

JESSE WILLIAM LAZEAR, '92

by J. A. DEL REGATO, M.D.



Reprinted from

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COLUMBIA UNIVERSITY COLLEGE OF PHYSICIANS & SURGEONS

Vol. XVI, No. 4, pp. 10-17, 21, Fall, 1971

COVER

Oil Sketch (never achieved) by Dean Cornwall. Commissioned by Wyeth Inc.

Historical scene in patio of Dr. Carlos Finlay's home (August 1, 1900). U.S. Army Board members (left to right): Lazear, Carroll, Reed and Agramonte. Dr. Finlay with soap dish in hand containing eggs of mosquito. Next to him, a witness, Dr. Diaz-Albertini, a clinician of Havana. Courtesy of Hench Yellow Fever Collection, University of Virginia Library.

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Omnibus has literas perlecturis

SALUTEM.

Collegii Medicorum et Chirurgorum in Urbe Nova Eboraco

COLLEGII COLUMBIAE

Presides atque Secretarios hoc scripto testimonio volumus

Jesse Guilielmum Lazear, A.B.

post tempus institutum. Medicinam studio diligentissimo impensam. Prælectionesque eruditissimas in Collegio Medicorum et Chirurgorum Professorum assidue auditis, prohibitione habita scientia sua in. Medicinæ arti luculentis testimoniis dedisse. Quapropter ad quædam summum admissus atque secundum legem

Doctor in Medicina

constitutus atque ordinatus est. In cuius rei memoriam solum Præsulum Chirographis atque amborum Collegiorum sigillis hæc Diploma munimentum curavimus.

Novi Eboraci

Anno Domini MDCCCXCII. Mensis Junii Die Octavo.

Inter Losos, L.L.D. et alios Secretarios James W. de Lane M.D. et alios Medici

James W. de Lane, M.D. Chir. Prof.

C. V. Chandler M.D. Chir. Prof.

John G. Curtis, M.D. Physiol. Prof.

George M. Tucke, M.D. Hyg. Prof.

George L. Peabody, M.D. Mac. Med. et Therap. Prof.

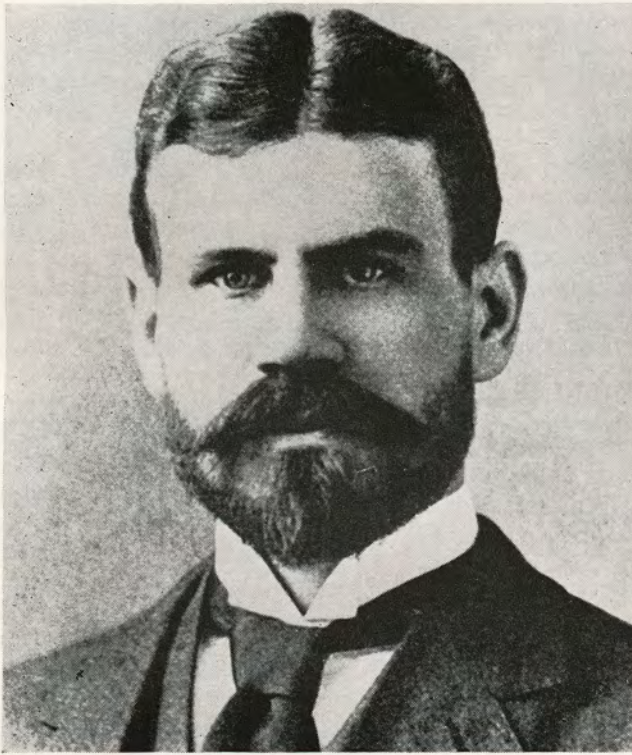
Charles H. DeLong, M.D. Primus Prof.

Edward L. Partridge, M.D. Obstet. Prof. Adj.

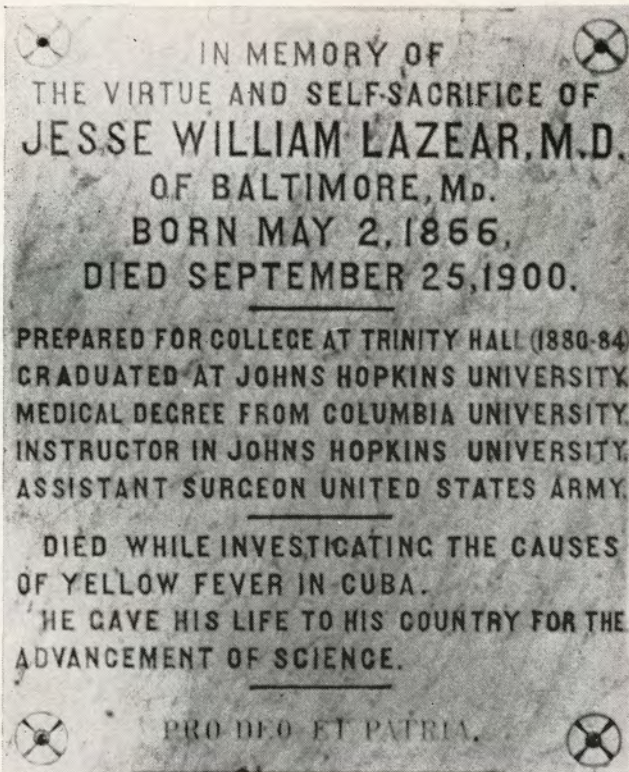
M. Allen, M.D. et alios Secretarios

Ernst Henslein, M.D. Anat. Prof.





Jesse W. Lazear, M.D. as he appeared around 1899.



Memorial Plaque at Trinity Hall High School, Washington, Penn.

by J. A. del REGATO, M.D.*

*"For Lycidas is dead, dead ere his
 prime
 Young Lycidas, and hath not left his
 peer:
 Who would not sing for Lycidas? He
 knew himself to sing and build the
 lofty rhyme."*

JESSE WILLIAM LAZEAR was the eldest of three sons of William Lyon Lazear, of Waynesburg, and Charlotte Clayland Pettigrew, of Pittsburgh, Pennsylvania. He was born in Baltimore, on May 2, 1866. His earliest known ancestor, Joseph de Lazier (Lauzière?) left France in 1682 amidst the persecution of Protestant predicants (Huguenots): in the waters of the Kanawha, in West Virginia, he was scalped by Indians. On his mother's side, Lazear was the grandson of Samuel Pettigrew, seventh mayor of Pittsburgh.

As a child, Jesse spent much time at "Windsor," the estate of his retired grandfather, a placid, beautifully wooded suburban property, in west Baltimore, overlooking what once had been a mill on the Gwynn's falls. In 1881, Jesse was accepted to the Trinity Hall Academy, situated on a hill with a beautiful view of the city of Washington, Pennsylvania. In 1884, Lazear was accepted to the Washington and Jefferson College and in 1885, he was initiated in the mysteries of *Phi Kappa Psi* fraternity. In 1886, he transferred to Johns Hopkins University, where he was admitted to the sophomore year, indicating his intention of pursuing biological studies in preparation for medicine; in June, 1889, he received his A.B. diploma.

In 1889, there were in New York,

*Dr. del Regato is director of the Penrose Cancer Hospital, Colorado Springs, Colo., and professor of clinical radiology, University of Colorado. He is a member of the National Advisory Cancer Council and of the Board of Chancellors, American College of Radiology. His honors include Grand Counciller, Order of Merit of Carlos Finlay, 1955, Gold Medal, Radiological Society of North America, 1966 and Gold Medal, American College of Radiology, 1968. He is author with L. V. Ackerman of *Cancer, Diagnosis, Treatment and Prognosis*.

cobblestone streets, a profusion of shabby red-color houses, rather weak jet-gas lights, and horse-drawn street-cars trundling along West Street. The heart of the city was gay and lively, Sixth Avenue where one could note the exaggerated elegance of the prosperous sons of liberated slaves who were merchants and professionals in the vicinity. Then, as today, uncollected garbage, poverty and despair crowded each other in certain quarters. The College of Physicians and Surgeons had recently moved to new buildings on West 59th Street, close to the Sloane Maternity and Vanderbilt Clinic. Having passed the entrance examinations the students registered with a preceptor to whom they became an apprentice; Lazear chose Dr. Frank Hartley as his preceptor. The most decisive student activity was the private "quiz" for which they paid a fee separate from the university tuition.

After his first year at Columbia, Lazear and three of his classmates and close friends, *Charles Norris*, *Matthias Nicoll, Jr.* and *Thomas P. Waring* took passage to Europe; their boat spent eleven days bringing them to Scotland. On the day after their arrival in Edinburgh they registered at the University and worked in the afternoon on dissections. Lazear registered for two courses on anatomy. The professor was Sir William Turner, who came daily to every student, asked questions, explained details of comparative anatomy and displayed his masterful use of scalpel. At the Quadrangle the students uninhibitedly cheered, or hooted, their teachers as they passed; at the Opera, they sang in the gallery before the performances and between acts: Lazear found the custom charming. The courses lasted eight weeks and certificates were issued. Medals were offered to the students who answered all questions in a quiz-marathon; in the junior course they went to Lazear and to a Columbia classmate, *Arnold H. Knapp*; in the senior course, Lazear having missed one question, a medal went to another Columbia classmate, *Edward Leaming*.

On weekends, Lazear, an inveterate walker, would hike across the Mead-

ows to Holyrood Palace, and on to Salisbury Crags, or across the heather covered Pentland Hills; he repeatedly climbed to the top of Arthur's Seat to admire the landscape. These were also his hours of introspection and often his thoughts went to his lonely mother, in far-off Pennsylvania; he carefully picked a bloom of heather, an ivy leaf, or a rare thistle, and solicitously made them the messenger of his tenderness as he sent them to her.

The Columbia students spent a fortnight in London, and another in Paris, in an ambitious, painstaking effort to enlarge their cultural vistas; Norris and Lazear proceeded to Basel to start a remarkable trek, along the broad valley of the Rhine, to the university cities of Freiburg and Heidelberg. The German scenery reminded Lazear of Millet's paintings; they were fascinated by the humble German people: admiring the beautiful villas along the shores of the Rhine, they walked as much as 100 miles in three days; they finished by train and sailed for New York.

Having passed his final examinations, Lazear received his diploma of Doctor of Medicine, on June 8th 1892, at the 138th Annual Commencement of Columbia College held at the Music Hall, on 57th Street and 7th Avenue. Lazear passed the competitive examination for Bellevue Hospital and became junior assistant in the Department of Medicine; upon completion of this third semester he became one of the 120 active members of the Society of Alumni of Bellevue Hospital.

Pasteur's discovery that microorganisms caused "diseases" of silk worm (1865), led to his suggestion that other specific microorganisms could cause diseases in man. Koch's isolation of the anthrax bacillus (1876) initiated the search for other agents and his postulates became invaluable in the establishment of pathogens. The development of *pure cultures*, the improvement of *staining methods* and the introduction of *animal experimentation*, brought about better understanding of infectious diseases. Pasteur's discovery of *produced* immuni-

ty, and his incredibly fast development of attenuating methods, enlarged the possible measures of prevention. The importance of laboratory methods in medical investigation opened a new era in medical bacteriology. In the last decades of the 19th century American scientists were travelling to Europe and inviting their students to do likewise.

Lazear decided to pursue his interest in microbiology. His widowed mother had given him financial and emotional sustenance throughout his studies; now he wanted to make her his companion in a trip abroad: it was to be a happy and eventful year for both. On October, 1894, they left New York for Hamburg; they proceeded to Berlin and eventually settled at Frau Dr. Luddes', at 27, Jaegerstrasse.

American visitors enjoyed the friendly hospitality and teaching of August von Wassermann, Koch's assistant and successor at the Kaiserliches Gesundheitsamt. Lazear and his mother enjoyed themselves immensely; their gourmet taste for music permitted them to enjoy the gamut of composers with equal gusto: Wagner, Beethoven, Handel, Verdi, Strauss, Liszt.

Lazear worked at the Kaiserliches institution until March, 1895, then he made a fateful visit to Munich where he met Mabel Houston, of San Francisco. Mabel was an attractive young lady with expressive large eyes and blondish hair; she was a beautiful listener and had an intriguing introspective appearance. Lazear was a conservatively elegant young fellow who sported a mustache and a well trimmed van Dyke; he was courteous and gay; only his eyes betrayed his inner intensity. They made a wonderful pair. They went to Venice where Mabel and Jesse rode on a gondola, at twilight; in Florence, they walked in the rain for two hours: children walk in the rain for innocent joy; lonely adults do so in frustration against adversity; lovers walk in the rain in symbolic communion of their resolve to face life's vicissitudes together. After a visit to Rome, the travelers met again in Lucerne. Miss Houston returned to England while the Lazears went to Paris.



Mrs. Mabel Houston Lazear with son William Houston Lazear and daughter Margaret Lazear, now Mrs. W. R. Briggs, through whose courtesy the family portrait (above) and the picture of Dr. Lazear and colleagues (below), are reproduced here.



The Jesse W. Lazear Chemistry Hall at Washington and Jefferson College, Washington, Penn.

Dr. Lazear with two unidentified friends.



Congressional Medal of Honor awarded posthumously to Dr. Lazear in 1929.

From May to July, 1895, Lazear attended a course on Microbiological Technique, offered at the Institut Pasteur, by Professors E. Roux and E. Metchnikoff. Thirty advanced registrants filled the course; thirty additional foreign microbiologists were accommodated as auditors of the course; it consisted of lectures, laboratory observations and clinical demonstrations at the Hôtel Dieu. His professional endeavors completed, Lazear and his mother visited Mrs. Martha P. Houston and her daughters in England; they all joined in a visit to Canterbury. The Lazears and the Houstons liked and admired each other. Before leaving London, Lazear wrote to Mabel, in Winchelsea. He explained his devotion to research, and the fact that he had accepted a position at Johns Hopkins, thus he was committed to make his home in Baltimore; he gave the name of those with whom he was to be associated: Osler, Welch, Kelly, Flexner.

"There is no such a group of men anywhere in the world. This is a great privilege to be able to work with such men. . . . I hope you understand how much I am devoted to this work."

The Johns Hopkins Medical School had opened doors in 1893; the strong personalities of Osler, Welch, Halstead, were being supported by junior staff. In October, 1895, the Board of Trustees approved the appointments of Lazear as instructor in Clinical Microscopy and of Harvey W. Cushing as instructor in Surgery. Lazear was the first man to be put in charge of clinical laboratories at Hopkins. He taught undergraduates and, in addition, with Thomas B. Fletcher, organized a post-graduate course on Clinical Microscopy which was very well attended.

After his first academic year of work Lazear visited the Houstons at 2232 Broadway, in San Francisco; he found their home elegant, their table "comfortable and well served." Mabel showed him her charming city; then the Houstons and their guest went 125 miles north by train and stage coach, to the Lierly Ranch, in the mountains, near Potter's Valley. For six weeks they lived the rugged life of tents and

spent their time trout fishing, deer hunting. In a contrasting setting, Lazear again saw a great deal of Mabel which was "the main thing desired"; a good woodswoman, climbing well in her short skirts and leggings, she proved to be more congenial than he had expected. As the time for parting came close Mabel and Jesse decided to get married; they were wedded at the Episcopal Church, in San Francisco, on September 8, 1896: he was 30 years old and she was 22. They proceeded directly to Baltimore and after a round of dinners at the Osler's and others of the Hopkins' staff, they started their first home at 127 Lanvalle Street, West.

Lazear did pioneer bacteriological work of note. In 1897, Dr. William S. Thayer reported a first case of gonorrhoea endocarditis and septicemia; the blood cultures and other bacteriological work on which the report was based was done by Lazear. In 1898, Fletcher reported Lazear's method of staining malarial parasites using thionin instead of methylene blue or toluidine. A paper written by Lazear and co-authored by Thayer, on a second case of gonococcal endocarditis and septicemia was published in 1899. He also prepared and delivered for publication, a paper on the plague, of which we have found no trace. Lazear wrote a detailed paper on the parasites of malarial fevers which was accepted for the Annual Meeting of the AMA, in June, 1900.

Dr. William S. Thayer, his senior associate, said of Lazear:

"Quiet, retiring and modest, almost to a fault, he was yet essentially a manly man with a good vigorous temper, well controlled and rare physical courage. He was one who made his own plans and worked out his own problems; with a deep love of his profession and an ardent desire to make adequate contributions to its advance. He always seemed to me a man of promise . . ."

Lazear sought to establish a private practice outside Hopkins: he moved to 835 Park Avenue, where his office and home were located. On February 5th, 1899, the Lazears were enriched by their first born, William Houston; that year's summer they went to North

Hatley, near Sherbrook, a beautiful resort, on the lake Massawippi. They played tennis and were charter members of the Hatley Golf Club. They watched the annual regattas; at night, the lake's quiet waters were only broken by the paddling of romantic canoeing under the stars.

In the beginning of the year 1900, Lazear applied for service in the U.S. Army in order to study tropical diseases, in Cuba. He wrote to the Surgeon General and forwarded a letter of introduction:

"My Dear General Sternberg:

. . . I desire to endorse most cordially Dr. Lazear's eminent fitness for this position . . . he has already distinguished himself by valuable scientific work . . . and is an expert in clinical microscopy. . . . He is now engaged in original studies on the malarial parasite which have yielded interesting results. He is a clinical man, a bacteriologist and withal a gentleman of cultivation and agreeable personality . . .

William H. Welch"

Lazear was rapidly offered a contract as Acting Assistant Surgeon, in charge of the Laboratories of Camp Columbia, Marianao, Cuba. From Tampa he embarked for Cuba with his wife, son and maid. On February 10, 1900, their ship brought them into Havana harbor where the flag was dipped as they passed by the bare iron ribs of the *Maine*. They were surprised to find Havana a most beautiful city, with numerous fine gardens, entirely unlike anything they had seen before. He reported for duty at the Columbia Barracks and found his laboratory very well equipped. They were given a cottage and took their meals at the officers mess hall.

In the middle of April, Mabel, her son Houston, and the maid returned in the S.S. Sedwick, before the yellow fever quarantine was established. After a visit to Baltimore, Mabel proceeded to Annisquam, to await her time to enter the hospital, for delivery, in Boston.

Giuseppe Sanarelli had claimed to have found a bacillus which caused yellow fever. Wasdin and Geddings, working in Havana for the U.S. Ma-

rine Service, had reported their agreement. Sternberg was convinced of their error and decided to gather a committee of bacteriologists to verify this point. He had the War Department approve the appointment of a U.S. Army Board "for the study of infectious diseases prevailing in the island". Major Walter Reed was appointed chairman. Reed was a career military physician and bacteriologist of the U.S. Army Medical School. He was tall and slender; his soldiery bearing and manner were noted and admired by his colleagues. Dr. Lazear was unquestionably the most experienced bacteriologist already on the grounds. Dr. Aristides Agramonte, an 1892 P&S graduate, was a tall, handsome and energetic Cuban, raised and educated in Manhattan; he had been a bacteriologist of the New York City Health Department before he joined the Army as a contract surgeon. Agramonte was already in charge of the laboratories at the Military Hospital Number One, at Príncipe Hill, in Havana. James Carroll, lanky, bald-headed, fastidious and rather taciturn, was the fourth member of the Board; he was a contract surgeon working under Reed.

The Board members first assembled on the veranda of the officers quarters, at Columbia Barracks, on the afternoon of Monday, June 25, 1900. Reed presented their letter of instructions; it was decided to proceed with blood cultures from patients and cadavers to verify, or rather disprove, the work of Wasdin and Geddings. On the evening of that same day Lazear had a fateful conversation with Dr. H. R. Carter of the U.S. Marine Hospital Service. In Mississippi, Carter had observed that an interval of 14 to 20 days lapsed between the first and second case of yellow fever on a previously unaffected house; this interval he had called the *extrinsic incubation period*. The next day Carter sent Lazear a reprint of his paper with a handwritten note:

"... the a priori argument of Dr.

F's theory has much in its favor and to me is more than plausible."

Dr. J. Carlos Finlay was born in Cuba, was educated in France and had graduated from Jefferson Medical College, in 1853; Finlay had a life-

time of dedication to research on yellow fever. In 1881, he had presented, to the International Sanitary Conference, in Washington, his view that the disease was not transmitted by contact but by means of an intermediary. Having studied the numerous varieties of Cuban mosquitoes, he had identified the culprit, collected and hatched its eggs, observed its habits. Finlay had inoculated non-immunes and produced non-fatal cases of yellow fever. He had reported the details of his experiments, including observations of controls, to the Academy of Medicine of Havana; an English version of his communication had been published by Rudolph Matas, in the United States, in 1882. He had continued his experimental inoculations on volunteers to a total of 104 cases, and had written 45 papers on various aspects of his work, mostly for medical journals in the U.S. and England. In 1894, at the 8th World Congress of Hygiene and Demography, Finlay had presented

the preventive measures to take: isolation of patients, fumigation of houses and destruction of mosquitoes. Despite his patient efforts no one cared enough to verify his work.

The heavy rains of May, in Havana, brought an epidemic of yellow fever in June and July, 1900. Troops at Quemados were heavily hit. Major J. R. Kean, Chief Surgeon, was among the victims; Reed visited him: it was the first case of yellow fever he had ever seen. Lazear was kept very busy doing blood cultures; Agramonte was doing a number of autopsies. Reed and Carroll were absorbed by their interest in the bacillus icteroides; their passionate concern with this controversy precluded their attention to other aspects of their plan. Lazear complained, in letters to his wife:

"Dr. Reed has been in the old discussion over Sanarelli's bacillus and he still works on the subject . . . Reed and Carroll . . . are interested in the controversy with

Page in Lazear's laboratory, courtesy of the New York Academy of Medicine.

37.

King

Mosquitoes caught in the room 70 Gen. Lee St. Quemados May 25, 1900.

May 25. Mosquito No 1. Killed. Examined legs and body. One black spot on coxae. Rather large mosquito. Stomach full. Cuticle yellowish with coarse granules on its back.

Many fat like granules in stomach. Head and thorax brown. Coxae yellowish with granules which look like those seen before.

May 26 Mosquito No 2. Killed. Stomach well-developed in factoring it out. All coxae filled with numerous bodies resembling fatty and coarse granules except that they are so much more abundant.

May 26 Mosquito No 3. Killed. It showed some condition as No 1. Great cells and much bacilli found in which many in due to that there was a little sugar water in the test tube in which the mosquito was kept.

May 27 Mosquito No 4 died. No other results found.

Mosquito No 5 died. Walls of stomach full of coarse granules.

Mosquito No 6 died. It contained the coarse bodies described in No 2 but fewer in number.

Sanarelli and think of that all the time . . . I am not at all interested in it but want to do work which may lead to the discovery of the real organism . . . Dr. Carroll . . . is a bacteriologist pure and simple . . . He is interested in germs for their own sake and has a very narrow horizon."

Lazear kept a *laboratory logbook*, with numbered pages. In the Spring of 1900 he recorded details of history and laboratory findings on cases of malaria (pages 170 to 197); later he entered a variety of details in reference to yellow fever: patients' histories, blood counts, autopsies (pages 7 to 96). Page 37 gives details of four mosquitoes caught in the room of a yellow fever patient at Quemados May, 1900; he sacrificed them and described minute details of their autopsies. (The intermediate pages of this logbook were later used by Reed.) Other handwriting was probably from Hospital Steward John Neate. Sergeant Neate later studied medicine, served under Carroll and became pathologist of the Woman's Hospital in Washington, D.C.; he died in 1912. The logbook was offered for sale, in 1932, by a person who claimed to have retrieved it from the trash can at Howard University; another version was that it had been discarded from the U.S. Army Medical Museum: the book is now the valuable possession of the New York Academy of Medicine.

Doctors H. E. Durham and W. Myers, yellow fever researchers of the University of Liverpool, visited Havana, on their way to Parà, Brazil, in July, 1900; they conferred with Finlay, with Carter, and with members of the U.S. Army Board; their reflections, published as a *preliminary* report six weeks later, were to have unforeseen repercussions. It is likely that their discussions influenced the direction of the Board's work for, after their departure, the Board members decided to investigate Dr. Finlay's work and the mosquito as a vector of yellow fever. On August 1st, 1900, they visited Dr. Finlay at his home. He received them courteously and enthusiastically and was glad to discuss his views, to enumerate his findings and to show the various aspects of his

work and publications. Finlay presented them with eggs of *Stegomyia fasciata* (now *Aedes aegypti*), carefully kept in a porcelain soap dish; he described the manner of hatching them, the fact that only the females transmitted the disease, the need to feed the mosquitoes, the technique used to infect them; he cautioned them on the danger of the escape of an infected mosquito.

". . . the work along the lines of Dr. Finlay's theory was undertaken as a matter of course . . . and not because as a whole the Board thought any too well of it—wrote Agramonte. At the time neither Drs. Reed, Carroll, or myself believed in the said theory, the only one of us inclined to consider it favorably being my friend and classmate, Dr. Jesse W. Lazear."

The Board members agreed to use volunteer non-immunes as subjects of experimentation, including themselves, to avoid criticism. On August 2nd, Major Reed left Havana; he was to stay in Washington for the next nine weeks writing a report on typhoid fever in American camps. Lazear was the natural heir to the work on mosquitoes; he was the only member of the Board with any knowledge of them; he developed his mosquito colony and travelled daily, by daugherty wagon, to the Hospital Las Animas to have the insects bite on yellow fever patients. From August 11th to the 19th he inoculated eight volunteers, including himself, without results: an additional trial done on August 25th was also a failure. The initial enthusiasm turned to disappointment.*

The mosquitoes needed to feed on blood in order to be kept alive; this forced Lazear to have them fill on various yellow fever patients in succession. On August 27th, during lunch at the officers' mess, Lazear complained that one of his infected mosquitoes was dying of inanition. Carroll, in a spirit of jest, offered to feed it and they walked to the laboratory for the purpose. On August 31st Carroll developed a typical case of yellow fever.

*On August 23 Lazear's daughter Peggy (Mrs. Walter D. Briggs, of Berkeley, California) was born, in Boston.

"Lazear and I were almost panic-stricken—wrote Agramonte. Lazear, poor fellow, in his desire to exculpate himself . . . repeatedly mentioned the fact that he himself had been bitten two weeks before. . . ."

Lazear also kept a *pocket notebook* with details on his mosquitoes, patients bitten, day of their disease, intervals before attempted inoculations, etc. He must have observed two facts that were different in the case of Carroll: the mosquito had filled on patients who were in their first or second day of the disease, whereas the mosquitoes previously used had bitten patients in the fifth to seventh day of their clinical course; also, the mosquito that had infected Carroll had filled on four different yellow fever patients. On the same day that Carroll came down, Lazear, with some hesitation, decided to make another try on an impromptu volunteer, Pvt. William H. Dean, who had previously submitted without results; he had the same mosquito which had bitten Carroll, and three others which had filled on patients early in the course of their disease, bite the soldier: within six days he also had yellow fever.

"I rather think I am on the track of the real germ—wrote Lazear to his wife on September 8th—but nothing must be said as yet, not even a hint. I have not mentioned it to a soul."

On September 13th, Lazear recorded on the *logbook* his attempt to inoculate a guinea pig with a mosquito which had bitten four yellow fever patients. On the same day he submitted himself to the bite of an infected mosquito. On September 18, Lazear was not well, he had developed an obvious case of yellow fever; Dr. J. R. Ames saw him and he was transported by stretcher to the isolation quarters. Major William Gorgas saw him daily. Knowing that Carroll and Dean had recovered, Lazear must have expected to get well. He had planned to join his family in Beverly, Massachusetts, in October. He appeared anxious that his wife be protected from the truth and left an accidental connotation drift in: he said that he had been bitten by a stray mosquito at Las Animas Hospital. His

pocket notebook contained information which left no doubt that he had submitted to the bite of one of his own mosquitoes. On September 25th, 1900, he expired. Lazear's temperature remained high for a week before his death; in his last hours he became delirious. Despite the presence of several concerned witnesses, we have few details of his agony; he was only thirty-four years old: young men are seldom prepared to rationalize hopelessness and to wish for the end.

Returning from his vacation at Blue Ridge Summit, Pennsylvania, Walter Reed was confronted in Washington with the news of Carroll's and Lazear's cases. Sternberg advised Reed not to return to Havana but he decided to go. Reed wrote to Carroll:

"Concerning the mosquito propagation of the parasite, I am intensely interested but I cannot say that any of your cases, except perhaps Dean's, *prove* anything."

and to Major J. R. Kean:

"Just how far Carroll's and Lazear's cases go to support that supposition, I don't know, but I hope to find out. . . . I shall expect to take up my old quarters . . . provided you think that there is no probability of that being the *infected* area. . . ."

On October 4th, Walter Reed arrived in Havana. Lazear's *pocket notebook* had been found in his uniform blouse and reserved for Reed's inspection; in his quarters there were books, reprints and journals borrowed from Finlay. Reed wrote Finlay a courteous note:

"I have taken the liberty of sending my driver for the copy of the British Medical Journal containing Durham and Myers' note and for any other articles or publications of yours concerning the mosquito

and yellow fever. . . ."

In the alluded article the Liverpool scientists wrote:

"This curious and somewhat prolonged interval is suggestive of a development of the infective factor in or about some agent. . . . The suggestion propounded by Dr. C. Finlay, of Havana, some twenty years ago, that the disease was spread by means of mosquitoes hardly appears so fanciful in the light of *recent discoveries*. . . ."

a reference to the transmission of malaria by the *Anopheles* mosquito.

Habitually slow and deliberate, wrote General Truby, Reed became a whirlwind of activity. Working almost exclusively from data in Lazear's *pocket notebook*, and on explanations of Sergeant Neate, Major Reed wrote his own preliminary note. He was obviously elated as he read the paper repeatedly to his colleagues. Reed let Kean know details of Lazear's self-inoculation found in his notebook. To his wife Reed wrote:

"Dr. Lazear contracted the disease . . . by letting a mosquito bite him . . . deliberately let it get its fill of blood in order to test *our theory*."

Reed acted with haste anticipating that Durham and Myers might proceed to test what they had already discerned. After nine days in Havana he returned to New York, asked Sternberg to arrange for prompt publication of his paper, and went on to present it to the American Public Health Association, in Indianapolis, October 23, 1900, four weeks after Lazear's death. He presented their negative conclusions in reference to the bacillus icteroides, then with no other evidence than what Lazear had recorded in his notebook, he stated that the mosquito "*serves as the*

intermediate host for the parasite of yellow fever"; Lazear appeared, posthumously, as third and last co-author. The conclusions were openly opposed by Wasdin and others who argued that this experience was no more convincing than Finlay's had been.

Reed returned to Havana, obtained the necessary authority and funds, and before the year was over, with the help of Agramonte and Carroll, staged his famous control experiment with American and Spanish volunteers. In the wake of these sensational events Lazear's courageous efforts and his contribution to the verification of Finlay's work were too rapidly forgotten. His valuable *pocket notebook*, in which he had written the key to successful experimental production of yellow fever, has been lost or perhaps deliberately destroyed: presumably in Reed's possession at the time of his death, there is at present no clue as to what became of it. Pathetic loss to medical history! Considering the fate of the *laboratory log-book* one wonders how such historical evidence could have been so irresponsibly handled.

Reed said of Lazear:

". . . he won the good will and respect of his brother officers and the affection of his immediate associates . . . added one more name to that imperishable roll of honor to which none other belong than martyrs to the cause of humanity."

At Hopkins, upon the unveiling of a plaque in his honor, Osler evoked Milton's poem *Lycidas*.

"It is very sad—said Carroll—to contemplate the loss of one so true, so energetic, so gifted, so well equipped, so ambitious—and later added—The credit belongs to the Board. If it were to be given to a single individual it should go to Lazear."

Agramonte paid this beautiful and just tribute to his friend and classmate:

"The one of us who from the very inception of our work so strenuously believed in the mosquito theory in connection with the propagation of yellow fever, the one of us who was best fitted by his train-

100

Guinea pig No 1 - sent
 Sep. 13 The Guinea pig bitten today by a mosquito
 which had fed from egg laid by a mosquito
 which had bitten James - 9/6
 The mosquito bit. Tuesday 9/30
 Wednesday 10/1
 Thursday 10/4
 Friday 10/10

Last entry in laboratory made on the day Dr. Lazear was fatally stricken.

ing in the line of our investigation to successfully carry out the work, who in fact performed the first inoculation unknown to his co-workers, Jesse W. Lazear, gave up his life in the pursuit of knowledge which shall immortalize his name. May he, in the Regions of the Unknown, find the Glory that is his due, which so unjustly has been withheld by man on earth."

The medical historian who ponders the details of this epic can not but consider this hypothetical alternative: Had Lazear survived, he would have been the undisputed central figure of the control experiments, for he alone possessed the key to their success. Having offered the world their transcendental demonstration, without travesty of discovery, the U.S. Army Board, as a whole, and Major Reed, as its chairman, would have deserved everlasting credit for the rapid erasure of the flaw, which resulted from their work. Finlay's truth at last recognized, he may have received his overdue credit, without unworthy subtle adulterations. Lazear, in turn, may have received acclaim for his scientific diligence and dialectics, as well as for his immaculate heroism.

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This is the first biographical article written about Dr. Jesse W. Lazear in the seventy-one years since his poignant death. The details of the story have been painstakingly sought and scrutinized; the scarcely adorned narrative is for the most part relevant to an understanding of his rôle. The listed references are complementary authority intended for the medical historian.

It was Lazear's fate to have died under circumstances that disrobed him of his true merit and made him the subject of historical injustice. He was given praise for his heroism, but his careful preparation, his scientific devotion, his achievement, went unproclaimed; his memory, forgotten. Indeed, Lazear is deserving of a more eloquent advocate.

I would be pleased to receive your comments.

The Author