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American Fruit Explorers:

David Grandison Fairchild: Plant hunter extraordinaire and father of foreign plant introduction

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Abstract

David Grandison Fairchild was the world renowned plant explorer who founded the Office of Seed and Plant Introduction, the predecessor of the current National Plant Germplasm System (NPGS), in 1897. By the time he retired in 1933, he and his Plant Explorers had introduced over 80,000 accessions, which included many of the fruits we enjoy today such as mangos, nectarines, pistachios and dates. His legacies are numerous and include the NPGS, many of our food and fruit crops, Fairchild Tropical Botanic Garden, The Kampong, and most of all his philosophy of free exchange of genetic resources worldwide.

Dr. David Grandison Fairchild (Figure 1) was best described by Elisabeth D. Kay (1964), as a 'mycologist, entomologist, plant pathologist, geneticist, administrator, plant explorer extraordinary, author and, above all, humanitarian'. Articles (Lawrence, 1964) as well as books (Fairchild, 1938; Harris, 2015; Stone, 2018) have been written about him and his importations of new and improved crops to the United States (U.S.). In this article, I give a brief overview of his life, some of his important fruit introductions, and his legacy.

Dr. Fairchild was born on April 7, 1869 in East Lansing, Michigan. When he was ten years old, his family moved to Kansas, where his father became president of the Kansas State College (KSC) of Agriculture. In 1888, Dr. Fairchild graduated from KSC and moved to Ames, Iowa, where he pursued graduate studies in mycology under the supervision of his maternal uncle, Professor Byron D. Halstead. He accompanied Prof. Halstead to Rutgers College, New Brunswick, New Jersey, where he enjoyed working with a collection of plants he was assembling. On a visit to Prof. Halstead, Beverly T. Galloway offered Mr. Fairchild a job, which he accepted, in the Section of Plant Pathology at the U.S. Department of Agriculture (USDA), in Washington D.C. While working as a pathologist, he looked for opportunities to study abroad, and in 1893 he secured a Smithsonian "working table" at the Naples Zoological Station, which covered all expenses for experimentation. So in November 1893 he resigned his USDA job and embarked on his first voyage across the Atlantic. Aboard the ship, he met the man who was to "direct his destiny", Mr. Barbour Lathrop, who later surprised him by offering $1,000 to finance his trip to his dream island, Java. After two years of travel and study across Europe, Dr. Fairchild finally accepted Lathrop's offer after meeting Dr. Melchoir Treub of Buitenzorg (now Bogor) Botanical Gardens in Java. In April 1896, he sailed to Buitenzorg with Treub and spent eight months investigating the subterraneous cultivation of mushrooms by termites. His stay in Java was interrupted by a visit from Mr Lathrop, who convinced him to end his research in Java and travel with him. In the

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Fig. 1. Dr. Fairchild with Marian Bell Fairchild enjoying mangos that he helped introduce into Florida at their home, The Kampong. Fairchild Tropical Botanic Garden Archive. Courtesy of Noris Ledesma and Tomas Ayala-Silva.

new year of 1897, while traveling together on the boat, Dr. Fairchild had promised Mr. Lathrop that he would take up studying plants useful to man, and with his help would work on introducing their culture to the U.S. Thus began Dr. Fairchild's long and distinguished career of plant introduction and exchange.

Upon his return to Washington D.C., Dr. Fairchild roomed with his classmate from KSC, Walter Tennyson Swingle, and with his help convinced the Secretary of Agriculture, James Wilson, to divert $20,000 from the Congressional Seed Fund to establish a 'Section of Foreign Seed and Plant Introduction' (Section of S.P.I.) (Fairchild, 1938). He wrote and distributed a detailed bulletin that explained the mission of the program as seeds and cuttings were delivered to Washington by American travelers and foreigners. In October 1898, after less than a year serving as the chief of this section, as he was struggling with tons of plant material arriving from Russia, he accepted Lathrop's offer to travel around the world with him in search of plants that would be useful to introduce to the U.S. Leaving the section so soon after its establishment, he angered Secretary Wilson, who grudgingly agreed to provide him with an official letter from the USDA introducing him as a "Special Agent" (later to become Agricultural Explorer).

This first period of plant exploration lasted until April 1906, when he was again placed in charge of what was then known as the Office of Plant Introduction (OPI). While this period was a very productive collecting time for Dr. Fairchild, it was not his first. During his overseas study in Germany in September 1894, he received a request from a former colleague at the USDA for cuttings of citron from Corsica to start an orchard in Monrovia, California. Candied peel of the lumpy-fruited citron was an important ingredient in Christmas puddings and wedding cakes.

After arriving in Bastia, Corsica in the summer of 1894, he received a telegram informing him that J. Sterling Morton, the Secretary of Agriculture, had not authorized bringing new plants to the U.S. He was caught taking photographs of orchards by a police officer and arrested. An official $15 dollar reimbursement check that had President Ulysses Grant on it reluctantly persuaded the officer to release him. He still managed to steal a few cuttings from a citron tree, jamming them into raw potatoes and mailing them to Washington, thus helping to launch a profitable citron business in California.

It was in Jamaica during this period of exploration with Lathrop in 1898 that Fairchild began seriously tasting new fruits and vegetables at marketplaces, and sending seeds and cuttings of those which seemed desirable. The first mangoes he collected from Trinidad included 'Gordon', 'Peters No. 1' and 'Père Louis' (Figure 2). From Panama, Chile, Argentina and Brazil, he shipped seeds and/or cuttings of calamondin (a sour citrus), hardy avocado, spineless cactus, and the 'Itamaraca' mango, respectively. In Italy, he obtained the 'Sultanina Rosea' seedless grape from a monastery in Padua. After Egypt, Fairchild and Lathrop sailed through the Java Sea on to Hong Kong and Canton and obtained shaddock (pummelo) seed from Sekar, New Guinea, 'Carabao' mango from Manila, edible acorn from Hong Kong, and seedless pummelo from Bangkok. Fairchild contracted typhoid fever and left Colombo on a stretcher on a boat to Southampton, England.

In 1900, he accepted a temporary assignment from Galloway, who was now the head of the Bureau of Plant Industry, to collect information about hops for American beer makers and succeeded in obtaining important cultivars of barley and hops. On his way to Egypt to look for dates in 1901, he made many stops in Europe, where he obtained fruits and/or cuttings of Istrian hazelnut from Italy; grape and carob from Lissa (Vis); as well as English walnut, olive and lemon from Cattaro (Kotor). On this second visit to Egypt he gathered and shipped suckers from six varieties of date and seeds of the sausage tree. Before joining another plant explorer in Algiers he made stops in Greece, Malta, and Malaga, where he collected 'Colla Giant' seedless lemon, seedless grapes that produce the "Zante currants" and the first 'Pfax' budded pistachio trees from Greece; blood orange and the 'Lumi-laring' orange from Malta; in addition to fig, Jordan almonds and 'Vera' carob from Malaga, Spain.

He rejoined Lathrop in 1901 for a second plant expedition around the world. He sent the 'Lan-fan' peach, persimmons, olives and two types of litchis from Canton, China. He met John M. Swan, a doctor at a missionary

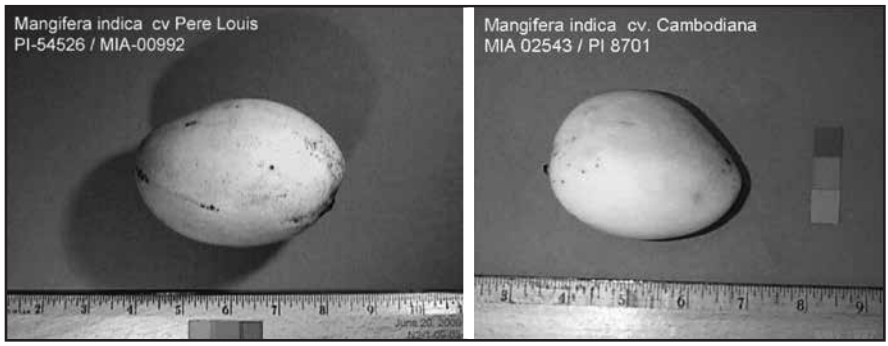

Fig. 2. 'Pere Louis' and 'Cambodiana' mangoes first collected by David Fairchild in 1898 and 1901, respectively, and still preserved at the Subtropical Horticulture Research Repository (Miami, Florida) of the USDA-ARS National Plant Germplasm System (NPGS) that Fairchild founded.

hospital in Canton, who helped him collect dozens of peaches, plums, persimmons and other fruits. In Bombay (Mumbai) he collected the 'Borsha', 'Pakria', and 'Pirie' mangos and arranged for shipment of the 'Ameeri', 'Paheri' and 'Totafari' to Washington D.C. After Hong Kong, Singapore, Ceylon and Bombay, Fairchild left Lathrop to explore Iraq and the Persian Gulf over the next two months for date palms. During that trip, he arranged for the introduction of 'Quetta' nectarine and 'Goolabie' grape from Quetta, then in British India, now in Pakistan, He collected 224 date palm offshoots or suckers, including those of 'Zahedi' and 'Halawi', each weighing ~30 pounds, and shipped almost four tons of trees to Washington. And in Saigon, he collected seeds from his favorite fruit, the mangosteen, and his second favorite, the 'Cambodiana' mango (Figure 2). This variety of mango is one of 24 that he collected from six countries during these four years. From the marketplace, he bought at least 100 fruits and hired half a dozen "boys" to eat them and scrub the seeds before packing them in charcoal and shipping them in time to return to the ship and rejoin Lathrop in Japan. The majority of the mangoes mentioned above are still preserved at the Subtropical Horticulture Research of the NPGS in Miami, Florida (https://npgsweb.ars-grin.gov/gringlobal/view2.aspx?dv=web_site_taxon_accessionlist&params=:taxonomyid=23351;:siteid=8). In Japan, he collected fruits and vegetables at public markets including the Nagi fruit and the 'Tanaqua' loquat, and fell in love with bamboo plants and flowering cherry trees. He collected bamboo plants and 30 varieties of flowering cherry and shipped them to Washington. Unfortunately, the workers who received this shipment of flowering cherry trees did not know how to handle it and sent the trees to California, where they died.

In 1902 Secretary Wilson finally acknowledged Fairchild and Lathrop's contributions in his written report in the 1902 Yearbook of Agriculture: "This work has been greatly aided by the generosity of Hon. Barbour Lathrop who, at his own expense, has carried on extensive agricultural explorations during the year, assisted by Mr. David G. Fairchild, an agricultural explorer of this department." He mentioned bamboos and dates as particularly valuable finds.

Fairchild visited the renowned plant breeder Luther Burbank in Santa Rosa, California prior to joining Lathrop in Africa for the next six months. He summarized his impressions of Burbank and the 'Burbankian episode in American horticulture' as: "He was the pioneer in large-scale methods of selecting seedlings from beds sown with millions of cross-bred seeds, and that his work marked a distinct advance over the old method of chance discovery of 'sports' in hedgerows and dooryards, and thus he blazed the way to much larger operations than had previously been thought necessary for the discovery of new varieties of fruit trees." Later, traveling in Africa with Lathrop, he collected kaffir orange in Lourenço Marques (now Maputo), Mozanbique, and discovered a delicious miniature pineapple from Natal, South Africa.

Upon his return to Washington D.C., he met Gilbert Grosvenor, editor of the National Geographic Society magazine, who invited him to address the society about his expedition to Bagdad. Mr. Alexander Graham Bell, who happened to be Grosvenor's father-in-law, was in attendance and invited Fairchild to one of his "Wednesday Evenings," an important social event in Washington. It is at this event that Fairchild met Mr. Bell's younger daughter, Marian Bell (Figure 1), whom he married in 1905. They bought a 40-acre lot in Maryland, which Mr Lathrop later named "In The Woods," and planted with many of their favorite plants, including 125 Japanese flowering cherry trees.

In April 1906, he was again placed in charge of the Office of Plant Introduction (OPI). Along with his predecessor, Mr. A. J. Pieters, he had hired Frank Meyer for his first three-year-long exploration of China. Dr. Fairchild's excitement over new foods

was transferred to Mr. Bell and Mr. Grosvenor, who served new introductions from the office at Bell's "Wednesday Evening" events and at the annual banquet of the National Geographic Society, respectively. The introductions served included: 'Deglet Noor' dates grown near Indio, California; and preserved Chinese jujubes or T'saos from Chico, California.

To bring attention to the newly introduced plants, Dr. Fairchild inaugurated a bulletin on August 19, 1908 titled "Plant Immigrants," illustrated with photographs of these introductions. After 210 numbers containing 340 full-page illustrations by members of the Office staff, the bulletin was stopped in 1924, to the chagrin of Dr. Fairchild who believed in its value for introducing these new plants to farmers and others interested in new crops.
By 1910, plant immigrants came in at the rate of 10 a day and the five Introduction Gardens available by then were not sufficient to care for them. Doctor Galloway succeeded in getting an appropriation that allowed the department to establish a permanent plant introduction site near Washington named the Bell Garden, which replaced the ill-suited Yarrow Garden. Fairchild also supervised in person the establishment of the Brookville Plant Introduction garden in western Florida, and of another one in South Miami, given by Charles Deering in 1915.

The Quarantine Act, which was passed by Congress in 1912, halted the unrestricted flow of plants. Upon finding out that the chestnut blight that was killing the American chestnut must have been introduced with the Chinese chestnut, which tolerated the fungus, Fairchild expressed his regret at feeling impatient towards quarantines and inspections.

Of the many accomplishments Dr. Fairchild is known for, introducing the 'Sakura' or flowering cherry blossoms is worth special mention. The 125 trees planted at 'In the Woods' thrived in Maryland and were beloved by the Fairchilds. To make them better known in Washington, the Fairchilds ordered more of the hardy drooping cherry trees, and in spring 1908 donated them to each school in the District of Columbia. Their enthusiasm for these beautiful 'Sakura' trees caught on and the first lady, Mrs. Taft, ordered the importation of flowering cherry trees to plant along the speedway. The mayor of Tokyo offered 2,000 trees as a gift to Mrs. Taft. Unfortunately the trees in this 1910 shipment were all burned when the inspectors from the Quarantine Office detected a number of pests on the trees. The second shipment of this gift from the mayor of Tokyo in 1912 was clean and the cherries were planted around the speedway and have become a major spring attraction in Washington D.C.

Frank Meyer's death by drowning in the Yangtzee River during his fourth trip to China was a major blow to Fairchild, who commented in his memorial: "Meyer's work is done. He will know that throughout his adopted land there will always be his plants, hundreds of them – on mountainsides, in valleys, in fields, in the backyards and orchards of little cottages, on street corners, and in the arboreta of wealthy lovers of plants. And wherever they are they will all be his." With the $1,000 Meyer gifted to the Office, Fairchild established the Meyer Medal for meritorious work in the field of Plant Introduction. The medal's first recipient was Barbour Lathrop and this medal is still awarded yearly to explorers who contribute distinctive service to what is now the National Plant Germplasm System (NPGS).

Their growing love for Florida prompted the Fairchilds to purchase a property in 1916 in Coconut Grove where "The Kampong" (meaning "village" in Malay) was established. Dr. Fairchild enjoyed growing his introductions in this sub-tropical/tropical climate and he and his family spent an increasing amount of time at their beloved home in Florida. Many of these plants are now preserved in what has become a public garden of the nonprofit National Tropical Botanical Garden.

Between 1924 and 1933 Fairchild participated in the Allison Armour Expeditions

aboard the Utowana, a cargo vessel purchased by the philanthropist Armour and outfitted for scientific expeditions. Regions explored aboard the *Utowana* included the Mediterranean, the coast of Africa, Ceylon, the Moluccas, Indonesia, South America, Mexico, and the West Indies. These travels are described in two of Fairchild's books, Exploring for Plants, 1930; and The World Grows Round My Door, 1947. More recently some of the expeditions were described by Francisco-Ortega et al., 2012, 2014; Korber et al., 2016; and Rose et al., 2017.

By the time Fairchild retired from the OPI in 1933 as a collaborator, he and his explorers had introduced more than 80,000 accessions into the U.S. The NPGS is a lasting tribute to Dr. Fairchild's vision and philosophy of free exchange of plant varieties between the different nations of the world.

The Fairchild Tropical Botanic Garden (FTBG) established in 1938 on 83 acres by the retired accountant Col. Robert H. Montgomery and named in honor of his friend, David Fairchild, is another enduring legacy of his tireless efforts to introduce, evaluate and preserve tropical genetic resources. His last exploration, in 1939-1940, aboard the Chêng Ho to the islands between Borneo and New Guinea, was sponsored by Anne Archbold to collect plants for the FTBG.

His four books and over 400 articles detail his experiences with growing plants and enjoying all they can provide and testify to his passion for plants in all their glory. Of the many fruits he introduced to the U.S., the mango was a favorite. The 'Cambodiana' (Saigon) has been used in breeding and is in the background of the cultivars Alice, Herman and Florigon while the 'Carabao' mango assisted in the spread of the mango and the development of important Florida cultivars such as Tommy Atkins and Kent, now grown in many parts of the world. The 'Quetta' nectarine has also been important in breeding new cultivars through its offspring 'Le Grand'.

Dr. Fairchild received many awards during his lifetime before passing away on August 6, 1954 at 'The Kampong'. These awards are listed in the detailed bibliography written by George Lawrence in 1964. When honoring Fairchild in 1940 in a ceremony at a government experiment station in Maryland, Secretary of Agriculture Henry Wallace said: "The garden of your dreams has been not merely a pretty thing; it is woven into the very fabric of our lives." I would like to conclude with one of Dr. Fairchild's quotes, which illustrates how he lived his life, according to his granddaughter, Helene Pancoast: "Never be satisfied with what you know, only with what more you can find out" (Stone, 2018).

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