

Walter Carter, 1897-1977

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Dr. Walter Carter, one of the most distinguished entomologists in the early history of Hawaiian entomology, who had profound influence on the development of modern agricultural industries in Hawaii, died Nov. 26, 1977, shortly after his 80th birthday, at Walnut Creek, California.

Walter Carter was born in Leeds, England, Nov. 23, 1897. His family migrated to Calgary, Alberta, Canada in 1912. After military service with the Royal Canadian Army Medical Corps in 1917-19, he received a B.S. (1923) from Montana State College, and an M.S. (1924) and Ph.D. (1928) from University of Minnesota. He married Minnie Jackson of Leeds, England in 1923. His career in entomology started with his appointment as Assistant Entomologist, Canadian Department of Agriculture (1923). This was followed by positions as Teaching Fellow (1923-24) and Research Assistant (1924-25), University of Minnesota; and Assistant Entomologist through Senior Entomologist, U.S. Department of Agriculture, in Charge of Sugar Beet Insect Investigation at Twin Falls, Idaho (1925-30). In 1930, he was appointed as Entomologist and Head of Department, Experiment Station, Association of Hawaiian Pineapple Cannery (later known as Experiment Station, Pineapple Producers' Cooperative Association, and then Pineapple Research Institute of Hawaii or PRI), in which capacity he served until his retirement in 1962. He was concurrently appointed Professor of Zoology, University of Hawaii (1931), and upon his retirement was named Professor Emeritus of Entomology. He and his family first arrived in Honolulu in March, 1930, and settled at 3234 Woodlawn Dr., Honolulu in 1934. In December, 1968 he and Mrs. Carter moved to Walnut Creek, California. Subsequently, he often visited Honolulu. His last visit was in June, 1977.

Walter Carter's life-long research interest was on the relationships of insect to plant disease. His renowned text book on the same subject matter (1962, 1973) was based on experience and knowledge accumulated in the course of his fruitful research efforts over many years. Prior to his appointment in Hawaii, he initiated a Federal research project at Twin Falls, Idaho in 1925-30 on ecology of the beet leafhopper which transmits the sugar beet curly-top disease. His findings on the population dynamics of that vector species in the desert permanent breeding grounds were presented in his doctoral dissertation. In Hawaii, his research on the mealybug wilt disease of pineapple conclusively demonstrated that the feeding of the pineapple mealybugs causes the disease, a phytotoxemia. His work on this disease made it the most thoroughly studied of all the phytotoxemias known. To elucidate the complexities in the etiology of the disease, numerous experiments were conducted over many years. The essence of his findings was that in order for mealybugs to synthesize the wilt-inducing salivary secretions, they must feed on a pineapple plant carrying a latent virus. The toxic salivary secretion is then translocated systematically to the roots which it kills, causing the wilt symptoms of the

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foliage to appear. The latent virus alone induces no wilt symptoms under any circumstances, but is transmissible by mealybugs from one plant to another, and can also be vegetatively propagated. A long series of papers on this subject is listed in the bibliographical section. Carter's discovery on the etiology, which is unique itself in complexities among phytotoxemias, is a monumental contribution to our knowledge of insect-plant disease relationships.

In the late 1920s and early 1930s, the mealybug wilt disease was so destructive that the survival of the pineapple industry in Hawaii was jeopardized. However, Carter was successful in developing a highly efficient control program for the disease by integrating mealybug control and ant control in order to disrupt the powerful commensal bond between mealybugs and ants. He demonstrated that the incidence of the disease can be decreased to nil by continuously maintaining mealybug populations at low levels, because a long period of feeding by large numbers of mealybugs is required to induce the disease.

Nematodes had also been serious pests of pineapple in Hawaii. In the early 1940s, Carter was again successful in demonstrating that soil fumigation with "D-D mixture," an oil refining product provided by Shell Development Co., was highly effective for nematode control. This first economically feasible soil fumigant for nematode control was widely adopted for various crops throughout the world. Subsequently another fumigant, "BBC" which has also been widely used in Hawaii and elsewhere, was developed by C.T. Schmidt, an associate of Carter at PRI. Carter and associates, C.T. Schmidt, K. Ito, and K. Sakimura, all of whom were associated with him since the early 1930s, were collectively able to solve all the major entomological problems in the Hawaiian pineapple fields by 1968, when the Entomology Department of PRI was disbanded. Walter Carter thus made a series of outstanding contributions to the pineapple industry as well as to the general economy of Hawaii. In 1951, PRI conferred on him the unprecedented title of Senior Scientist.

During his years at PRI, and the period following his retirement, he was often invited overseas to consult on the insect-plant disease problems of various tropical crops. Such missions were to Brazil (1946), Gold Coast (1948), Ceylon (1953), Ghana (1956 and 1960-61), Jamaica (1962-65), Malaysia (1966-67), Ghana (1969), and Cook Islands (1972). He was a Visiting Scholar in the Department of Entomological Sciences, University of California at Berkeley (1969-77). On the temporary basis, he also served (1949-51) as Director of the USDA Oriental Fruit Fly Investigation in Hawaii, and was instrumental in organizing this Federal project soon after this injurious fruit fly was first discovered in Hawaii. He also served during the pre-war period as the Chairman of Land Planning Committee, Territorial Planning Board (Hawaii).

Walter Carter was a member of the American Association for the Advancement of Science (Fellow), Entomological Society of America (Fellow in 1938, Chairman of the Pacific Branch in 1956, Honorary Member 1973), American Phytopathological Society (Emeritus Member 1975), Hawaiian Academy of Science (President in 1938-39), Hawaiian Entomological Society (President in 1935, Honorary Member 1962),

Hawaiian Botanical Society, Hawaii Chapter of Sigma Xi (Chairman in 1955-56), and the Cosmos Club (Washington, D.C.). He was honored with two prestigious achievement awards, the Distinguished Service Award of the University of Minnesota (1961), and the C.W. Woodworth Award of the Pacific Branch of the Entomological Society of America (1974).

Walter Carter was a dedicated scientist with distinctive creative traits, and vigorously and tirelessly pursued his researches for many years, achieving numerous major contributions to science. He was a kind, generous, and affectionate person, always friendly to other people wherever he went. He will be long remembered by many friends. To his coworkers and colleagues, he was always very patient and tolerant, and generously gave of his time for counseling and advice. He was an enthusiastic orchid fancier ever since he settled in Honolulu. He was a charter member and a President of the Pacific Orchid Society, and edited the Bulletin of the Society for 19 years. Other hobbies which he followed were singing and photography.

Walter Carter is survived by his wife, Minnie; three children, Howard Jackson, Mrs. J.D. Ackerman (Marjorie Ruth), and Robert Duncan; eleven grand and great-grandchildren, and two sisters.

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Compiled by Minnie Carter

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