

In preparation for IMMUNOLOGY 2015™ in New Orleans, Louisiana, the history of AAI members and institutions in the state was researched for a special exhibit at the meeting. In the process, the story of Charles C. Bass's colorful career, recounted below, emerged as among those worthy of a wide audience. More information on the biomedical history of Louisiana will appear in the next AAI Newsletter.

Country Doctor, Pioneering Parasitologist, and the Father of Preventative Dentistry

Charles C. Bass, M.D. (1875–1975)

by John Emrich

Charles Cassidy Bass (AAI '16), the first member of the American Association of Immunologists (AAI) in Louisiana, began his medical career quietly as a country doctor but rose to prominence and acclaim, not only in his studies of diseases endemic to the American South but also in his pioneering post-retirement research establishing the field of preventative dentistry.

In addition to his research, Bass's renown stems from his eventful 18 years as dean of Tulane University School of Medicine. During his tenure at Tulane, Bass modernized the medical school, doing so despite resistance from the then extremely powerful populist Louisiana Governor Huey Long.

The Country Doctor

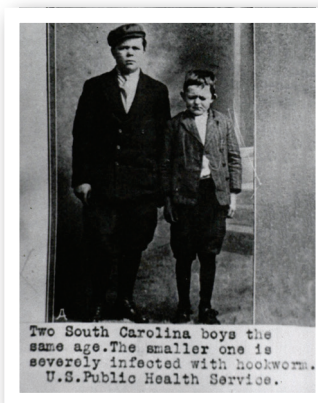
Bass was born January 29, 1875, on the family farm in Carley, Marion County, Mississippi.¹ After high school, Bass spent two years working on the farm before entering (1896) and graduating (1899) from Tulane University School of Medicine. Bass then returned to Marion County as a family physician. As the youngest of three physicians in Columbia, Mississippi, Bass had an unremarkable start to his medical



Charles C. Bass
*Images from the History of Medicine,
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career. During his first four years of practice, he was a typical country doctor, operating a small practice out of his home and regularly making house calls on horseback.² His career, however, changed dramatically when he attended a 1903 American Medical Association meeting in New Orleans.

At the meeting, Bass heard a number of lectures on hookworms. The majority of the speakers agreed on two things: a parasite was responsible for hookworm disease (also known as uncinariasis), and the disease was new to the United States. One talk in particular caught Bass's attention when the speaker argued that hookworm infections rarely, if ever, occurred in this country. Bass knew empirically that this statement was wrong. He had seen many of his own patients, especially children, suffering from the exact symptoms described by the speaker.³ Shortly after the meeting, he purchased a microscope and, over the next seven to eight months, began testing the children of Marion County for hookworm.⁴ By the end of his study, he had identified and treated 75–80 cases of hookworm.⁵ Bass became so engrossed in laboratory research that in 1904, he enrolled in a one-year-long course in clinical laboratory diagnosis at



*Images from the History of Medicine,
National Library of Medicine*

1. Rudolph Matas, *Dr. Charles C. Bass, Dean: An Appreciation* (New Orleans, LA: Tulane University School of Medicine, 1940), 2. Originally published in *New Orleans Medical and Surgical Journal* 92, no. 10 (1940): 545–50.
2. Arden G. Christen, "Charles C. Bass, M.D.—1875–1975: That Cantankerous Genius of Preventative Dentistry," *Bulletin of the History of Dentistry* 30, no. 1 (1982): 9.
3. Most people infected with hookworms have no symptoms. Minor symptoms include gastrointestinal problems. In serious cases, there is blood loss, leading to anemia and protein deficiency. In children with continuous infection, the loss of iron and protein results in growth and developmental problems.
4. Matas, *Dr. Charles C. Bass*, 5–6.
5. Matas, *Dr. Charles C. Bass*, 6.

the Johns Hopkins University. At Johns Hopkins, he studied microscopy under Charles E. Simon and the proper techniques for blood counts under William S. Thayer.⁶

Following his training at Johns Hopkins, Bass chose not to return to his family practice in Columbia. Instead, he relocated with his family to New Orleans, where he started a new practice. He saw patients in a conventional medical office building but constructed his own personal laboratory at home.



Tulane University School of Medicine, Canal Street, c. 1900
Library of Congress, Prints and Photographs Division

Research Pioneer

Bass's home research did not go unnoticed by his alma mater, Tulane. In 1905, he was appointed to a non-salaried position as an instructor in the Department of Medicine, and in 1907, he was hired as a salaried instructor of clinical microscopy and medicine in the Tulane laboratories of clinical medicine.

Interested in opsonic index and autogenous vaccines, Bass traveled to England in 1908 to train with Sir Almroth Wright (AAI '14), an early authority

on inoculation techniques and vaccine therapy, at St. Mary's Hospital.⁷ The work he undertook in England helped to form his later research, and the relationships he built there with the future founders of AAI led to his nomination and election to the association in 1916.

Back in the States, Bass was soon promoted to director of the Tulane laboratories and, in 1912, to professor of experimental medicine. While in the laboratories of clinical medicine, Bass immersed himself in uncinariasis and defined the etiology, pathology, and more effective treatment for the disease.⁸

His pioneering work in this area was based on a small study of 90 students at Tulane. He discovered that, whereas 20 percent of all participants were suffering from uncinariasis, 42 percent of the rural students carried the parasite.⁹ In 1910, he published findings from a large study conducted with George Dock, in which they were the first to assert that the high rate of infection in the rural South was attributable to sandy soil, the poor access of privies, and the "habit among children...of going barefoot."¹⁰

While completing his research on hookworm infections, Bass began studying another parasitic disease afflicting the South: malaria.¹¹ In 1911, he successfully cultivated the three most common malarial plasmodia (*vivax*, *malariae*, and *falciparum*) in vitro using human blood and published a seminal paper, entitled "A New Conception of Immunity: Its Application to the Cultivation of Protozoa and Bacteria from the Blood and to Therapeutic Measures."¹² This breakthrough in hematic



Patient with a hookworm infection
Centers for Disease Control and Prevention

6. Christen, "Charles C. Bass, M.D.," 9; Matas, *Dr. Charles C. Bass*, 6. Charles Edmund Simon (1866–1927) opened the first diagnostic laboratory in Baltimore (1897) and at Johns Hopkins, started the first known teaching program on filterable viruses (1922) and compiled a large collection of virus specimens. William Sydney Thayer (1864–1932) was a long-time faculty member of the Johns Hopkins University School of Medicine (from 1896 to 1921), which included terms as head of the hospital medical clinic and director of the Department of Medicine. At the medical school, Thayer was responsible for organizing the first course in clinical microscopy.

7. Matas, *Dr. Charles C. Bass*, 10. Wright was an honorary member of AAI (1914–1920).

8. Matas, *Dr. Charles C. Bass*, 7. See also George Dock and Charles C. Bass, *Hookworm Disease: Etiology, Pathology, Diagnosis, Prognosis, Prophylaxis, and Treatment* (St. Louis, MO: C. V. Mosby Company, 1910).

9. Thomas Waisley, "Public Health Programs in Early Twentieth-Century Louisiana," *Louisiana History: The Journal of the Louisiana Historical Association* 41, no. 1 (2000): 42.

10. Dock and Bass, *Hookworm Disease*, 44. In his field research, Bass made the discovery that hookworm larvae were unable to thrive in the high clay soils of southern Louisiana. Bass and others were able to establish the pathology of uncinariasis in children, which included stunted growth and mental developmental issues.

11. The parasitic protozoans were identified in 1880; the means of transmission by *Anopheles* mosquito was described in 1899.

12. C. C. Bass, "A New Conception of Immunity: Its Application to the Cultivation of Protozoa and Bacteria from the Blood and to Therapeutic Measures," *Journal of the American Medical Association* 57, no. 19 (1911): 1534–35; C. C. Bass and F. M. Johns, "The Cultivation of Malarial Plasmodia (*Plasmodium vivax* and *Plasmodium falciparum*) In Vitro," *Journal of Experimental Medicine* 16, no. 4 (1912): 567–79.

parasitology, which had eluded such titans as Theobald Smith (AAI '20), opened countless new avenues of malarial research.¹³ It led to Bass's own three-month collaboration in 1912 with Colonel William C. Gorgas at Ancon Hospital in the Panama Canal Zone, where the high incidence of the disease threatened the Canal project.¹⁴



Anopheles mosquito feeding
Centers for Disease Control and
Prevention

While a principal investigator at Tulane, Bass pursued increasingly expansive research interests, including the diseases caused by vitamin deficiency (beriberi and pellagra), diphtheria, dysentery, typhoid fever,¹⁵ and periodontal disease.

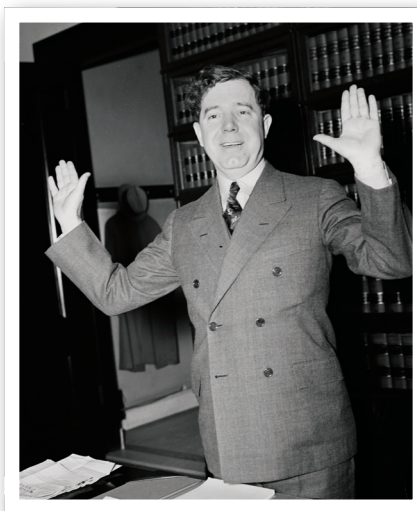
In mid-1914, Bass somehow became aware of a paper delivered at a Pennsylvania State Dental Society meeting, tentatively concluding that amoebas found in the gums of patients with periodontitis may be responsible for the disease. Bass seized on these early findings and collaborated with a colleague at Tulane, Foster M. Johns, on a series of periodontitis studies, producing two journal articles and a book within one and one-half years. Bass and Johns tentatively concluded that *Endameba buccalis* was responsible for periodontitis. In their findings, they issued what proved to be an apt caveat: they were unable to re-isolate *E. buccalis* to satisfy Koch's postulates. Despite this limitation, they proposed a treatment using a hypodermic injection of emetin to kill the amoeba and cure periodontitis.¹⁶ The dental community initially had a positive reaction to Bass's research and treatments, but the positive reception did not last. The science that supported their conclusions was soon refuted in dental literature

and at meetings, and within one year, the central role of amoebas in periodontitis and the emetin treatment were completely rejected by the scientific community. Bass must have been chastened by this setback, for he put aside dental research for nearly one quarter century. He would, however, return to it energetically after his retirement from Tulane.¹⁷

Cunning Administrator

In 1922, Bass was elected dean of the Tulane University School of Medicine, which remained the only accredited medical school in the state. Although he maintained his professorship, his energy was focused almost exclusively on the administration of the school. During his 18 years as dean, Bass oversaw the expansion and relocation of the medical school from its cramped Canal Street facility to the Hutchinson Memorial Building that houses the medical school and research facilities still today. One initiative, in particular, drew strong resistance from populist Governor Huey Long. At issue was a new Tulane clinical facility that almost doubled the school's presence and influence at Charity Hospital, a nearly 200-year-old public institution in New Orleans. Long, who was intent on founding a public medical school in Louisiana, opposed the

elite private medical school's expanded clinical facility and authority at the state's hospital. With appointments to the board of directors for Charity Hospital being within the governor's purview, the board had become highly politicized under Long. In 1930 and 1931, the Long-appointed superintendent rescinded and denied Bass's appointments to the hospital on political grounds. As the dispute grew public, Long used the conflict to advance the construction of the Louisiana State University School of Medicine in New Orleans. Bass, however, did not back down on his appointments. By 1932,



Huey P. Long, c. 1935
Library of Congress, Prints and Photographs Division,
Harris & Ewing

13. Matas, *Dr. Charles C. Bass*, 8.

14. Bass was the head of the Tulane University School of Tropical Medicine to the Tropics for the Study of Malaria Expedition, 1912–1922. William C. Gorgas (1854–1920) was the chief sanitary officer in the Panama Canal Zone from 1904 to 1914.

15. Bass discovered a new method for diagnosing typhoid fever and presented his findings at the American Congress of Internal Medicine in Chicago in 1920. Whereas the previous method for testing for typhoid fever took 12–24 hours, Bass's new method required only a blood test at the patient's bedside and took just 10 minutes. C. C. Bass, "American Heart Likely to Benefit by Prohibition," *The Atlanta Constitution*, February 25, 1920.

16. Emetin is derived from ipecacuanha and had been used since the early nineteenth century to treat amebic dysentery. Edward B. Vedder, "Origin and Present Status of the Emetin Treatment of Amebic Dysentery," *Journal of the American Medical Association* 62, no. 7 (1914): 501–6.

17. Christen, "Charles C. Bass, M.D.," 10–11.

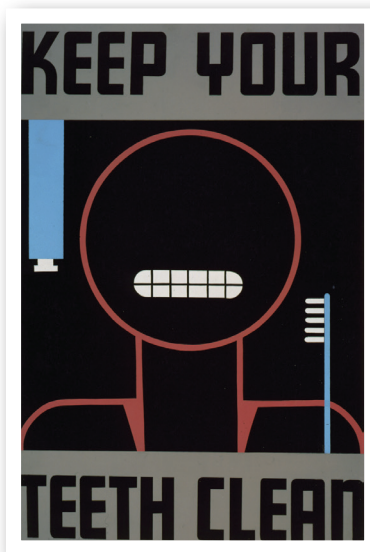
his appointees had received their privileges at Charity Hospital.¹⁸

Father of Preventative Dentistry

In 1940, as Bass turned 65, he reached the mandatory retirement age for Tulane. Although technically retired, he continued his research for the next 35 years. With the zeal of a crusader, he returned to the field of dental research. These were productive years for Bass, during which his research and successful clinical methodology ultimately earned him the moniker, “father of preventative dentistry.”¹⁹

In his seminal article, “The Cause and Prevention of the Loss of Teeth,” published in 1940, Bass asserted an “urgent need for an awaking of the situation” that tooth decay and loss should not be “considered to be necessary and unavoidable burdens of life.”²⁰ Rather, his research, using standard microbiological techniques, demonstrated that cavities and gum disease are caused by bacterial infections. Furthermore, he argued, these infections are preventable through proper dental hygiene.

Between the ages of 71 and 94, Bass published 32 journal articles, 26 of which were about dental hygiene. Many of these publications further elaborated on his “Right Kind” method for proper brushing and flossing techniques, including proper oral-care techniques for children and the elderly.²¹ He eventually designed a toothbrush and floss to work with his method that were so precise that their



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Charles C. Bass

Images from the History of Medicine, National Library of Medicine

requirements included the exact thickness and shape of the bristle tips and number of turns per inch of a particular unwaxed nylon yarn.²² Bass’s articles also noted deficiencies in preventative dentistry in the military and in dental education. These articles fueled antipathies with the Public Health Service, American Dental Association, and the rest of organized dentistry and seldom appeared in dental journals.²³

Over a long scientific career, Charles C. Bass advanced public health. In his first chapter of scientific life, he pioneered hookworm disease etiology, pathology, and treatment. He also solved a confounding technical problem in malaria research by discovering how to cultivate the parasitic protozoa in vitro. In the second chapter of his career, as an administrator, he finessed the powerful Louisiana governor to expand the influence of the state’s only accredited medical school at the largest public hospital in New Orleans. In his final chapter, at a time when many of his colleagues had completely retired from the lab, he spearheaded public and professional awareness of the benefits of preventative dentistry, this time successfully defending his theory that “a clean tooth does not decay.”²⁴ In doing so, Bass secured rights to the epitaph he once suggested for himself: “He designed and promoted an effective method of personal hygiene.”²⁵ ■

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Katlyn Burns, AAI History Intern, contributed to this article.

18. John Salvaggio, *New Orleans' Charity Hospital: A Story of Physicians, Politics, and Poverty* (Baton Rouge, LA: Louisiana State University Press, 1992), 100–119; John Duffy, *The Tulane University Medical Center: One Hundred and Fifty Years of Medical Education* (Baton Rouge, LA: Louisiana State University Press, 1984), 146–52.

19. Christen, “Charles C. Bass, M.D.,” 16.

20. C. C. Bass, “The Cause and Prevention of the Loss of Teeth,” *New Orleans Medical and Surgical Journal* 93, no. 2 (1940): 229, 227.

21. The “Right Kind” method was first published in 1948.

22. Christen, “Charles C. Bass, M.D.,” 13.

23. Ibid., 16.

24. Bass, “The Cause and Prevention of the Loss of Teeth,” 229.

25. Christen, “Charles C. Bass, M.D.,” 16.