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BIOGRAPHICAL MEMOIR
OF
THEOPHIL MITCHELL PRUDDEN
1849-1924

BY
LUDVIG HEKTOEN

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J. Mitchell Prouden

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In 1898 Prudden wrote: "Twenty-five years ago, pathological laboratories were rare in this country, and such as did exist were usually small corners in the dead-house of some hospital which had more enlightened governors or more money than the rest. In the medical colleges, then largely proprietary, pathology was merged in the chair of the practice of medicine. The student could, if he were enterprising, witness an occasional autopsy, but beyond this his knowledge of this fundamental theme was derived from lectures, charts and books."¹

In the United States, teaching and research in pathology by men especially trained for the purpose and devoting themselves exclusively to this kind of work may be said to have begun in New York about 1878. In that year, T. Mitchell Prudden was appointed assistant in pathology and director of the laboratory of the alumni association of the College of Physicians and Surgeons in New York. The following year, William H. Welch assumed the professorship of pathological anatomy and general pathology in the Bellevue Hospital Medical College. This was the first full-time appointment of its kind in this country, and the fundamental importance of pathological anatomy in the medical curriculum was now established. Prudden and Welch are the American pioneers in renouncing medical practice and devoting themselves wholly to teaching and investigation in pathology. "Finally there appeared on the horizon in this country a few anomalous individuals who cherished the notion that the science of disease, even in its etiological and morphological aspects alone, was broad and deep enough to command the exclusive attention of its devotees" (Prudden).²

¹ Pathology and the department of pathology. Columbia University Bulletin, No. 19, 1898 (103-119).

² Progress and drift in pathology. Med. Record, 57, 1900 (397-405).

It was high time for this departure. After the study of the cell in disease was introduced by Virchow in 1856 (*omnis cellula e cellula*), pathology had developed rapidly. Due in large measure to German influence and example, the need in the medical course of laboratory work in pathology had become acute. It was recognized too that besides clinical and anatomical observation, experimental methods were necessary to progress in research on fundamental pathological problems. And the epochal discoveries of Pasteur and Koch just at this time were bringing in the microbic era with its wonderful progress in knowledge of infection and of prevention and treatment of infectious disease. It was a glorious period for medical science, and in advancing its revolutionary influences on medical education and medicine in this country the subject of this sketch³ played a leading part.

Theophil Mitchell Prudden was born in the congregational parsonage at Middlebury, Connecticut, July 7, 1849. His mother was Eliza Anne Johnson, 1819-1889, daughter of Eben and Sally Mitchell Johnson at Southbury, Connecticut, and his father was George Peter Prudden, 1819-1872, a congregational clergyman, Yale graduate in arts and divinity, and the direct descendant in the seventh generation of the Reverend Peter Prudden, "among the worthiest of the honored founders of New England," one of the leaders of the New Haven colony in 1638, which he left in 1639 when he established the Milford church. A charming story, privately printed, of the life and work of Peter Prudden in Connecticut has been written by Lillian Eliza Prudden,⁴ Dr. Prudden's sister, to whom I am indebted for much information and helpful comment. There were three more sons in the family—Edward Payson, who died in 1843; Henry Johnson, who died in 1890, and Theodore Phi-

³The sketch follows closely the biographical notice of Dr. Prudden by Simon Flexner (Science, 1924, 60, 415-419; Annual Report of the National Academy of Sciences, Fiscal Year 1923-24, 1925, 101-109). Since the sketch was written there has been published privately Biographical Sketches and Letters of T. Mitchell Prudden, M. D., edited by Lillian E. Prudden, Yale University Press, New Haven, 1927.

⁴Lillian E. Prudden: Peter Prudden, a story of his life at New Haven and Milford, Conn., with the genealogy of some of his descendants and an appendix containing copies of old wills, records, letters and papers, New Haven, 1901.

lander, M. A. and B. D., Yale; D. D., Illinois College; author of religious books, who died in 1916.

T. Mitchell Prudden had a healthy and happy childhood in Connecticut parsonages with the best of traditions. The parents were guided by "a sympathetic realization of the youngster's point of view and of the necessity for amusement and initiation into knowledge and familiarity with things worth while." Intellectual ideals were implanted early. In adolescence life became more strenuous. The father openly advocated antislavery principles at a time when it was unpopular and even dangerous to do so, and his house was a station on one of the branches of the "underground railway." Ill health soon compelled his retirement from active service, and the later years were spent in New Haven. The eldest son, Henry Johnson, who had literary tastes and eagerly wanted a college education, gave up this wish and entered business in New Haven, where he later prospered. In 1866, T. Mitchell, then seventeen, went to work in his brother's establishment, which he swept and dusted and where he could watch the ways of business, but the duties proved irksome and he gave up the work after about one year. A little later he had a cruising adventure in Long Island Sound in a fishing schooner that ended in mutiny of the crew, landing of the passengers on the rocks of Stratford Light, and his return to New Haven on foot. In the meantime with the aid of his brother, he had made a start toward college and science.

In addition to the schooling he had received in various places, he prepared for Yale at Wilbraham Academy in Massachusetts and entered the Sheffield Scientific School in 1869 under a State fellowship with free tuition. At the end of the first year, medicine was settled on as the goal. Here was the chosen field in which he might hope to be able to satisfy his high ideals of life and service. As yet no provision had been made in the Sheffield Scientific School for instruction in zoology, botany, organic and physiological chemistry. Realizing the importance of these subjects for medicine, Prudden and his friend and classmate, Thomas Russell, later professor of surgery in Yale Medical School, appealed to the faculty, and "the biological course in preparation for medicine" was established. There is good reason to believe that this appeal for a biological course was inspired

by the enthusiasm and insistence of Prudden. The Yale College catalogue for 1870-71 contains this statement about the course preparatory to medicine: "During one year the work of this course will be chiefly under the direction of the instructors in chemistry; during the second year, under that of the instructors in zoology and botany. In chemistry, especial attention will be given to the examination of urine and the testing of drugs and poisons; in zoology to comparative anatomy, reproduction, embryology, the laws of hereditary descent and human parasites; and in botany to a general knowledge of structural and physiological botany, and to medicinal, food-producing, and poisonous plants. The studies of the select course in physical geography, history, English literature, etc., are followed by these students." Prudden and Russell were the first two students in the biological course. They "were invited for special advanced work in botany into Eaton's Herbarium at his house; they were placed in Johnson's private laboratory for physiological chemistry; they worked rather as assistants than as students under the eye . . . of Verrill and Sid. Smith in the old bug lab. (alias zoology laboratory)." It may be recalled here that a laboratory for physiological chemistry was organized as an integral part of the biological course by R. H. Chittenden in 1874.

Beside his association with Thomas Russell, Prudden became allied intimately in scientific interests with James Thacher (1847-1891), tutor in physics and later in zoology at Yale, investigator of vertebrate involution, and from 1879 professor in the medical school, to the development of which he devoted himself with marked success. The last two years in Sheffield were full of action—collecting of animals and plants on land and water about New Haven, courses with Whitney, Lounsbury (honorable mention in English composition), and Gilman, membership in Berzelius ("invited early to join Berzelius, its associations were throughout among the most salutary of the college influences"), scientific editorship of *Yale Lit.* He received a prize in minerology. In the spring vacation of 1872 Prudden and Russell chartered a yacht and with a few choice spirits made a dredging expedition down the Sound. They brought back much valuable material and established new habi-

tats for several marine vertebrates. Theirs was the first dredging about Woods Hole.

In 1872, Prudden graduated as A.B. and entered the Yale Medical School without delay. As illustrating the confidence his teachers felt in him, it may be mentioned that at this time he taught elementary chemistry, and with noteworthy success, during the absence in Europe of Professor Mixer of the Sheffield Scientific School. At the same time he served as secretary of the faculty. He received his medical degree in 1875. In the spring of that year he spent some time in New York in studying pathology with Dr. Francis Delafield at the College of Physicians and Surgeons, a visit that undoubtedly came to be of great influence in his further career. Companions since Sheffield days, he and Thomas Russell now served together as internes in the New Haven Hospital, six months each on the medical and surgical services. At this time this as well as practically all other hospitals in this country had no facilities for any kind of laboratory work for clinical or other purposes, and it is greatly to the credit of Prudden's interest and vision that he arranged a small laboratory in a basement room of the hospital. His interest in fundamental medical problems had survived the didactic grind and lack of contact with realities of the medical course of that day. On completion of his internship, Prudden at once went to Germany to work in pathology under Professor Julius Arnold at Heidelberg. This step no doubt was planned long in advance and probably had the cordial support of Dr. Delafield and other advisers. In a letter of September 10, 1876, Arnold writes that a place has been reserved and that the only fee required is 10 marks for registration. In the winter of 1876-7 Prudden followed the lectures and laboratory courses of Arnold and his associate Thoma and worked on changes in living cartilage. Later he visited other centers, including Vienna, and worked in other laboratories, returning to New Haven after an absence of two years. He now had mastered German and established friendly relations with several of the leading workers in pathology. "When most of us were serving our novitiate in pathology, the study of inflammation was largely limited to a bare description of visible phenomena and a cataloguing and classification of lesions . . .

the more inquisitive among us were much exercised to find out whether it was the emigrated leucocytes or the fixed connective tissue cells which were most concerned in the formation of new cells. So earnest were the advocates of each of these views that the social amenities sometimes suffered. Thus it was my hap to be banished from Stricker's laboratory in Vienna when it became known to that champion of the connective-tissue cells that I had been under the baleful influence of Cohnheim and Arnold.³ The result of his research under Arnold was published in Virchow's Archiv in 1879 (see Bibliography). The work deals with changes in living cartilage, a subject of special interest now in the day of vital staining and in vitro study of animal cells. He proves to have been endowed with a high grade of investigative workmanship. An effort was made to follow the effects of harmful agencies on living cells under otherwise normal environment. By a clever device the transparent episternal cartilage of the frog was observed for hours under the microscope while connected with the body. The chromatin of the nucleus was recognized, variations in cell form and content were produced at will, and the important fact was noted that certain dye solutions do not color living cells but do color dead cells. "But it seems to me particularly significant that it is possible to observe under the microscope, on living cartilage tissue, the processes of contraction and the formation of vacuoles; and that it is possible thus to determine whether and under what conditions such changed cells return to the normal state or whether they undergo degeneration and die. The observations made with reference to the behavior of living and dead cartilage cells in response to dyes also seem to me noteworthy, because we thus learn that only the nuclei of the latter stain homogeneously. We are, therefore, in a position to distinguish whether cells are dead or living, and can thus exclude their participation in regenerative processes." It is a spirited, pioneer study of what actually goes on in living cells as distinguished from inferences drawn from the appearances of cells in dead tissues fixed by chemicals and stained.

³ Progress and drift in pathology, Med. Record, 57, 1900 (397-405).

The illustrations were drawn by himself. His later work in New York on cartilage transplantation and on the effects of carbolic and salicylic acids on ciliated cells, leukocytes and vascular membranes is a direct continuation of the study in Arnold's laboratory.

When Prudden returned from Europe, he was eager to introduce into the medical course laboratory work in pathology and to devote himself to teaching and research. In order to be able to do so he had made up his mind after much questioning to give up for good the thought of practicing medicine. He hoped he might have the good fortune to become a teacher of pathology on full time. As stated, in those days in this country the teaching of pathology was done by the professor of the practice of medicine, the exception being Harvard Medical School in which J. B. S. Jackson and Reginald H. Fitz taught pathology, and the authorities of several medical schools and certain leading physicians with whom Prudden discussed the situation, did not seem to take any special interest in his plan. Having failed to find a place to work in pathology even as a volunteer, he reluctantly opened an office for practice in New Haven and accepted a lectureship in histology in the Yale Medical School. While the medical schools may have seemed satisfied with the situation as it was, a new movement nevertheless was under way. Among the most influential real leaders in this movement were Francis Delafield (1841-1915, Yale, 1860), a great medical teacher and student of pathological anatomy, and Edward Gamaliel Janeway (1841-1911), one of "the foremost clinical teachers and consultants of his generation." These two remarkable men and the brilliant J. W. Southack, who died young, conducted systematic autopsies for the first time in New York City.⁶ Through their work in the dead-house these men and others such as Reginald H. Fitz in Boston, and Christian Fenger in Chicago, came to learn the changes of disease as the greatest clinicians knew them in the past, and as few will ever know them in the future, now that pathology is a separate field of investigation. The following extract from the remarks of Dr. William H. Welch,⁷ at a dinner in his honor, are of special

⁶ Theodore C. Janeway in *American Medical Biographies*, 1920, 610-14.

⁷ In Honor of William H. Welch, Baltimore, 1910, p. 41.

interest at this point: "Dr. Delafield little knew, when he used to give that summer course in pathological anatomy in the College of Physicians and Surgeons of the interest which he stimulated in me at that time. When he came to know me better he honored me—and I felt at that time it was the greatest honor that could come to me—by giving me the privilege, in his absence, of making an autopsy at Bellevue Hospital and then permitting me to record the protocol in his own private autopsy book. He little knew the seed he was sowing then, for this certainly was the very beginning of my interest in pathological anatomy."

In 1876, Delafield was made adjunct professor of pathology and the practice of medicine in the College of Physicians and Surgeons in New York (full professor in 1882). In 1877, a fund of \$10,000 was raised among the alumni of the college "for advancing the standard of medicine" there, which on the advice of Delafield was devoted to a histological and pathological laboratory, and soon after Prudden's setting up an office in New Haven, Delafield offered him the position of assistant and director of the laboratory. After careful consideration, a letter was written in which this offer, which brought a turning point, was declined with regret because financial and other circumstances did not justify cutting adrift from old associates and the modest living as practitioner and teacher in New Haven. The letter was to be posted the next morning, but during the night the spirit of devotion to science and of adventure caused a change of mind, and the offer was accepted. This momentous decision, which was followed by a career of forty-two years of teaching and investigation and of leadership in medical progress, was communicated promptly to Professor Arnold in Heidelberg, and in a letter from him dated November 15, 1878, occurs this passage: "Your letter pleased me greatly, because I am convinced that the position you have assumed will assure you a future. From my knowledge of you, I am, I believe, justified in saying that you will not now easily be diverted from the goal of a scientific career. There is no doubt in my mind that your institute will be a success. The fact that it is small and has only moderate means at its disposal is not important. Some time ago, our German pathological in-

stitutes, with the exception of a few, were very bad; now they are being replaced by good ones. But I know from personal experience it is possible to work in even a small institute."

The new laboratory of the College of Physicians and Surgeons was supported largely by the alumni association of the college, the constantly recurring deficits being made up by Dr. Delafield. Evidently part of the money for running expenses was obtained for a time by Dr. Delafield from student fees. The work started with rather meagerly attended voluntary classes in normal histology. Before long, the number of students began to increase. In the meantime, Prudden assisted Dr. Delafield in autopsies at the Roosevelt Hospital and became a skilled and careful pathological anatomist. Dr. Prudden himself describes the first laboratory as follows: "It was a narrow store on the ground floor, on Fourth Avenue, with a scanty strip of sky just visible through an iron grating, and with scarcely a feature adapting it to the needs of a microscopic laboratory, save that its walls kept out the wind and rain. An ice-cream store on one side and a harness shop on the other; the clatter of wagons and horse-cars and pedestrians sweeping endlessly along the street in front; the small boy peering curiously between the iron bars of the windows at the strange performances within, linked science to the busy world in a fashion truly cosmopolitan. The great brewery wagons rumbling heavily along the pavement set every microscope a-tremble; and the frequency with which microscopic observation must for this reason be suspended, while a severe strain upon the temper of the devotee to science, often left him free to muse upon the important rôle which beer plays in modern metropolitan life."⁸

Before long, Professor Arnold's prophecy began to come true. The curriculum was extended, more laboratory work was required, a stimulating atmosphere prevailed, and the lean years came to an end when the college moved into the new building on West 59th Street with a splendid, in fact long unequalled, group of laboratories. Prudden continued as first assistant and direc-

⁸ Pathology and the department of pathology. Columbia University Bulletin, No. 19, 1898 (103-119).

tor of the laboratories from 1872 to 1892. He gradually attached to his laboratory a growing group of enthusiastic workers in whom developed the spirit of research and teaching. In addition to their academic duties, some of the assistants acted as pathologists to hospitals, dispensaries and physicians, the compensation for this service being specimens for teaching. During these years, Prudden took an efficient and tactful part in the administrative affairs of the institution. When the college at last became in fact a part of Columbia University in 1892, a department of pathology was created of which he was professor until he retired as emeritus in 1909.

From the beginning of his directorship, normal histology was associated with pathology, largely for convenience in administration. For two or three years after coming to New York, Prudden seems to have taught normal histology at Yale also. It consequently is not strange then that his first publication in New York should be "Notes on the Course in Normal Histology," which in two years were expanded into his "Manual of Practical Histology," five editions of which were issued, the last, revised by his assistant, G. C. Freeborn, in 1893. Soon articles began to appear on results of experiments on cells, on observations on a wide range of topics in pathological anatomy, and on the tubercle bacillus and other bacteriological subjects. At this time there was no textbook in English that could be said to do justice to pathological anatomy as studied and taught especially in Germany. Even before his return from Europe, Prudden considered translating a small book by Perls, but he was unable to obtain an American publisher. The need in question was filled by the publication in 1885 of a second edition called "Hand-book of Pathological Anatomy and Histology," by Delafield and himself, of Delafield's "Hand-book of Post-mortem Examination and Morbid Anatomy" (1872). A new edition was called for in less than one year. This book still holds its place as a standard text. The subsequent editions all were revised with special care and each was more complete and comprehensive than its predecessors. The number of illustrations, most of them drawn by Prudden himself, increased regularly. With the sixth edition in 1901, the main title was changed to a "Textbook of Pathology, etc." Dr. Delafield now

no longer shared actively in the revisions. In the preface to this edition it is stated that it has seemed wise now to dwell on the relationships of pathology to the allied phases of biological science and "to view pathology as one aspect of the diverse manifestations of life and of energy, rather than as belonging to a special and exclusively human domain." The eleventh edition (1919) was revised by Francis Carter Wood, one of Prudden's pupils. The twelfth edition appeared in 1922, the thirteenth in 1925 and the fourteenth in 1927. The success of the book rests on the clear and precise grasp of the principles as well as the practical details of pathology and on the polished and lucid language.

The epochal work of Pasteur and Koch in microbiology met with a quick response from Prudden, who promptly grasped the significant part the new science would play in medicine, and as soon as the announcements of the discoveries in infectious diseases began to stir the medical world, he partitioned off for bacteriology a small corner of his dark and crowded laboratory, "with second-hand glass sashes—the wreckage of a livery stable." "So small was this apartment, that the worker standing at his table with its twilight illumination, could touch the walls in all directions, while at frequent intervals he must beat a hasty retreat for a breath of fresh air." This was one of the earliest bacteriological laboratories in this country.

Koch reported the discovery of the tubercle bacillus, March 24, 1882, and in 1883 Prudden published two articles on its demonstration in tuberculous lesions. He soon planned to return to Germany to work if possible with Koch. To this end he enlisted the good offices of his teacher, Professor Arnold, who sent a note from Koch in which he says that "at the moment it is not possible to accede to the request of Dr. Prudden, as the few available places at Gesundheitsamt have already been assigned for some time ahead." Koch adds: "The Hygienic Laboratory will be open within the next few months and I expect to give a bacteriological course there." Arnold suggested a preliminary course with Hueppe in Wiesbaden or Frobenius in Munich. Prudden's desire to work under Koch was realized; in May, 1885, he was requested by the Connecticut Board of Health to make a report on the application to health

work of recent developments in bacteriology, and accordingly he spent two months in Koch's and Hueppe's laboratories. In his report of the course he followed in Koch's laboratory, he gives his impressions of Koch himself: "—the calm, judicial mind of Dr. Koch—the master worker in his field—his marvellous skill and patience as an experimenter, his wide range of knowledge and his modest, unassuming presentation of his views, are all calculated to inspire confidence in the results of his own work, to stimulate his students to personal exertion in this field, and to lend certainty to the already widespread hope that ere long through the resources of science we shall be able to cope successfully with those most terrible and fatal enemies of the human race—the acute infectious diseases."⁹ In his report he urges the appointment of a bacteriologist by the board and the establishment of a laboratory for examination of water, milk, food, and for research, on a plan similar to that of agricultural experiment stations, and he suggests that possibly the laboratory might be connected with some existing institution like a medical school. The purpose of the laboratory was to serve as a center of control and research. This surely is one of the earliest definite plans for a bacteriological laboratory in connection with a board of health.

In the same year of 1885, Timothy Matlack Cheesman began to give instruction in bacteriology in Prudden's laboratory, and as stated, research was begun even earlier. Prudden was the main instrument through which the new knowledge of bacteria was brought into New York. He made this knowledge practically potent through his influence with the city health officials, particularly, Herman M. Biggs, his report to the Connecticut board and by a well-planned newspaper correspondence carried out anonymously over many years, as well as by his researches and instructive popular writings on the relations of water and ice supplies and dust to health and disease. His booklets, "The Story of the Bacteria" (three editions), "Dust and Its Dangers" (two editions), "Drinking-water and Ice Supplies and their

⁹ On Koch's method of studying the bacteria, particularly those causing Asiatic cholera. Eighth Annual Report of the State Board of Health of the State of Connecticut for the year ending Nov. 1, 1885. 1886 (213-230).

Relations to Health and Disease" (two editions), carried welcome and timely information to a much wider circle of readers than merely the medical group. Their style is simple and delightful, they were read eagerly, and served effectively in spreading the knowledge on which public health, hygiene, and the modern diagnosis and treatment of infectious diseases are based. Particular mention must be made of his work on the bacteriology of ice because of its importance as the pioneer groundwork that insures the supply of sanitary ice. He made extensive studies of the bacteriology of ice and demonstrated the necessity of the control of ice fields and of artificial ice, thus contributing largely to the solution of the ice problem.

It was no accident that led the department of health of New York City to become one of the first to apply bacteriological teachings to practical public health work. The report by Prudden, Biggs and Loomis, pathologists, to the board, on the nature and mode of spread of infection in tuberculosis, and the memorandum of its acceptance in 1889, constitute a landmark and a point of departure in the campaign against tuberculosis. The report, recently reprinted because of its historical importance,¹⁰ is a brief and comprehensive statement of principles then new, the crucial point being that "tuberculosis can be prevented—it is not directly inherited and is contagious." Of this report, 10,000 copies were distributed. In 1892, Herman Biggs, whom Prudden characterized as "wise in counsel, ready in service, a good comrade," became director of the newly organized diagnostic laboratory of the health department of New York City, one of the earliest of this new kind of laboratory.

In the meantime, more and more attention was devoted to bacteriology by Prudden and his co-workers. Important details in various infectious diseases were worked out. With his assistant, Eugene Hodenpyl, the genesis of the lesions of tuberculosis was studied extensively, and they were able to show that the tissue may react to the presence of dead tubercle bacilli by forming typical tubercles. Prudden further demonstrated that cavities may develop in the lungs of rabbits by injecting tubercle bacilli through the trachea into the lungs, where they would set up a caseous bronchopneumonia, and then injecting streptococci

¹⁰ Health News, 17, 1922 (8,9).

later. He produced malignant endocarditis experimentally and studied bacteriologically the etiology of pleuritis and influenzal pneumonia.

Soon after the announcement of the discovery of the bacillus of diphtheria, Prudden in 1889 published the results of a careful bacteriologic study of 24 asylum and hospital children with throat infections resembling diphtheria. Only streptococci were found and those in such numbers that he regarded them as the causative factor in the group of cases he had studied. Subsequently it was found that these cases taken as a series should not have been regarded as typical instances of primary diphtheria, but rather as a mixed group of membranous throat infections secondary to measles, scarlet fever and other diseases. The momentary confusion in regard to the causative rôle of the bacillus of diphtheria that resulted from Prudden's report was dispelled completely two years later when he published the results of further studies of diphtheria that led him to the conclusion that the name diphtheria should be applied exclusively "to that acute infectious disease, usually associated with a pseudomembranous inflammation of the mucous membrane, which is primarily caused by the bacillus called *Bacillus diphtheriæ* by Löffler." In the meantime he had found, with his lifelong friend, W. P. Northrup, that in seventeen children dying from diphtheria complicated with pneumonia, streptococci were present in the lungs of all save one. The results of this work on diphtheria served to make clear the dangerous rôle of streptococci as secondary invaders. Prudden also dipped into immunology and was one of the first to study the germicidal action of serum.

During all these years, hundreds of medical students later going into the various lines of medical service, came under the immediate influence of his high ideals of life and scholarship. Dr. E. O. Jordan, professor in the University of Chicago, writes: "I spent the month of October, 1888, in Dr. Prudden's laboratory. Dr. T. M. Cheesman and Dr. G. C. Freeborn were assistants at the time. Dr. Prudden's energetic, genial personality dominated the whole place. Although my knowledge of bacteriology was exceedingly rudimentary, he gave freely of his time and advice. He told me briefly what to do, then turned

me loose and after a few days, probably once a week, discussed results. It was a very stimulating and fruitful experience, and I have profited all my life from even that brief contact." One of Prudden's assistants writes: "As a teacher he was an inspiration to the keen and serious student and a sarcastic enigma to the dullard. In his lectures, which were charmingly delivered, he probably at times addressed the upper half of the class. He was very clear in the exposition of essentials. He took keen delight in the fine points of demonstrations, and this attitude was communicated to the students. . . . As a medical educator he was for many years the main factor in the development of the College of Physicians and Surgeons, acting through James W. McLane (the dean). For a long time these two had weekly and even daily conferences." Besides instruction of medical students in normal histology, bacteriology and pathology, the department offered facilities for advanced work, particularly to physicians and candidates for higher degrees. In 1898, Prudden wrote that the number of advanced workers each year was about twenty. At that time a special library was supported by the workers in the department, and about seventy-five periodicals were received regularly. From 1890, volumes of reprints of the most important articles published from Prudden's laboratory were issued under the title of "Studies from the Pathological Laboratory (since 1893, Department of Pathology) of the College of Physicians and Surgeons."* At the time of Prudden's retirement, eleven substantial volumes had

* The following lists which are not claimed to be complete, contain the names of assistants in Dr. Prudden's laboratory—Bacteriology: Timothy M. Cheesman, Harrison G. Dyar, Rowland G. Freeman, Philip Hanson Hiss, Clinton B. Knapp, Charles Norris; histology: James Ewing, George C. Freeborn, Edw. M. Kitchell, Ira T. Van Gilson; pathology: Frederick K. Bailey, John H. Borden, Hughes Dayton, John S. Ely, James Ewing, Eugene Hovenpyl, D. S. D. Jessup, John H. Larkin, Augustus J. Lartigau, Charles Norris, Wm. Hallock Park, Augustus Wadsworth, Francis Carter Wood; photography: Edw. Leaming.

This list gives the names of the volunteer workers represented by articles in Studies I-XI: James P. Atkinson, Pierce Bailey, William H. Baker, William H. Bates, David Bovaird, John W. Brannan, William C. Clark, Edw. B. Coburn, R. Denig, Charles N. Dowd, Haven Emerson, Elmer W. Firth, Charles B. Fitzpatrick, Robert T. Frank, Henry Heiman, Henry A. Higley, Luther Emmet Holt, Smith Ely Jelliffe, Arnold Knapp, Gustav Langman, Isaac Levin, Samuel J. Meltzer, Alexis V. Mashchowitz, Matthias Nicoll, Charles C. Ransom, Frederick F. Russell (U. S. Army), Thomas C. Southworth, William J. Stone, R. W. Taylor.

appeared—an impressive record. He watched over the work in his laboratory with extreme faithfulness and subjected the reports and papers of his associates to the high literary and scientific standards that he applied religiously to his own productions.

But Prudden was not only a leading pioneer teacher and worker in pathology and bacteriology—his articles and books on American archeology reveal him as one of the elect in that science also. Many summers he spent in travel, chiefly in the southwestern parts of the United States. A disinclination to mingle with people generally has been mentioned as one reason for spending his vacations as he did. He hunted fossils with O. C. Marsh in Nebraska one summer, and for eight summers he wandered with pack train over Colorado, Utah, Arizona and New Mexico locating prehistoric ruins. It is doubtful if any one else ever explored so thoroughly the difficult region of the arid plateaus of the San Juan country. He brought back maps of the canyon systems, notes on the climate, and descriptions and photographs of the hundreds of ruined pueblos and cliff houses that he found. His interest lay in the fundamental problems of culture growth. The early basket-making culture was first described by him. His article on the prehistoric ruins of the San Juan watersheds (1903), is said to be a model report with a most valuable map and especially important because it includes his identification of the old "unit-type" of pueblo structure, and thus lays the foundation for all subsequent research on the developmental side of southwestern civilization. This discovery led him to excavate a number of villages. He gives a vivid and delightful account of the southwestern and desert travel in his "The Great American Plateau." His kindness endeared him to all with whom he came in contact; to be known as a friend of his was the best credential on the Navajo Reservation. In later years, when ill health kept him from his beloved San Juan country, he generously and quietly, as was his wont, contributed to funds for expeditions, and gave advice and friendly criticism of great help to the younger men entering the field of southwestern archeology.¹¹

¹¹ The statements about Prudden's work as archeologist are gathered from *American Anthropologist*, 1925, 27, p. 149.

His very valuable collection of pottery was presented to Yale University, and models of the early cave dwellings are in the American Museum of Natural History. Of his writing and of his kindly relations with the Indians, a good example is the introduction of his address to the graduating class of Yale Medical School, June 25, 1895:

"I wandered last summer over that marvelous land of sunshine in our great Southwest where still fast dwindling groups of the real Americans cherish quaint customs, and linger among the superstitions of vanished centuries. And Fortune made me for a time a guest in a small tribe of these Indians, as yet almost untouched by the blighting finger of what to us is civilization.

"I was drawn to them in this way: There came to our camp upon the plains, one evening, a woebegone dark fellow of this tribe, who with his squaw had wandered away from his comrades, seeking a quiet place to die. He was wan and feeble. A demon, he told us, had long since gained entrance to his body and had tortured him with pain and cold and fire. All the art of his tribal medicine men had failed to free him from the intruder, and a little while before, some spirit had begun to whisper to him in his sleep, he said, that he must go into the dark. All this was gathered from lip and gesture and pantomime as he lingered with us, loath to relinquish at the last scant comfort of human companionship.

"In the light of the lore which had been imparted to me many years ago by my medical teachers here at Yale, I reckoned him the victim of malaria; and shortly, in fact, quinine had cured him. The demon was exorcised, the spirit ceased to whimper, the sun was again his friend, and the winds began anew to breathe to him their wonted biddings to the chase. The grateful soul, now eager to be away, was urgent that I should visit his people, for he was fain to celebrate the facility of the white medicine man who could banish evil spirits without rattle, dance or chant. And so I went. Eighty miles across the desert from any settlement, down at the bottom of a rock-walled chasm which leads into the Grand Canon of the Colorado, and whose sides tower sheer half a mile, these brown-painted folks have lived alone and almost forgotten since long before the Spanish pioneers came hither for God and gold some centuries ago.

“At the time of my visit several persons in the tribe were ill, and a celebrated medicine man had been summoned from afar in council over the stricken ones. . . . After long and repeated conferences, my dark medical brothers consented to lay aside cherished forms of professional etiquette and permitted me to take a place in the grave circle which at midnight crouched about a small fire built in the open, near which lay, half naked, the group of patients. One of these was clearly the prey of consumption; one was shivering with malarial poisoning; one was a croupy child; one I judged to have partaken unwisely and too much of spoiled jerked meat; and one was the victim of old age. I have not time to picture for you, as I should like to do, the weird scene which was enacted there from midnight until dawn, night after night. A low rhythmic chant rising and falling to the time of a rattled gourd; slow passes of the hands over the prostrate bodies, which now and again were blown upon from the pursed lips of the painted Aesculapius, who now crouched crooning beside his charges, now danced furiously about them, while at frequent intervals wild yells from the attending circle woke hideous echoes from the cliffs. I will not dwell upon the sequels of this adventure, but remind you only that the conceptions of disease which these people foster, and the practices which they adopt to free the body from what is to them a definite possession by some evil thing, are essentially those which were prevalent ages ago, and whose significance we glean so toilsomely today out of the misty and broken records of the past.”

Prudden was one of the advisors consulted in regard to the founding of the Rockefeller Institute for Medical Research, and became an original member of its scientific board. He was first vice-president of the board and first chairman of its executive committee, holding these offices until he died. He refused to become president of the board, although he was urged repeatedly to accept the office. His services to the Institute are stated to have been invaluable. He served also on the International Health Board and on the Public Health Council of the State of New York. In 1897 he received the honor of the degree of LL. D. from Yale. Prudden became a member of

the Academy in 1901. He was an honorary member of the Connecticut State Medical Society. He was averse to joining more societies than compelled to by necessity and had no hankering for honors. He served as president of both the New York Pathological Society and the Practitioners' Society of New York, and was a member of the Association of American Physicians, the New York Academy of Medicine, the American Association of Pathologists and Bacteriologists, and the Society of American Bacteriologists. His avocational interests are illustrated by his memberships in the American Anthropological Association, the American Ethnological Association, the Archæological Institute of America, the New York Historical Society, the Sequora League, and the American Folk-Lore Society.

Soon after graduation he withdrew from the Congregational Church and he did not ally himself with any church again. There was no antireligious element in this action; he simply did not wish to be obliged to subscribe to matters of which he was not quite sure.

Dr. Prudden was not married. Always a most agreeable host, he curtailed his social contacts to save his strength for his work and seldom accepted even the most alluring invitations. He was a member of the University Club, the Century Club, and the New York Athletic Club. Dr. James Ewing, pupil and assistant, writes: "Dr. T. Mitchell Prudden was a gentleman of distinction in personal habits, social relations and intellectual pursuits. He was of tall, slim build and walked with a lively, rapid step. His apparel was plain and well chosen. He lived in a spacious apartment, overlooking Central Park, presenting an urban view that in beauty and attractiveness could hardly be equalled in any other city. His tastes were esthetic in all respects, and his desires moderate and fully controlled. He had comparatively few intimate friends and was not easy at first to approach, but he was intensely loyal to the chosen few. . . . He had no questionable habits and nothing could distract him from his work. His conversation was couched always in refined, moderate language. He chose all his words carefully and was a most careful student of language, making fine distinctions in the use of words, a habit which translated itself into fine distinctions in judgment and action. He recog-

nized shortcomings in the medical profession, discussing them quietly and with regret rather than asperity. Overexertion and overindulgence of every type he spared himself, but he seemed never to waste a moment. . . . Instinctively retiring, he preferred to keep in the background." But that Prudden was not afraid on occasion to stand squarely athwart the current is illustrated by his defense of the quarantine administration of Dr. Alvah H. Doty, whose displacement "under cover of a mock investigation and a prodigious defamatory hullabaloo" he condemned fiercely. He recognized fully the importance of the legal applications of medical knowledge and urged the promotion of medicolegal science. In his earlier years he occasionally served as expert, but he found it impossible to continue such work.

Prudden retired from his professorship in 1909, but continued to take an active interest in medical research and public health work until the last. In his later years he was in poor health, but he bore illness and disability with remarkable equanimity and wrote in charming fashion for general readers on tuberculosis and its prevention, on yellow fever, on the new outlook in the conquest of disease through chemotherapy, and other topics. He also paid earnest and impressive tribute to the life-work of his friends and associates, Herman M. Biggs and Luther Emmett Holt. He went to the Rockefeller Institute daily. Tuesday morning, April 8, 1924, he attended a meeting of the Public Health Council of the State of New York and the next morning he was at the Rockefeller Institute, intellectually alert and active as ever. That night he died of coronary thrombosis.

Prudden's initial and personal equipment appears to have been the essential stimulus that directed his life. Ambition for service in science manifested itself early. He looked on the facts with level eyes, indulged not in loose speculation, and loved the lucid honesty of the scholar. Apparently austere, he had a heart of rare warmth and richness. The forty-two years in New York were years of splendid and unostentatious service. He was a pioneer leader in pathology and bacteriology. For many years he was the central figure in the scientific medical life of New York City. In developing his department of teach-

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ing and research he revealed an exceptional administrative ability which is seen also in the success with which he served other scientific and philanthropic enterprises in their formative stages. He aided greatly indeed in the development of the health departments of both city and State to their present efficiency, and through research and writing he took a most effective part in promoting the public health movement. His archeological work was admirable. And, crowning all, he had the gift of inspiring in others zeal for high accomplishment in seeking new truths.

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