Leprosy Research and the Public Health Service —A Brief Chronological Résumé

1898 *Public Health Reports* publishes a "Report on Leprosy in the Hawaiian Islands, November 29, 1898" by Surgeon D. A. Carmichael, U.S. Marine-Hospital Service.

1899 Congress approves an act to investigate the origin and prevalence of leprosy in the United States and report upon what legislation is necessary for the prevention and spread of this disease. A commission of medical officers of the Marine-Hospital Service is appointed by the Surgeon General to undertake this investigation.

1902 A report by the commission entitled "Leprosy in the United States" is presented by Surgeon General Walter Wyman and includes a report on leprosy in Hawaii.

1904 Dr. C. B. Cooper, President of the Board of Health, Territory of Hawaii, requests the Federal Government to undertake scientific research on leprosy in the Hawaiian Islands. The American Medical Association passes a resolution along the lines suggested by Dr. Cooper.

1905 At the request of Surgeon General Wyman, Congress passes a bill appropriating $100,000 for a hospital and laboratory at Kalawao, Island of Molokai, and $50,000 is appropriated for annual upkeep. This represents the first hospital for research on a specific disease authorized by Congress.

1906 Dr. Walter R. Brinckerhoff, a pathologist from Harvard Medical School, is appointed Director of Leprosy Research in Hawaii and in the same year establishes a temporary laboratory in Honolulu.

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1908 Public Health Service Bulletin publishes three articles by Dr. Brinckerhoff.

1909 The research hospital, named U.S. Leprosy Investigation Station at Kalawao, is finally opened near the leprosy settlement at Kalaupapa, Molokai, with Dr. Brinckerhoff as its first director.

Dr. Donald H. Currie, Director, Leprosy Investigation Station, Molokai (after Dr. Brinckerhoff) is one of three delegates from the United States sent to the Second International Conference on Leprosy, held in Bergen, Norway. At this conference it is resolved that "The clinical study of leprosy induces the belief that it is not incurable."

1910 Laboratory space is given to the Public Health Service at the Kalihi Hospital (also referred to as the Kalihi Receiving Station) in Honolulu. The majority of the personnel from Kalawao are transferred to Kalihi.

Dr. Currie, Dr. Brinckerhoff and Dr. Harry Hollmann report attempts to confirm the cultivation of the leprosy bacillus by the method of Clegg.

1912 Dr. Hollmann studies the cultivation of the rat leprosy bacilli by the method of Clegg.

1913 The Leprosy Investigation Station on Molokai is closed.

1914 Congressional hearings are held on a bill providing for the establishment of a National Leprosarium. Dr. Rupert Blue, Surgeon General of the Service, speaks out in favor of the bill.

1917 Congress authorizes the Public Health Service to establish a Federal home for the care and treatment of persons with leprosy.

1918 At the request of Dr. George W. McCoy, the Department of Chemistry, College of Hawaii (later the University of Hawaii), prepares

esters of chaulmoogric acid which can be used parenterally without too much discomfort. (Later it was learned that the Germans had prepared esters of chaulmoogric acid in 1909.)

1920 Dr. J. T. McDonald, Director of the Service's continuing leprosy investigation effort, and Dr. A. L. Dean, Chemist, University of Hawaii, report on "The Treatment of Leprosy—with Especial Reference to Some New Chaulmoogra Oil Derivatives." While this report did not claim a cure for leprosy, the authors were certain that the ethyl esters of chaulmoogric acid exerted a beneficial effect on the disease and in the 14-month period of the study, 48 of 186 patients were sent home as arrested cases.

Regardless of the ultimate evaluation of this treatment, this report of the Public Health Service in 1920 spread quickly throughout the world and the esters of chaulmoogric acid dominated leprosy treatment in most parts of the world for the next two decades.

1921 The "Louisiana Leper Home", established in Carville in 1894, is purchased by the U.S. Government and is designated as the National Leprosarium (the present Public Health Service Hospital, Carville).

1932 Congress authorizes the Surgeon General to make a survey of the existing facilities for the protection of the public health in the care and treatment of persons with leprosy in the Territory of Hawaii.

1921-42 The leprosy investigations in Honolulu are continued. The Service furnishes the physicians for the care of patients in Kalihi Hospital (usually 100-150) and the Service also equips and completely staffs a small research laboratory. The annual budget is $30,000-$40,000. This research activity, directed and financed by the National Institute of Health, is terminated by World War II.

Subsequent studies by Public Health Service officers at Kalihi Hospital fail to show that esters of chaulmoogric acid are of specific value in treating leprosy. Studies are made of the epidemiology and the relationship of leprosy and tuberculosis. Frequent clinical observations of all patients to determine the course of the disease document the natural tendency of leprosy in a significant percentage of patients to improve or even be arrested without specific treatment.

Other important work at Kalihi includes Dr. N. E. Wayson's observations on neurologic changes as an aid to early diagnosis and work by Dr. George L. Fite on the pathology of human leprosy and rat leprosy. Continued but unsuccessful attempts are made to cultivate the bacilli of human and rat leprosy. The Hawaiian strain of rat leprosy bacilli is discovered by Dr. Lucius F. Badger. This strain has been and continues to be used in many laboratories around the world.

1943 Dr. Guy Faget and staff at Carville cautiously report their results on the use of Promin, a sulfone drug, in leprosy. At the end of 1 year, 15 of 22 patients have improved.

1947 Dr. Fite, working as a Research Pathologist at the Public Health Service Hospital at Carville, with his associates Cambre and Turner, describes a simple procedure for staining leprosy bacilli in tissues. The Fite-Faraco stain has been adopted by pathologists in many parts of the world as an excellent method for staining leprosy bacilli in tissue sections. (At the time of this publication, the method is still widely used.) The success of Khanolkar's work, "Studies in the Histology of Early Lesions in Leprosy" (New Delhi 1951) was to a great extent due to the highly successful acid-fast stains prepared by the Fite-Faraco method. Dr. Fite worked at Kalihi Hospital from 1937 to 1941.

1948 The Fifth International Leprosy Congress, held in Havana, recognizes the sulfone drugs as the treatment of choice for leprosy. Thus, once again, the Service is instrumental in revolutionizing leprosy treatment throughout the world.

Dr. James A. Doull, Public Health Service epidemiologist on loan from the Service, is appointed Medical Director of the Leonard Wood Memorial (American Leprosy Foundation). He reactivates the Memorial's epidemiologic studies on leprosy in Cebu Province, Philippines.

1949-57 Epidemiologic study of leprosy in the United States is begun at the Communicable Disease Center (CDC), Atlanta, Ga., by Dr. Badger. His studies produced convincing evidence to show that in the United States: (*a*) leprosy cannot be considered to be feebly contagious because in families the attack rate is about 5 percent, (*b*) leprosy is not necessarily the result of exposure in early childhood because in the United States about one-half of the patients become infected after the age of 20 years and one-third after the age of 30, and (*c*) prolonged intimate contact may not be necessary because in two of three patients admitted to Carville no family or known contacts were discovered.

1950 At Dr. Doull's request, the Armed Forces Institute of Pathology (AFIP) establishes a Leprosy Registry of the American Registry of Pathology under the auspices of the National Research Council.

1951 Dr. Chapman H. Binford, Public Health Service Officer (Pathologist) on the staff of the AFIP is appointed Registrar for Leprosy for that institute.

Dr. Doull initiates large international field studies to determine the efficacy of sulfone therapy. Although sulfone drugs, after the 1943 report by Dr. Faget and associates had been accepted as effective therapy for lepromatous leprosy, there had been no adequately controlled studies. Aware that the popularity of esters of chaulmoogra oil had far exceeded their established therapeutic value, Dr. Doull, with support of the Leonard Wood Memorial, National Institutes of Health, the Veterans Administration, and seven drug companies, initiates and carefully carries out a double-blind controlled study to determine the efficacy of sulfone and other drugs in 964 lepromatous patients in two hospitals in Japan, one in the Philippines, and one in South Africa. The regimens and timing of the trials in each hospital are identical. The efficacy of sulfone therapy using the inexpensive parent sulfone drug now available as dapsone was firmly established by these trials.

1953 The Public Health Service establishes a Subcommittee on Leprosy Research with members from its three major divisions and Dr. Doull of Leonard Wood Memorial. Its objective is to stimulate U.S. scientists to undertake research in leprosy. The first priorities are cultivation of *Mycobacterium leprae* and transmission to animals.

The Subcommittee's recommendations resulted in a project to undertake tissue cultivation of *M. leprae* at the CDC's Virus and Rickettsia Laboratory, Montgomery, Ala., and in 1956 at the CDC's Chamblee, Ga., facilities, a comprehensive 5-year project was initiated. It was specifically concerned with the transmission of leprosy to animals, a phase of research that had largely been abandoned worldwide since the failure of the experiments with hamsters in the 1930s.

1956, 1958 First and Second Carville Conferences on Research Potentials in Leprosy, were organized by the Service's Subcommittee on Leprosy Research. Despite a total lack of travel funds for participants, they were enthusiastically attended by scientists from the Service, other Federal agencies, and universities. Interest in leprosy research was renewed.

At the 1956 conference the observation is reported that, in human beings, the leprosy bacilli grow best in tissues with temperatures of 32° to 35° C. It is recommended that experimental transmission to animals should be made in tissues with temperatures similar to these. (Subsequent successful experimental transmission to animals has borne out this concept. The experimental inoculation in the armadillo was undertaken because its body temperature is 32° to 35° C.)

1959 Dr. Badger writes the chapter "Epidemiology" in "Leprosy in Theory and Practice" (Robert Cochrane, editor).

1960 Dr. Charles C. Shepard, of the Communicable Disease Center, Atlanta, reports the mouse foot pad technique which permitted the first propagation of *M. leprae* in an experimental animal for successive generations, albeit the growth in the foot pad is limited. This model has been very useful in evaluating effectiveness of potential drugs for leprosy and in the study of the drug resistance problem.

1965 The Leonard Wood Memorial, with Dr. Binford, a retired Service officer as Medical Director, and the Armed Forces Institute of Pathology conduct a May 11–14 Conference on Research Problems in Leprosy. Approximately 130 scientists including 25 non-U.S. scientists participate. Travel expenses are underwritten by the Memorial and the participants' institutions.

The United States-Japan Cooperative Medical Science Program is organized by agreement between President Johnson and Premier Sato. The U.S. Leprosy Panel is appointed shortly after the AFIP conference. Under the guidance of the Panel, and with financial support assured by the National Institutes of Health, an entirely new era in leprosy research is initiated.

1971 The nine-banded armadillo, in inoculation experiments conducted at Gulf South Research Institute by Dr. Eleanor S. Storrs with Dr. W. F. Kirchheimer, of the Public Health Service Hospital, Carville, collaborating as the leprosy specialist, was shown to be highly susceptible to infection with *M. leprae*.