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LOUIS OTTO KUNKEL

1884—1960

A Biographical Memoir by

WENDELL M. STANLEY

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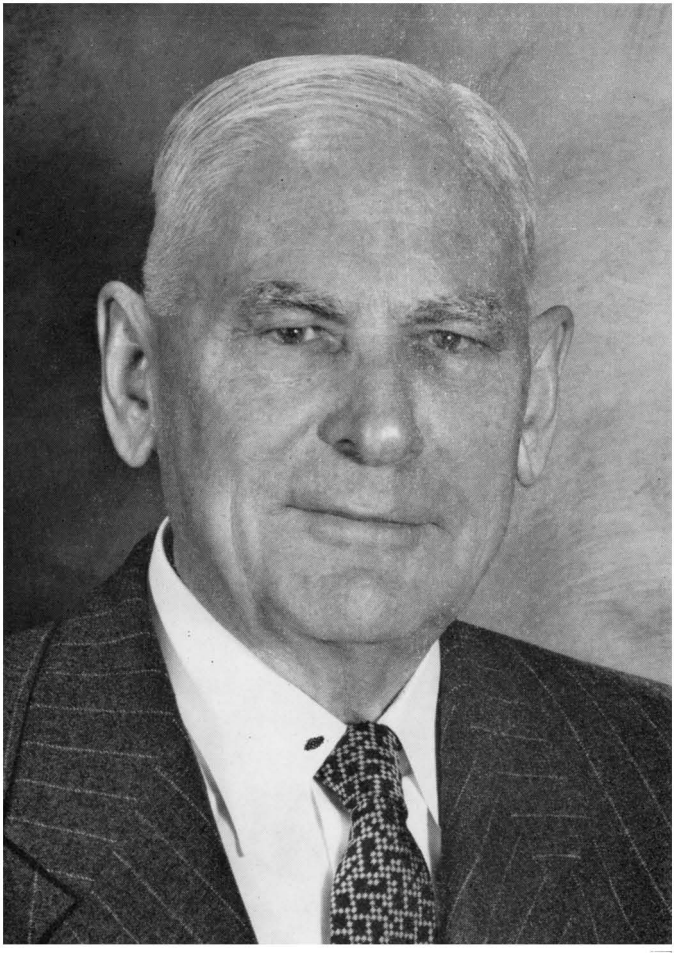

K. O. Kimball

LOUIS OTTO KUNKEL

May 7, 1884–March 20, 1960

BY WENDELL M. STANLEY

DR. LOUIS OTTO KUNKEL, the son of Henry and Katie Price Kunkel, was born on a farm in Audrain County near Mexico, Missouri, on May 7, 1884. He died on March 20, 1960, after a lifetime of outstanding research and administration in plant pathology, mainly in the field of virology.

At the age of sixteen he left school to work for three years, first as a member of a wheat harvesting team traveling through Missouri, Kansas, and Oklahoma, and later in a nursery where he was involved in the budding of peaches. This early contact with peach trees and their manipulation apparently developed an interest in peach trees and their diseases that remained with him throughout his lifetime. In 1903 he returned to high school and then entered the University of Missouri in 1906. There he received the degree of B.S. in 1909, the A.B. degree in 1910, and the M.A. degree in 1911. Dr. Kunkel spent a year of graduate work at the Henry Shaw School of Botany of Washington University in St. Louis and then transferred to Columbia University in New York City where he was associated with Professor Robert A. Harper. In 1914 Dr. Kunkel received the Ph.D. degree in botany at Columbia. The research work presented in his doctoral thesis was on the influence of physical and chemical factors on the toxicity of inorganic salts to the fungus *Neuro-*

spora sitophila. On the completion of his doctorate Dr. Kunkel accepted a position with the Bureau of Plant Industry of the United States Department of Agriculture in Washington, D.C. There he conducted studies on the powdery scab and wart diseases of potato and on the clubroot disease of cabbage. On September 4, 1915, he married Johanna Caroline Wortman and to them were born four sons, Henry George, Otto Wortman, Walter Ralph, and Paul Spencer.

During 1916 Dr. Kunkel studied at German and Swedish laboratories and then returned to his work for the United States Department of Agriculture. During this period he became interested in the virus diseases of the potato. In 1920 Dr. Kunkel resigned from his position with the United States Department of Agriculture and accepted an appointment as Associate Pathologist at the experimental station of the Hawaiian Sugar Planters' Association. In Hawaii he engaged in studies on viral diseases of sugar cane and their insect vectors. He returned to the United States in 1923 and accepted a position with the newly established Boyce Thompson Institute for Plant Research at Yonkers, N.Y. There he established a research laboratory and with his associates developed a diversified program of studies on viral diseases of plants. Throughout his lifetime Dr. Kunkel always maintained an active program of personal research. It is doubtful if a working day ever passed without Dr. Kunkel spending several hours in the laboratory or the greenhouse. During his time at the Boyce Thompson Institute he became interested in the "yellows" type of plant diseases and the insect vectors involved in such diseases. This general area of research was to constitute his main interest for the rest of his life.

After eight years at the Boyce Thompson Institute Dr. Kunkel was called to the Rockefeller Institute for Medical Research to organize and direct a new Division of Plant Pathology at Princeton, N.J. He visited many laboratories in this country

and abroad during the planning stages of the new division. As a result many innovations of importance were incorporated in the new laboratory building and greenhouses. Perhaps of greater importance was the fact that his visits to various laboratories brought him an acquaintance with many young investigators and from these he made selections for his Princeton staff. Dr. Kunkel was a good judge of men and by 1932 he had assembled a top-flight group of younger associates. He was a demanding albeit a wise and sympathetic leader. He set a good example in all respects for his younger associates and much of the substantial success of his group was due to his influence. Although he carried a very active program of research, most of which was done with his own hands, he always had time to talk with and counsel his younger associates. Dr. Kunkel always read all of the manuscripts coming from the group, and his suggestions for improvement of language and manner of presentation were instrumental in maintaining a very high standard for the publications emanating from the Division of Plant Pathology. In order to evaluate Dr. Kunkel's total research accomplishments, it is truly necessary to take into consideration not only his own publications, almost all of which are published under his own name, but also those of his associates, all of which are published under their own names. It is obvious that his influence on research in virology has been very great indeed.

After seventeen years the Princeton laboratories were closed and many of the staff moved to newly constructed facilities at the location of the New York laboratories of the Rockefeller Institute on the East River. Although Dr. Kunkel became an Emeritus Member of the Rockefeller Institute in July 1949, he remained head of the group in Plant Pathology until 1955 when he retired from all administrative duties and devoted all of his time to research. In 1935 Dr. Kunkel purchased a farm in Pennsylvania a short driving distance from Princeton. Al-

though the Kunkel family first lived for some years in a large house overlooking Lake Carnegie on the Rockefeller Institute property, the farm in Pennsylvania soon became his headquarters. The Princeton house was vacated and thereafter, except for short trials at apartments in Princeton and New York City, Dr. Kunkel lived on his farm. Needless to say, after the move of the Institute to New York City, the commuting from the farm placed a severe drain on his physical resources. Nevertheless, his love of farm life was so deep that he continued to make this sacrifice and his only concession was during the final few years when he reduced the number of days per week in New York City.

Dr. Kunkel had an unusually productive career in research, especially in view of the fact that he carried a heavy load of administration for many years. When he began his work with the United States Department of Agriculture in July 1914 there was a federal quarantine against the powdery scab disease of potato in Maine; hence, there was much interest in the causative agent *Spongospore subterranea.* Dr. Kunkel studied the spore germination, modes of infection, cytology, and pathological histology of this organism, which is one of the slime molds. Later he studied another slime mold, *Plasmodiophora brassicae,* the causal agent of clubroot of cabbage. He also determined the conditions favoring spore development on agar plates of *Macrosporium solani,* which is the causal fungus of early blight of potato, and made studies of the black wart of potato disease. During his time with the United States Department of Agriculture Dr. Kunkel became well acquainted with Erwin F. Smith, who was the first to discover a bacterial cause of plant disease and the first to demonstrate the communicability of the peach yellows disease. In 1920 Dr. Kunkel, with Smith's encouragement, went to Hawaii to study diseases of sugar cane in his position with the Hawaiian Sugar Planters' Association. There he studied the cell

inclusions of the corn stripe disease and concluded that these might represent some stage of an organism causing the disease. He demonstrated that the corn leafhopper, *Peregrinus maidis,* could transmit this disease but not the similar disease of sugar cane. He found the latter could only be transmitted by aphids. On his return to the United States and to the Boyce Thompson Institute Dr. Kunkel concentrated on the "yellows" type of plant diseases. He discovered that the leafhopper, then known as *Cicadula sexnotata,* but now known as *Macrosteles fascifrons,* could transmit aster yellows virus. Another and very major discovery was that the insect vector of peach yellows was the leafhopper *Macropsis trimaculata.* This finding subsequently made possible many important studies on this disease.

At the Rockefeller Institute Dr. Kunkel observed that the incidence of the aster yellows disease diminished during the hot summer months and this caused him to wonder whether or not the aster yellows virus might be heat sensitive. He pursued this lead and soon demonstrated that this was in fact the case. He made similar studies on the virus of peach yellows and found a similar situation existed. Dr. Kunkel based much later work on this discovery and demonstrated that it was possible to cure infected plants of several virus diseases by growing the plants at temperatures which destroyed the virus without injuring the plant. This procedure has become of considerable importance to the plant industry. Dr. Kunkel also used the heat treatment technique to secure suggestive evidence that the aster yellows virus multiplies in its leafhopper vector, a very important fact which was later proved to be correct by his associate, L. M. Black. Dr. Kunkel made many studies in the general area known as cross protection, a phenomenon in which one strain of a virus will protect against another strain, even a more virulent strain of the same virus. He found strains of aster yellows viruses that would protect against each other in the plant. He

studied strains of tobacco mosaic virus and made the very important observation that inoculation of local lesion hosts with mixtures of strains generally resulted in lesions, each of which contained only one or the other of the strains. With his colleagues Dr. Kunkel became interested in the parasitic vine commonly known as dodder and demonstrated that by means of the dodder several viruses could be transmitted from plant to plant. This technique proved important in studies on viruses that were difficult to transmit or in cases where it was desired to test the presence or absence of a virus in a plant in which normal means of transmission were ineffective.

Dr. Kunkel's last scientific discovery made during the years of his so-called retirement was the demonstration that the insect vector of aster yellows virus could be protected, through prior feeding on plants carrying one strain of a virus, from subsequent infection by a second strain of the virus. He had, of course, showed some years earlier that a similar phenomenon occurred in the case of the disease in asters.

Dr. Kunkel was a member of the National Academy of Sciences since 1932. He was also a member of the American Philosophical Society, the Botanical Society, the American Phytopathological Society, Phi Beta Kappa, and Sigma Xi. He received the Certificate of Merit award at the Golden Jubilee meeting of the Botanical Society of America in 1956 and a Distinguished Service Award of The New York Botanical Garden in 1959. He served as Member of the Board of National Research Fellowships in the Biological Sciences for the National Research Council, as Member of the American Advisory Council for Yenching University at Peiping, China, as Member of the Advisory Council of the Department of Biology at Princeton University, as Member of the Committee to Visit the Division of Biology for the Board of Overseers of Harvard College, and as Member of the Board of Managers and Member of the

Scientific Committee for The New York Botanical Garden.

Dr. Kunkel will long be remembered by his associates and others who were privileged to know him. He was a man of great integrity and complete honesty. He sometimes exhibited strong convictions which he maintained with intelligence and vigor. He was always courteous, friendly, very fair in his relationships, and perhaps modest to an extreme. He always had time to counsel with his younger associates. He tended to be very practical and had a flair for devising experiments that always seemed to yield results that provided decisive answers to problems of importance. All in all he was a tower of strength of many dimensions on whom more than one of his younger associates leaned with great benefit over the years. Dr. Kunkel was a great man and a great plant pathologist.

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KEY TO ABBREVIATIONS

Am. J. Bot. = American Journal of Botany
Bull. Exp. Sta., Hawaiian Sugar Planters' Assoc., Bot. Ser. = Bulletin of the Experiment Station, Hawaiian Sugar Planters' Association, Botanical Series
Bull. Torrey Bot. Club = Bulletin of the Torrey Botanical Club
Contrib. Boyce Thompson Inst. = Contributions of the Boyce Thompson Institute
Internat. Congr. Microbiol. = International Congress for Microbiology
J. Agr. Res. = Journal of Agricultural Research
J. Bacteriol. = Journal of Bacteriology
Mem. Brooklyn Bot. Garden = Memoirs of the Brooklyn Botanical Garden

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