 1, Jan. 29, 1868.

quest to procure at last the essential auxiliary instruments; on November 11, 1867, he contributed \$200 for general expenses.

It is reasonable to infer that a close personal relationship developed quickly between Langley and Thaw. Langley, Boston bred, was a student of literature, history, philosophy, and the arts to the verge of genius. Over the years he amassed a formidable library, particularly of French literature and poetry. As mentioned, he was a friend and associate of such preeminents as Edward Everett Hale and Oliver Wendell Holmes. Little wonder that in Pittsburgh he would come to experience a keen sense of isolation.

The person most capable of filling this intellectual void was William Thaw, for he possessed a very similar and yet complementary spirit to that of Langley. The Reverend Herrick Johnson expressed a tribute to Thaw in these words, "What a scientist he would have made, if he had given himself to science. . . . if he had become a man of letters instead of a man of affairs, he would have risen to most distinguished literary eminence." Or as John A. Brashear, the skilled lensmaker and colleague of Langley, summed up the closeness of the two men, "No man held Mr. Thaw in higher regard than did Prof. Langley, and no man felt a deeper interest in the now famous researches of Prof. Langley than William Thaw, and perhaps few men comprehended the great value of these scientific investigations more than he did." 14 Thaw, in addition, was a resolute philanthropist, twice each day granting audience to any persons seeking help. He held a deep concern for the well-being of the observatory. Small wonder that Thaw's total contribution of funds for the operation of the Allegheny Observatory, starting with that initial \$200, would by the time of his death in 1889 swell to nearly \$40,000.15 Thaw championed a research mission for the observatory and quickly recognized Langley to be the person destined to fulfill this mission.

Langley presented reports to the trustees on January 29 and again on June 28, 1868. Regrettably, no copies of these reports exist for they most certainly contained an interesting account of the state of the deterioration of the observatory and its equipment, together with the requirements for refurbishing and a list of the needed instrumentation. Much, however, may be inferred from a report submitted to the

<sup>14 [</sup>Mrs. William Thaw and John A. Brashear], In Memoriam, William Thaw (Pittsburgh, 1891), 17, 19.

<sup>15</sup> Frank L. O. Wadsworth, "Annual Report of the Director of the Allegheny Observatory, 1900," unpublished manuscript, Records, Board of Trustees, Western University of Pennsylvania.

trustees in June 1869.<sup>16</sup> With Thaw's help, Langlev had been able to solicit money from many of those who had contributed to the endowment of his chair. Found in this report are a complete listing of money received as a result of Langley's solicitation and a complete listing of funds expended, both for "Repairs to Building" and "Instruments." Four major repair expenses involved iron work, carpentry, tinning, and the services of the original observatory architects, Barr and Moeser. The total cost, including painting, amounted to nearly onethird the original cost of the entire building.<sup>17</sup> In a letter to J. L. Dawes, a local painting contractor, Langley referred to "new ribs and shutters of dome." Evidently, a major reconstruction had to be done to the existing dome. Itemized also were repairs to the telescope including the mahogany tube covered with rosewood veneer (accepted practice at that time). The telescope had to be completely dismounted and shipped to Philadelphia for repair and refurbishment. Instruments purchased included the transit telescope, a clock, a chronograph, a spectrograph, and a micrometer. By then Langley had procured more than \$7,500; of this amount William Thaw contributed \$5,200.18

While busy teaching and supervising the repair and refurbishing, Langley was planning for the day when his instructional load would be reduced and he could undertake a program of research with the telescope. A leading Pittsburgh newspaper soon reported at length on the improvements to the observatory, and in so doing listed Langley's research preferences.<sup>19</sup> Included were observations of the sun, particularly the relative heat of different parts of sunspots and of the solar disc: observation of southern double stars: and the determination and compilation of the Allegheny Catalogue of Star Positions. Each in itself would have been an ambitious program, worthy of full effort by a team of researchers. Such a strong research program would soon conflict with the equally strong teaching aspiration of Dr. Woods. Indeed, an early implication of conflict does appear in a letter which Langley wrote to William Thaw endorsing his brother John for the position of professor of chemistry at the university, "If Dr. Woods can bring himself either to hold out his hand or to take mine, with

<sup>16</sup> Samuel P. Langley, "A General Statement of cash receipts and ex-penditures," *Report of the Director of the Allegheny Observatory, 1869.* 17 The "Investigating Committee" of the university trustees reported at the June 16, 1871, meeting on the total assets of the university. The cost of the observatory building was listed at \$5,000. 18 Samuel P. Langley to J. L. Dawes, Oct. 19, 1868, Samuel P. Langley to Alexander Nimick, treasurer, Western University of Pennsylvania, Mar. 31, 1871, Letterbook No. 0, Archives, Allegheny Observatory. 19 The Daily Commercial (Pittsburgh), Oct. 13, 1871.

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as sincere a purpose, as I should feel we could. . . ." 20

Although Langley's solicitation of funds was successful, it must have been painfully obvious that continued solicitation soon wears out one's welcome. Another means would have to be found to secure operating expenses. His experience at Harvard had shown that proper operation of an observatory required an assistant who would continuously monitor and maintain the accuracy of a sidereal (startime) clock (this was Langley at that time), thus freeing the director to conduct scientific research. Lewis Bradley, during his dedicatory address in 1862, had pointed to the uselessness of a large telescope without accurate startime. But Langley now had everything Bradley lacked, that is, the transit telescope, a chronograph, and a good clock. The dilemma that faced Langley was that the observatory was a oneman operation; if he must devote his energies to observing with the transit telescope and monitoring the clock, there would be little time for scientific research with the large refractor, the essence of an observatory. Obviously, an assistant was required to carry on the routine chores of the transit telescope, so that as director he would be free to pursue scientific programs as he desired. Two obstacles made this goal appear nearly insurmountable; one was a lack of available money to hire an assistant, the other was his continued burdensome teaching schedule.

It was through the Alleghenv Time Service, devised and so designated by Langley, that he surmounted these obstacles. Langley had traveled extensively in Europe and England during the mid-1860s and was quite aware of the system of uniform time in use there by the railroads, in stark contrast to the chaotic situation in the United States. By fortunate coincidence, his new friend and benefactor, William Thaw, was closely connected with the railroad industry, initially in the freight forwarding business. As a director of the Pennsylvania Railroad and second vice-president of the Pennsylvania Company, Thaw was thoroughly familiar with all the difficulties that local times presented to the railroad industry. If the concept of a single uniform time system for the entire Pennsylvania Railroad system controlled by a centrally located observatory was not original with Thaw, then it would have been one to which he would have been immediately receptive. As the concept developed, he became its chief advocate within the Pennsylvania Railroad hierarchy. Many years later, Langley described his Allegheny time system, inaugurated in

<sup>20</sup> Samuel P. Langley to William Thaw, Feb. 10, 1872, Archives, Allegheny Observatory.

1869, as the parent of all the later ones adopted in the United States; it was the first regular and systematic method of time distribution to those railroads and cities using it as an official standard.<sup>21</sup>

The key to any time service is a master clock, on which the time must be maintained as accurately as possible. In the Allegheny system Langley employed a Howard Pendulum Clock, which even at this writing beats continuously and accurately after more than 110 years. Time was then defined from the essentially constant rate of rotation of the Earth. The transit telescope was utilized to determine the exact elapsed time interval (to the limit of observational error) of one single rotation of the Earth on its axis. A clock, of course, is a far less perfect instrument than the Earth and usually will be somewhat in error in registering the elapsed time of one rotation, an error that often varies from day to day. This slight error the transit telescope observer determined by comparing the clock with the true rotation of the Earth, noted by the exact moment a given star passed a fixed cross hair in his transit telescope on successive nights.

Langley's system employed a second clock, called a journeyman, which was adjusted each day to indicate the correct time, with allowance for the slight error of the master clock. The journeyman was the clock used to transmit the time over the telegraph wires to the customers; each swing of the pendulum made an electrical contact that admitted a pulse of electricity into the telegraph line. This line ran from the observatory to the office of the superintendent of the Pennsylvania Railroad, and, at specified times, was connected into the entire railroad telegraph system. Then, every telegraph sounder on the railroad clicked in synchronism with the beat of the journeyman clock. Ultimately, more than forty railroad companies became electrically connected to the observatory, from New York in the east to Chicago in the west, from Erie in the north to Baltimore in the south, aggregating 4,713 miles. Other telegraph lines from the observatory connected with downtown jewelers and with city hall. For this service the railroads, city, and individuals paid a fixed fee and, within two or three years, the observatory was receiving an income of \$3,500 per year.

What made the arrangement even more remarkable was the fact that Langley had conceived the entire operation on a professional fee basis and had persuaded the local jewelers (doing watch repair and

<sup>21</sup> Samuel P. Langley, "History of the Allegheny Observatory," in John E. Parke, Recollections of Seventy Years and Historical Gleanings of Allegheny, Pennsylvania (Boston, 1886), 174.

adjustment), the railroads, and the city to pay for the service. Other observatories followed suit and established similar income generating time services. The ultimate downfall of these operations was the United States Naval Observatory in Washington, D.C., which provided a similar service and, as a governmental agency, was forbidden to charge fees. It agreed to provide the service free to Western Union, which in turn charged a cheaper fee for distribution. Finally radio station WWV rendered the whole scheme obsolete. The Allegheny Time Service did continue to sell time to local jewelers into the 1920s. In its heyday before the advent of standard time in 1883, the Allegheny Time Service was justifiable not only for its accuracy but more important because it diminished the chance of railroad accidents.<sup>22</sup>

Although the Time Service income did not reach maximum until several years later, it was apparent by 1870 that from the service the observatory would receive sufficient support. Langley's prestige was increased when he became director of the observatory, and the institution was now being managed by an observatory committee of the trustees, chaired by William Thaw. The refurbishing had been completed; the large telescope was remounted and ready for scientific research, and the auxiliary instruments were installed and ready for operation. There still remained the problem of Langley's teaching burden, however. The original definition of his duties had implied that when the observatory was finally equipped, there would be a change to instruction in astronomy and physics and the "customary duties of such observatories." Langley interpreted this to mean that he should spend most of his time at the observatory and do only occasional teaching. Anticipating this eventual change, as well as income from the Time Service, Langley in October 1869 hired an assistant, Charles L. Parker of Oberlin, Ohio.23 Parker remained as assistant until September 18, 1871, whereupon it appears evident he was summarily fired.

William Thaw conceived the plan to free Langley from his teaching burden. In 1871, he startled the entire Pittsburgh community with the announcement that he would give the university \$100,000 towards an endowment. This gift was a response to previous pleas by Woods in his reports to the board of trustees for an endowment for the university. It was Thaw's hope that the gift would help stimulate others to contribute endowment money.

Attached to this gift, however, were several conditions. The con-

Ibid., 183, 184.
Allegheny Observatory Daily Journal, Oct. 18, 1869.

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dition receiving press publicity stated that Woods had to raise a matching \$100,000 during the next three years. The agreement was to become effective July 1, 1871; however, delay resulted from negotiations and revision of the wording, as well as the necessity for the state legislature to amend the university charter, thus permitting the trustees to accept conditional gifts. Articles of agreement were drawn up and finally signed to become effective July 1, 1872.<sup>24</sup> A *primary* condition, which received almost no publicity though, placed a specific requirement on the university (or more specifically on now-Chancellor Woods) in regard to Langley and the observatory:

The said party of the second part [university trustees] does further hereby agree with the said party of the first part [William Thaw], his heirs, executors and administrators that the Professor of Astronomy and Physics in said University [specifically referred to in a later section as the party of the third part] under the endowment of that chair made when the Observatory property was transferred to said University, shall take charge of the Observatory and perform the duties pertaining to said charge, with the title of "Director of the Allegheny Observatory." He shall not be required to attend at, or give instruction in the college buildings, where the classes usually meet, but may instruct a class of students who shall attend at such times as the Professor may designate, with the concurrence of the Board of Trustees or of the Executive Committee. Said Professor of Astronomy and Physics shall receive as a salary not less than two thousand dollars per annum, together with the use free of rent of the dwelling house on the Observatory grounds. Any income derived from "time service" to railroad companies, cities or other parties, shall be applied to the maintenance of the buildings, equipment and service of the Observatory: and it shall be the duty of the said party of the second part to keep up and maintain the said Observatory in a state of practical efficiency.

So far as the assignment of said Professor to operating duty at the Observatory may make it necessary to increase the force of Instructors in said University, in order that its students may receive thorough instruction in the department of Astronomy and Physics, the said second party engages to employ and pay an Assistant Instructor or Professor in said department, who shall

<sup>24</sup> Minute Book No. 1, Jan. 29, 1872.

give instruction to the classes in the College building, under such regulations and with such relative position towards the Professor in charge of the Observatory, as the Board or Executive Committee may define.25

This was an incredible document — the university could have \$100,000 if, and only if, Professor Langley was not required to teach as a member of the faculty! This, in fact, created a nonteaching research professorship for Langley, certainly the first in the university, and one of the earliest research professorships in the entire country. Even more incredible, as events will demonstrate, Langley did not read the final agreement, and his misconceptions of its contents led to misunderstanding and complication.

The first condition, however, had still to be met, and that was the additional \$100,000 to be raised by Chancellor Woods. Far from an easy task, it was not accomplished until mid-1875. Money was collected from a multitude of sources, including church collections. Chancellor Woods, writing to Thaw on the state of the campaign, expressed both hope and despair, "I found that many have given and are giving to Yale and Harvard." 26 Happily for all, the goal was attained and, on December 30, 1875, Thaw wrote to the committee of investment of the board of trustees. "I wish to make immediate payment of the One Hundred Thousand Dollars I have pledged to the University." 27

Remarkable as these events were, just eight days following the signing of the articles of agreement an even more extraordinary event occurred. On the night of July 8, 1872, the single most vital and valuable item in the observatory, the lens of the great equatorial telescope, was stolen. Might a connection have existed between this and the agreement absolving Langley of teaching duties? Could it have been linked also to the fact that Langley's brother John had recently been elected a member of the faculty over the opposition of Chancellor Woods? Little can be learned about such questions now. But it remains a curious fact that much of the story of the theft was hushed up, and that a blanket of secrecy still hides many facts. For example, Zaccheus Daniel, an astronomer at the Allegheny Observatory for more than fifty years, once questioned Stephen Thaw, a grandson of

<sup>25 &</sup>quot;Articles of Agreement" between William Thaw and the Board of Trustees, Western University of Pennsylvania. Copy in the Thaw Collection, Archives, Historical Society of Western Pennsylvania, Pittsburgh. 26 George Woods to William Thaw, July 10, 1875, *ibid.* 27 William Thaw to Committee of Investment, Board of Trustees, Western University of Pennsylvania, Dec. 30, 1875, *ibid.* 

William Thaw who had served as an assistant at the observatory. Stephen Thaw replied that as a child he had been told that he must not ask too many questions about the theft and never learned any further details.<sup>28</sup>

To meet the specification of the agreement, an instructor of physics and astronomy had to be hired to perform the teaching duties to be relinquished by Langley. Charles C. Dickey, valedictorian of the Western University of Pennsylvania class of 1869, was hired on June 27, 1871, to take the position. Before he could commence teaching in September 1871, Dickey became sick and was not able to teach until November 1.29 During the first two weeks of the term Parker performed the duties which closely coincided with the date of Parker's abrupt leaving on September 18. For the next six weeks, Langley stepped in and did most of the teaching, aided by Benjamin C. Jillson, professor of chemistry. Langley in a letter to Thaw several years later stated, "This was shortly after\* his [Woods's] private overtures to Mr. Parker." 30 Langley's indignation is evident by his use of the word "affair," even though he had crossed it out while writing the letter, for Woods apparently tried to replace Langley with Parker, at least in physics. Obviously, much hard feeling prevailed among all concerned.

A trustee committee on faculty duties, which had been formed to realign curriculum and faculty assignments, reported on January 29, 1872. It presented a recommendation, dated September 30, 1871, that Jillson be given the Chair in Physics, "if Prof. Langley finds it necessary to give it up." At this meeting it was announced that Jillson had previously resigned and that the trustees had already begun to search for a successor. Woods then presented the credentials of a large number of candidates for the position and a committee of the trustees selected three candidates for further consideration. One of these candidates was Langley's brother John, who possessed a B.S. in chemistry from Harvard. If the situation had not become explosive enough, with Langley now drawing a high salary but doing no teaching, it can be imagined that the prospect of hiring his brother was analogous to pouring gasoline on a fire. In a letter to Thaw, Langley

<sup>28</sup> Nicholas E. Wagman, card file of notes, anecdotes, and references relating to astronomy and the Allegheny Observatory, Archives, Allegheny Observatory.

<sup>29</sup> Records, Board of Trustees, Western University of Pennsylvania, June 27, 1871, Jan. 29, 1872. 30 Samuel P. Langley to William Thaw, Nov. 8, 1873, Archives, Alle-

<sup>30</sup> Samuel P. Langley to William Thaw, Nov. 8, 1873, Archives, Allegheny Observatory.

<sup>\*</sup>At this point the words, "the Parker affair," were struck out.

defended his brother on the basis of concern for the university and the community, "I will only say now that my desire to get him here arose largely from my sense of his eminent fitness to govern young men and at the same time to interest the business men and manufacturers in the University as a *practical* good to them." <sup>31</sup> The university now became polarized; Thaw threw his backing to Langley's brother, and Woods supported one of the other candidates, a Mr. Bramwell.

On March 4, the trustees met to elect a professor of chemistry. The vote was split nearly down the middle, being eleven for John W. Langley to ten for Bramwell. On motion the election of J. W. Langley was made unanimous.<sup>32</sup> He immediately assumed his duties in the classroom, and the students responded appreciatively. "Dr. Langley is a proficient professor," read a comment in the student publication.33 John W. Langley now assumed his brother's burden of fulfilling the technical and science curriculum at the university.

At this time, turmoil also raged over the amount of Langley's salary. Faculty salaries were even then considered low. On more than one occasion Woods made an issue of this to the trustees. Langley himself considered his salary from the endowment fund "meager." Nevertheless, his salary was on an equal footing with the other faculty members in the university, being \$2,000 per year, derived in part from the \$20,000 endowment income of \$1,460. During his earliest years at Allegheny Observatory, Langley had participated in two solar eclipse expeditions under the direction of Professor Winlock, his former employer; one to Oakland, Kentucky, in 1869 and the other to Jerez, Spain, in 1870. On these expeditions he met and made friends with a number of prominent scientists, one of whom was A. M. Mayer at Lehigh College in Bethlehem, Pennsylvania, with whom he became close friends. In 1871 Mayer transferred to the Stevens Institute of Technology, and, at the same time, offered Langley his old position at Lehigh at a salary equivalent to \$3,400 per year.<sup>34</sup> This salary was attractive to Langley, but acting on the advice of Thaw, he turned down the offer. Apparently Thaw proposed in general terms that Langley might benefit salarywise from the Time Service income when it was on a firmer footing. Possibly Langley was also beginning to formulate in his mind a program of

<sup>31</sup> Samuel P. Langley to William Thaw, Feb. 10, 1872, *ibid.* 32 Minute Book No. 1, Mar. 4, 1872. 33 The College Journal, Western University of Pennsylvania (Apr. 1872), 3: 3.

<sup>34</sup> Samuel P. Langley to A. M. Mayer, Lehigh College, Bethlehem, Pennsylvania, Mar. 12, 1871, Archives, Allegheny Observatory.

professional astronomical education analogous to that at Harvard.

Not until he submitted his annual report to the observatory committee in 1872 did he make specific reference to this promise of salary support from the Time Service. By now it was on a firm footing, the annual income approaching \$3,000. Langley called the committee's attention to this fact and politely suggested that his duties in organizing and supervising it deserved some additional compensation. William Thaw referred the request to the committee with this suggestion, "I think perhaps a royalty of 20 per cent upon service income — limited to a maximum of 1000\$ would be a suitable experimental allowance." 35

Just at this time another job offer prompted Langley to press for more definite action. New vacancies at the United States Naval Observatory in Washington had been created by act of Congress and Langley was invited to apply. In an exchange of letters with Thaw he wrote, "I have no intention or desire to do so [apply], yet it seems to be the occasion for my asking some official expression of intentions which have been verbally conveyed for so long, that the wholly informal nature of the communications, leaves room for misconception." 36 Thaw replied that the other members of the committee had not responded to his suggestion so that no official action could be taken as yet, but that he personally would guarantee Langley an income of \$3,000 per year for the next three years by covering any deficiency out of his own pocket. Langley quickly replied, "I accept with gladness, the assurance of remaining in my chosen work here, and I have written to Washington in consequence."

Early in 1873, the city of Pittsburgh agreed to the terms and began paying \$1,000 per year for the Time Service which now controlled the tower clock on city hall. Langley took this as the occasion to remind Thaw that he was due \$833.33, needed to bring his 1872 income to \$3,000. But Thaw was deeply involved with negotiations designed to induce the railroads between Pittsburgh and Chicago to accept and pay for the Time Service. No record exists of a reply to Langley's request for the \$833. Still hesitant to approach Thaw directly. Langley now presumed that a ratification of the guarantee by the university trustees was needed. The trustees, however, were not about to guarantee Langley a salary of \$3,000 per year, when his

<sup>35</sup> Samuel P. Langley, "Report of the Director of the Allegheny Ob-servatory, May 1872," unpublished manuscript; William Thaw to Messrs. C. G. Hussey and Josiah King, Esq., May 15, 1872, *ibid.* 36 Samuel P. Langley to William Thaw, May 26, June 1, 1872, May 12, 1873; William Thaw to Samuel P. Langley, May 27, June 15, 1872, *ibid.* 

guaranteed salary of \$2,000 was as much as that of the other professors, and especially since \$3,000 would also have been considerably in excess of the salary of Woods, the chancellor. Langley reasoned that a personal guarantee by Thaw depended on Thaw's continued good health. Thaw, acknowledging this fact, endeavored to negotiate the matter with the trustees, apparently at the consternation of some. The trustees stood by the articles of agreement which they had accepted. Langley, not fully aware of the final terms of the agreement since he had read only preliminary drafts, wanted the agreement to relieve him of compulsory teaching duties, compulsory attendance at university affairs such as daily chapel services, and from payment of rent and repairs on the observatory dwelling. This the agreement specified, but Langley had been misled by interpretations placed upon it by Chancellor Woods, and he pressed Thaw for still further negotiation. On June 10, 1873, Langley at last did become aware of the full terms of the agreement.

I read yesterday for the *first* time the extract you were kind enough to have made for me from your contract with the W.U.P.

To all your references to this document in past conversation I have attached a uniformly mistaken signification, and I see you must have had frequent occasion to think me unreasonable in asking anything more explicit or binding.

To whatever misapprehension my persistent error has been due I am glad it is removed.

At the bottom of this letter is written this comment in Thaw's handwriting: "S. P. Langley's admission that he had misread the 3 party Contract of West. University and that all his pertinacity about defining relations between Ob and its Director, and the Chancellor etc. were needless and superfluous. It has cost me very much time and trouble." <sup>37</sup>

Much of the foregoing has focused on turmoil and tribulation surrounding Langley during the early 1870s. It has been shown that jealousy on the part of his colleagues would have been a natural consequence of Langley not being required to teach and yet receiving a salary higher than theirs. The chancellor may have feared intrusion upon his authority as a result of Langley's influence on Thaw, and

<sup>37</sup> Samuel P. Langley to William Thaw, June 11, 1873, *ibid*. The extract from the articles of agreement referred to had been in Langley's hands for a full year.

some of the trustees undoubtedly were asking the question. "What are we paying him for?" Langley, himself, further aggravated the situation by insisting on receiving additional income for contract services as the Time Service, and by endeavoring to secure a guarantee of his high salary and nonteaching situation by having it specifically defined and authorized through trustee action. Thaw, by wielding financial clout, induced the trustees, the university, and the community to accept the situation in Langley's favor by offering the university \$100,000 under the terms of the articles of agreement. It was a maneuver that was not without a measure of risk, and as has been mentioned, on July 8, 1872, just seven days after the articles of agreement had been signed, the thirteen-inch diameter lens of the great telescope was stolen. The missing lens was not recovered until November. Langley used the intervening months of forced inactivity to devise his plan for a Department of Astronomy.

At this time, a new development in higher education was occurring in Pennsylvania, as well as the nation, a growing trend towards departmentalization of faculties. As has been indicated, Chancellor Woods and many of the trustees had for some years advocated a strong scientific program for the Western University of Pennsylvania which would meet the needs of industry in Pittsburgh. Ignoring the preparatory department (high school remedial), the Western University catalogue for 1867-1868 records two departments, collegiate and scientific. The 1868-1869 catalogue includes in addition departments of civil and mechanical engineering. By 1871-1872, a law department had been added and, whereas previously no departmental breakdown of the faculty existed, in this year for each department there was listed a designated faculty. However, a majority of the total faculty in fact still belonged to all departments, law excepted. And, in 1871, the investigating committee of the board of trustees recommended that the degree of bachelor of science be granted.<sup>38</sup>

Langley, as was apparent in several of his letters to Thaw, chafed over a feeling of isolation from the university. He had, for instance, attended faculty meetings on a regular basis during 1867-1868, attended no meetings during 1868-1869 (evidently due to conflict with his efforts to refurbish the observatory), once again attended on a regular basis during 1869-1870, and never again thereafter.<sup>39</sup> His salary was not derived from student tuition, and, due to the animosity of Woods,

<sup>38</sup> Minute Book No. 1, June 17, 1872. 39 Records, Faculty Meetings, Western University of Pennsylvania, Minutes for the years 1867-1870.

he considered himself practically forbidden to teach at the university, despite the listing of his name in the catalogue as a member of the faculty. In an effort to correct this apparent slight and to enhance his own scientific stature, Langley began to formulate a plan based to some degree upon the organizational hierarchy then at Harvard. He proposed a separate Department of Astronomy. This proposal apparently received encouragement in a casual discussion with Woods in April 1872, at which time Woods appeared to express interest. Langley devised his plan which he presented to Thaw in December 1872.

It began with a term "usage" which Langley seemed to employ in two senses: that of general university *usage* throughout the United States and also specific *usage* within the Western University.

I think that the general usage of universities is founded on reason, which assigns to each department some person or persons called its "Faculty" whose special charge it is to see to *it*. The appointment in my own case makes me Director of the Observatory and Professor etc. in the *University*, without assigning me to any department though by usage and common consent it is well understood that my chief duties are here.<sup>40</sup>

Surprisingly to Langley, the term "usage" led to extensive debate among the trustees until they eventually formed a trustee committee to investigate the relationship of observatories and professors of astronomy to university organization throughout the country.

In this plan Langley offered two specific proposals. He suggested that his title of professor of astronomy and physics in the Western University be changed to professor of astronomy and physics in the Allegheny Observatory of the Western University. Secondly, he proposed that he, as director, and his assistants constitute the "faculty" of the observatory. Although these proposals seem to be innocuous and noncontroversial, the plight surrounding Langley due to his nonteaching status was sufficient to create controversy of his every utterance or even of an occasional appearance by him on campus. Langley justified these proposals as specifying "that his professorship attaches him integrally to the University, through the Observatory, without giving occasion for the empty statement that he is a truant member of

<sup>40</sup> Samuel P. Langley, "Proposal to the Board of Trustees for a Department of Astronomy," unpublished manuscript, Dec. 1872, Archives, Allegheny Observatory.

the College Faculty who had evaded the duties which weigh on others. . . ." It was his desire that the observatory be considered as working alongside the college, for the university was a means of teaching as well as a sustainer of original research.

He suggested that his duties be defined:

The Director of the Obs<sup>y</sup> may be assigned to any duty as acting head of the depart<sup>t</sup> of A and P in the College which he does not find incompatible with a proper attention to his duties in the former.

For the present he is with this understanding assigned by the Trustees to the Acting headship of this Department of the College, and will while detailed for this service perform the usual duties of the head of a College Depart<sup>t</sup> directing the course of study by introducing suitable textbooks, and supplementing these by lectures as he may see proper, by improving and extending as he may be able the physical cabinet, and by opening the privileges of the Observatory with proper superintendence to the Senior and Junior College Students during the time devoted to study and recitation. While it is expected by the Trustees that this provision will enable the Observatory to render useful service to the College, in addition to its declared function in the University as representing the latters purpose of fostering the promotion of knowledge and original research, as well as the means of imparting these in education, it is nevertheless meant to do so in a manner to recognize the proper position of each Faculty as judging its own affairs. And it is understood that he, the Director of the Observatory, while so aiding the College Faculty will introduce no new textbook, or change in any radical manner the course of study he may have adopted. or deliver any course of lectures at unusual hours, or invite the students to the Observatory at unexpected times without communicating his intention to the College Faculty in writing and obtaining their assent. . . . 41

The proposal is interesting for it appears to be an attempt on Langley's part to enter into a more harmonious relationship with Chancellor Woods and with the other faculty members. The departmental structure in the university, however, specified that even though each department might have a separate faculty, the chancellor

41 Ibid.

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would serve as the titular "head" of each department. Langley's inadvertent proposal of himself as department head succeeded only further to arouse the ire of Chancellor Woods and many other members of the faculty.

In another sense this proposal relates directly to the emergence of astronomical curricula in universities throughout the United States. Few, if any, separate departments of astronomy then existed. Even Harvard, where Langley had received his initial astronomical training, did not establish a full baccalaureate or doctoral program in astronomy until 1921.42 Most professional astronomers at that time received their formal training in mathematics or in physics. Others, like Langley, received an informal apprenticeship training at an observatory such as at Harvard or the University of Michigan. Langley did not specifically propose a degree-granting program in astronomy for his new department; he sought only to provide courses for juniors and seniors to complement other degree programs.

As questions concerning the term "usage" arose, Langley hastened to provide more explanation, hoping to soothe ruffled feelings. In a follow-up letter to Thaw he insisted that what he meant and said in an earlier draft was that the chancellor, not he, should head the department, and also that "usage" referred specifically to the Western University; "as far as precedent or 'usage' here, was concerned [he] was not a member of the College Faculty (the new one informally made) in the absence of legislation of the Trustees on this point." 43

William Thaw again pressed Langley for additional clarification, this time regarding the term "Observatory Faculty." Endeavoring to be more specific, Langley replied, "I think I should advise an Observatory Faculty, consisting of the Chancellor of the University, the Director and his assistants; the Director being responsible immediately to the Trustees." But here Langley proposed a particularly unusual and discomfiting organizational arrangement. In the university departments the faculty reported to the chancellor who, in turn, reported to the trustees. Everyone was now confused. In the letter to Thaw, Langley further clarified his view of the relationship of the department of astronomy to the university:

As to the relations between the Directors duties, and those of the Professor of A and P I suppose it would be best to look at

<sup>42</sup> Samuel Eliot Morison, The Development of Harvard University (Cambridge, Mass., 1930), 305. 43 Samuel P. Langley to William Thaw, Dec. 28, 1872, Archives, Alle-

gheny Observatory.

these quite impersonally and define them as sharply just as though they were held by two individuals, as the growth of the University, may one day oblige them to be. It is a special difficulty however in our own case that the fundamental instrument of transfer is made to declare that this Professor shall be the person in charge of the Observatory.

If there can be no modification of this fundamental instrument, then it should be made very clear whether this individual is ----

(1) Professor of A. and P. in the Observatory or

,, ,, ,, ,, ,, ,, ,, (2)College

(In either case being a Professor in the University) or 3rd whether he is a Professor at large in the University and as such ex officio member of any Faculty a part of whose duties lie in the supervision of instruction in Astronomy and Physics. He may be useful in either one of these cases to the College by delivering Annual Courses of lectures (private or open to the Public) supplementary to other instruction - by advising with the Faculty as to text books and course of tuition — by being enabled to open the Observatory for a complete special course, gratuitously to any deserving College student desiring it - by opening it at proper times to the whole of the Senior or Scientific College classes in Astronomy --- and in many ways in which it is superfluous to enter - in which as a presumed specialist he would be if a good man very useful to the educational side of the University, while preserving his freedom of action as Director and giving his time mainly to the Observatory's practical work and research.44

The observatory committee now began negotiations with the new trustee subcommittee, comprising Dr. W. D. Howard, the president of the trustees, and Chancellor Woods, which had been formed to consider the question of creating a new department as well as how "usage" applied at other universities. First, the subcommittee turned its attention to the status and duties of Langley, who quickly came to believe that this committee actually served as a mask for the personal ill will aimed at him by Woods, and, with Howard, unwittingly cast in the role of committee enobler, blind to the intrigues of Woods.<sup>45</sup> The subcommittee in its report to the trustees not sur-

<sup>44</sup> Samuel P. Langley to William Thaw, Jan. 11, 1873, *ibid.*45 Samuel P. Langley to William Thaw, Mar. 17, 1873, *ibid.*

prisingly reaffirmed the conditions stated in the articles of agreement.

The subcommittee then proceeded to address the issues of "usage" and the observatory faculty. To do so intelligently, they evidently entered into an extensive correspondence with similar institutions around the country. Thus, their report stands as a useful survey of astronomy teaching and research arrangements throughout the United States during the early 1870s.

However desirable it [provision for a distinct observatory faculty] might be, the Executive Com<sup>tee</sup> will probably find it difficult to carry out this suggestion, first, because of the great difference between our circumstances and those of other institutions to which observatories are attached; second, because there does not seem to be any uniform usage in relation to this matter.

Of the three-hundred and seventy two colleges in our country there is not a single one, to which we can refer as a model unless it be Harvard and possibly the University of Chicago. And how far it would be practicable for us to conform our arrangements to those of an institution so far our superior, not in years only but in wealth and other advantages we will leave the Com<sup>tee</sup> to decide. Harvard has enjoyed a continuous growth for nearly two hundred and fifty years, and its facilities for establishing and conducting the celebrated Observatory connected with it have been such that if we follow in its paths at all it must be with some modifications.

Cornell, Michigan University, and Boston University, by reason of princely endowments, or large aid recently given from the State sprang at once to the rank of Universities, with different schools. Yale has no Observatory of importance.

Professors Watson of Ann Arbor, Peters of Hamilton, and Young of Dartmouth, all eminent at home and abroad in their departments, instruct as well as take charge of their respective Observatories. Professor Young instructs in Astronomy and Physics and has only the assistance of a college student. The President of the University of Michigan says of Professor Watson, "He teaches one senior class General Astronomy, and an advanced class of seniors higher Astronomy." And Dr. Browne, President of Hamilton College, says of Professor Peters, "he directs the studies of the senior class in Astronomy during the third term of the college year. At present he has no assistant." Yet the relations of our Director and Instructor are nearly the

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same as those in Harvard, and nearly the same as is contemplated by the union of the Dudley Observatory and the Medical College of Albany with Union College. The Director in Harvard takes no part in the regular course of instruction; but there is a class of students who desire to make Astronomy a specialty, who are taught in the Observatory. When we have such a class of students here, it may be well to have a separate Observatory Faculty. None of the Universities or Colleges of the country except Harvard, so far as we know, have such a Faculty, still if the Executive Comtee think it best to organize such a Faculty, even at some future time, there would be no impropriety of now adopting the rules and regulations to govern it. But, it might be well to defer this, until such a class of students as would make it necessary present themselves. Upon this point the Comtee will decide for themselves.46

This is a careful and honest review of the role of observatories in a university framework throughout the United States. It seems impartial and does not appear to justify Langley's charge of vendetta. Harvard certainly represented a special case, actively engaged in the training of future astronomers. If Langley had hopes of doing likewise at the Allegheny Observatory, his hopes never materialized. No student ever enrolled in a course of astronomical study under Langley's tutelage, although occasionally a student from another institution would spend a few summer weeks at the observatory.

In regard to the character of the department, the trustees recommitted the report to the subcommittee for further consideration.<sup>47</sup> At issue was the makeup of the department, which they presupposed consisted of the chancellor, the professor of astronomy and physics, the professor of chemistry, geology, and mineralogy, and the instructor in astronomy and physics. The professor of chemistry, geology, and mineralogy was, of course, Langley's brother John. The professor of mathematics was Milton B. Goff, who would serve the university many years later as chancellor. The instructor of astronomy and physics was Charles C. Dickey. These individuals dealt the concept of a Department of Astronomy a final and crushing blow by expressing their own opposition to it. The final report of the subcommittee stated that not only were the prospective members opposed but that it would

<sup>46</sup> W. D. Howard and George Woods, "Report of the sub-committee to the Board of Trustees," unpublished manuscript, Mar. 17, 1873, *ibid*. 47 Records, Board of Trustees, Executive Committee, Western University

of Pennsylvania, Apr. 21, 1873.

take from the university faculty powers that rightfully belonged to it, in the sense that all departments should be subservient to the actions of the faculty acting as a whole. The observatory faculty would not seemingly be so bound, and they concluded "a Faculty with such powers as the one proposed is not only contrary to our usage, but usage everywhere in this country, so far as we can learn." <sup>48</sup> The committee did concede that there might be an observatory faculty consisting of the chancellor, the director of the observatory, and such assistant or assistants or professors as deemed best. The duties of this faculty would comprise the supervision and the direction of the study of "Practical Astronomy" in the observatory.

The trustees, however, took no further action. The concept of a Department of Astronomy and a curriculum leading to professional astronomical training at the Western University faded into oblivion. Samuel P. Langley concentrated his efforts toward a program of research on the sun and its energy. The single general astronomy course continued to be taught at the university by various faculty members, including Milton B. Goff, although none of these persons ever did any research at the observatory. John Langley soon left the university, and the scientific curriculum became subdivided into separate programs of chemistry, physics, geology, and engineering. The recommendation of an observatory faculty did come to fruition under James E. Keeler, director of the observatory in the 1890s, but in this case, as before, no student ever enrolled. It was Frank Schlesinger, director from 1915 to 1920, who did succeed in establishing a true curricular department. A full program of courses led to the M.S. and Ph.D. degrees and, under his guidance, the department attained the status of school of astronomy, on a par with the graduate school, and the schools of medicine, engineering, and education.

It is hard to avoid an implicit comparison between the Allegheny Observatory and the Harvard College Observatory. Both had telescopes that were among the world's largest. Both had strong directors who engaged in pioneer programs of astrophysical research. Harvard, however, succeeded to develop a program of informal professional training in astronomy; Allegheny did not, until many years later. Allegheny, under Schlesinger, did develop the earlier formal curricular program, and both institutions had strong financial backing during the early years. Where, then, did the two institutions differ? A major difference was that Harvard's financial backing continued

<sup>48</sup> Records, Board of Trustees, Executive Committee, Western University of Pennsylvania, June 10, 1873.

strong from several sources. After the death of William Thaw, Allegheny's financial backing began to dwindle seriously. Harvard retained a vigorous commitment to research in astrophysics. Allegheny, under Schlesinger, turned to astrometry, no less important, but lacking the general appeal often found in astrophysics. Student interest at Allegheny became more limited without the stimulus of astrophysics and has remained so. And finally, that sense of isolation, keenly felt by Langley, continued to be a divisive factor throughout his tenure. His fame as a scientist spread to the far corners of the earth. But when can fame be sufficient unto itself? Ponder if you will this quotation of a student writing for the student and alumni publication:

When we went to hear Professor [Frank W.] Very's [Langley's assistant] lecture we were at a loss to know which of two or three strange gentlemen present was he. That circumstance we coupled with an inquiry we heard during an interval of the lecture "What good is the Observatory to this University?" and we came to the conclusion that unless the glory coming from owning the Observatory is enough return, the institution is very little benefitted [sic] by having it. And even the glory is rather threadbare, for not one out of ten persons who know of the Observatory know that the University owns it. What good do all the costly apparatus do the institution or its students? Practically, none. No one ever goes up to the building on the hill, and those who are up there seldom or never show themselves at our building, and we doubt if two months ago one-tenth of our students would have known either of the professors from the hill. There is no astronomy here, except during one term of the senior year, and the embryo stargazers get one small and exceedingly ceremonious trip to the Observatory. The astronomic knowledge is purely theoretical, and yet we have one of the finest observatories in the land. This is truly a lamentable state of affairs, and the inquiry was certainly a reasonable one: "Of what good to this University is the Observatory?" 49

Today, as then, no program of professional instruction in astronomy and astrophysics can be fully supported from student tuitions. A recent trend toward greater support from government is now being reevaluated due to a present-day overabundance of astronomers. Re-

<sup>49 [</sup>Anonymous], The Pennsylvania Western (Feb. 1884) 3:45.

search, also, has been hampered by restricted funding; even Harvard is presently facing severe difficulty in the support and operation of its large sixty-one-inch reflecting telescope. It can be said that although strong astronomy and astrophysics programs will continue to survive, many smaller programs will face hard decisions about research and instruction in the years to come.