THE CARRELL

JOURNAL *OF THE* FRIENDS
of the UNIVERSITY OF MIAMI LIBRARY

Volume 18 1977

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JOURNAL OF THE FRIENDS OF THE UNIVERSITY
OF MIAMI LIBRARY
P. O. Box 248214
Coral Gables, Florida 33124

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Cover: WALTER T. SWINGLE 1911. Portrait medallion by Theodore Spicer-Simson; cast bronze 90mmX90mm. Original in the University of Miami Library, Special Collections; gift of Mrs. Walter T. Swingle.

The Carrell is published once a year in December. It is indexed in *Annual Bibliography of English Language and Literature*, in *MLA International Bibliography*, and in *The Year's Work in English Studies*.

Walter Tennyson Swingle, 1871-1952

FRANK D. VENNING

Editor's Note: Dr. Swingle was Consultant in Tropical Botany at the University of Miami from October 1941 until his death in January 1952. His botanical library of 3,500 volumes was given to the University by his wife, Maude Kellerman Swingle, "in appreciation of how pleasant the last 10 years of his life had been made because of his association with the University." In addition, his diaries, notebooks, letters, honors, and significant papers were presented to the Library's Special Collections.

IN DECEMBER 1940, as he neared the mandatory retirement age of 70, Dr. Walter T. Swingle was one of America's outstanding botanists and agriculturists. Instead of taking pride in the accomplishments of a fifty-year career with the U.S. Department of Agriculture, he felt frustrated. He did not think of himself as old, had no intention of retiring and could not possibly think of leaving the Department, for he had work to finish, projects to continue, new work to begin.

As a world authority on citrus, he was writing a 412-page monograph on *The Botany of Citrus and Its Wild Relatives of the Orange Subfamily*, the culmination of many years of technical study. As an international expert on the date palm and the founder of date culture in America, he felt his judgment and guidance were still needed for this industry to obtain optimum success. A career-long student of plant pathology, he was worried that the "tristeza" disease he had seen the year before destroying Brazilian orange groves might enter the United States now that air travel had begun. If it were to, no one else was taking seriously the threat that California growers stood to lose all their orange trees, Florida growers half of theirs. As a geneticist and plant breeder (he had coined the term "plant breeding" back in 1897), several hundred of his citrus hybrids were yet unstudied, undescribed, untested as new rootstocks. Fruits such as the lychee showed promise for

peninsular Florida, but problems stood in the way of routine commercial production. Swingle planned a series of monographic studies like the one he was writing on citrus, now that a technique had been perfected under his direction for "restoring" dried plant specimens from the herbaria and preparing them for microscopic study. As a student of Chinese civilization he had found eastern Asia to be a veritable storehouse of useful plants, and although he had supervised extensive translations from Chinese literature about them, he knew the surface had barely been scratched, and who was better able to continue the work? In addition, there were all those plants used by primitive peoples to stupefy fish. They needed to be correctly identified and studied as possible sources of new insecticides. There was no end to work in sight.

At the time that formalities were under way that would allow him to remain as a collaborator at the Department of Agriculture Swingle was stricken with his first serious illness, appendicitis. In hospital after surgery he was visited by David Fairchild, his friend from student days at Kansas State University. Fairchild invited him to his home in Coconut Grove, Florida and Swingle accepted. As early as 1897 the two friends had envisioned a future retirement in south Florida, and now perhaps that time had come.

When Fairchild returned to Miami in 1940, he took sub rosa action prior to Swingle's arrival, in the hope of making it possible for Swingle to keep a promise made years before in the enthusiasm of youth.

In 1896, after Henry M. Flagler had completed the Florida East Coast Railroad as far south as Miami, he became interested in the creation of a laboratory to study tropical plant diseases. As an inducement, in 1897 he offered the Department of Agriculture an acre of land in Lemon City, about fives miles north of the mouth of the Miami River. When Mrs. Mary Brickell heard about it, she promptly offered six acres of Brickell Hammock, if the government would put the laboratory there. Both Swingle and Fairchild had hoped that such a laboratory could include a garden for introducing and studying tropical plants.

Swingle and his assistant, Herbert John Webber, were ordered to Miami in the fall of 1897 to inspect the sites, take possession, and get things started. They found the hammock land ideal, and persuaded Flagler to subscribe $1,000 towards construction of a laboratory in lieu of the acre in Lemon City. Swingle and Webber hired a crew and personally surveyed and staked off six acres between the old road to Coconut Grove and Biscayne Bay, supervised partial clearing of one acre, and had construction of the laboratory under way when they were joined by Fairchild early in 1898. None of them had been in south Florida before; they were thrilled by its tropical character, by the young seedling mango, avocado, and papaya trees in people's yards, and by having a place where they could grow tropical plants. It was the first official U.S. Plant Introduction Garden. They made plans to take turns in managing it, and, in their enthusiasm, solemnly promised each other that when they retired, they would all move to Miami, where they could work together studying tropical plants.

These plans had not worked out; their individual abilities had led to positions of far greater scope and responsibility than the management of a six-acre garden. At retirement, only Fairchild had moved to Miami, where he devoted himself to tropical plants. Webber had become a pioneer cotton breeder, later Professor of Subtropical Horticulture and Director of the Citrus Experiment Station of the University of California at Riverside. Although now professor emeritus, he was still at work, and all his family ties were in California. Swingle had passed up retirement at 65, and at the age of 70 was staying on in Washington as a collaborator; his wife Maude, only 53, was a bibliographer at the department library. They needed her salary now that living costs were rising. Their oldest boy was still in college, the younger one just entering, the older daughter about to be married, and the younger one starting high school. What possible chance was there of his moving to Miami? Fairchild could see none; yet, might there not be a way?

Fairchild called on Dr. Bowman F. Ashe, president of the University of Miami and a member of the board of the Fairchild Tropical Garden. He outlined Swingle's career, and wondered if the University might offer him a part-time or similar position. Dr. Ashe was noncommittal, but expressed an interest in meeting Swingle.

By February 1941, Swingle was well enough to travel. He arrived in Miami just before the annual meeting of the Fairchild Tropical Garden. Colonel and Mrs. Robert H. Montgomery gave a luncheon for the officers and members of the Board of Directors, at which both Ashe and Swingle were present. After lunch, Ashe approached Swingle and said, "I'd like to have your opinion. What do you think the University's role might be, in relation to the needs of Latin America?" (Before jet travel, Miami's proximity to Latin America was perhaps of greater significance, and President Ashe stressed the need for fostering studies in the Hispanic-American field as "the true means by which sympathetic inter-American understanding could be advanced." A limited student exchange program was under way, but in looking toward the future, would these efforts be enough?).

Swingle replied with a profusion of ideas, for he was *never* at a loss for ideas. He felt deeply and warmly toward all people; he understood the meaning of intellectual good will, and, when talking to someone, he had that rare gift of making you feel that you and your concerns were the only things in the world that mattered at the moment, and he meant it. Dr. Ashe was favorably impressed and located a "Friend of the University" who agreed to provide an honorarium for three years. He then invited Swingle to call on him.

"We would like to propose," Dr. Ashe began, "that you act for us as Consultant in Tropical Botany, to help make your information and experience available to the University, to South Florida, to the Latin American countries, and to science in general. We can't offer more than an honorarium and a travel allowance, but we can give you an office, stenographic help and student assistance, and the laboratory equipment you need for your work." Dr. Ashe continued, "You'd be a member of the faculty and

a science associate, but we'd leave your activities and procedures up to you. We have no desire to limit you as a free agent." It was hard to refuse such a proposal. Swingle talked it over with his family when he returned to Washington and then accepted. Dr. Ashe was pleased, Dr. Fairchild elated.

I was a senior at the University at the time, a botany major and student assistant. We noticed the famous "cardboard" partitions being shifted to make a new room about 12 by 20 feet. When the hammering and sawing continued, we looked in to see that bookshelves were going up all the way to the 15-foot ceiling. Then came the big wooden boxes, 11 from Washington, 12 from California: three tons of books. Finally, Dr. Swingle arrived, a tall, slim, distinguished-looking gentleman with white curly hair, a trim white moustache, and manners suggesting Old World courtliness. He spoke in a soft voice accompanied by expressive hand-gestures. I was assigned to help him unpack his books.

Each box contained an assortment of books, journals, technical bulletins, and the like, so we had a big sorting and collating job on our hands. As we worked, Dr. Swingle kept up a running commentary about each item. What I had assumed would be routine mechanical labor turned into a whole new botanical education. (Our botany courses had given us a respectable understanding of the fundamentals of the plant sciences, and a lot of experience studying living plants, but we had not learned much about botanists themselves, nor had we had much exposure to original botanical literature. In those years, the library had an "excessively modest" number of titles in botany, and subscribed to one or two botanical periodicals. I had never heard of the publications we were unpacking.)

Among the books there were some "birds of rare plumage". A thick quarto, bound in vellum, was a Greek edition of Pliny the Elder's *Historia Naturalis*, published in Athens in 1559. "It's worthless as science", Swingle said, "because Pliny only went to second-hand sources, and it's part fact and part myth. The one time he undertook an original study he got into trouble. He went to investigate the eruption of Vesuvius, the time it buried Pompeii, got caught in a cloud of poison gas, and was asphyxiated." When *The Gardener's Calendar*, London, 1754, turned up, he observed, "They call England a nation of shopkeepers, but they're also a nation of gardeners. I don't know any other people in Europe as dedicated to growing plants for pleasure." He showed me the hand-painted gold designs on the page dedicating *The Voyages and Travels of the Ambassadors to Tartar, Persia, and Muscovy* to His Majesty, King Charles II, printed in London in 1669. The beautiful full-color lithographs of grape varieties in a half-folio monograph, *La Grandeur de Tunisie, d'Algerie et du Maroc*, reminded him that, "We've never been able to grow Old World grapes, the *viniferas*, in the eastern part of this country; it's either too cold or too wet, and they go down under a host of pests and diseases. But west of the Rockies it's another story. In 1898 the Office of Pomology paid my way to Europe to make a collection of good table grapes that might work out in California. I stopped in Paris to look them up, ran across this monograph, and decided to collect in North Africa, too. Some of those were the most successful."

When we came to the Chinese books, it was clear that he held them in special esteem. It was the first time I had seen an authentic Chinese book; the binding went all the way round on four sides, like a box with the ends missing, and was held shut by two ivory pins on little straps, the pins inserted into keepers. "See how the Chinese make a book", he said, as he slipped out the pins and opened it. To my surprise, the cover fell away loose, and inside was what looked like a stack of large paperbacks. He handed me one of these, explaining, "They bind each chapter separately; that way, you don't have to hold the whole book while you read it."

When Chi Han's *Nan fang ts'ao mu chuang*' was unpacked, Swingle told me, "This is the oldest Chinese botanical treatise we know of. Chi Han wrote it in the 3rd Century. In it he describes a method of biological control of the insect pests of oranges and other fruit trees, in use in south China. The Chinese colonized their trees with a voracious stinging ant that drove all other insects away. These ants nested near the branch tips by sewing leaves together, and they all went into the nest at night. Chi Han reported that these ants were raised, "harvested" by tying a sack over the nest at night, then cutting off the twig. They were then sold to the farmers, who tied the nest in a tree, opened the bag, and stretched bamboo poles from tree to tree so the ants would colonize the whole orchard. When we translated and published it, nobody paid the slightest attention. They didn't believe it, but you know what? We found a village in south China where they still raised and sold these ants to the farmers, just as Chi Han described 1700 years ago!"

We did not always spend my eight work-hours a week unpacking books; there were local people and places Swingle wanted to visit, and he took me along with him. On these occasions I was treated as a colleague and expected to act as the "devil's advocate" — to offer opposing data, or take a different side in the question he had brought up. It was his method for arriving at a sound conclusion, and for stretching the mind, but it could be hard going. He had been so long familiar with the technical details of his specialties, he did not realize how dismayed his "colleague" was by being expected to discuss such opinions as, "I think the Procimequat throws light on bigeneric Fortunella-Citrus back-crosses, possibly represented by the Malay hedge lime, since the Procimequat is really intermediate between a true bigeneric back-cross and a trigeneric hybrid, because *Fortunella hindsii* is in the subgenus Protocitrus."

By the semester's end the last box had been unpacked; the books, journals, bulletins, and reprints all sorted and on the shelves. Swingle was going back to Washington, I was graduating, the country was at war, the future uncertain. I told him goodbye, not really expecting to see him again. It worked out differently, however.

Swingle was completing his monograph on the Citrus subfamily. The Department of Agriculture had provided technical facilities and an assistant, Dr. Albert H. Tillson, for the work. Many of the type specimens of

these plants were so fragmentary that Swingle adopted a technique developed by the Swedish botanist, H.O. Juel, for "restoring" critical portions of a herbarium specimen so that they could be sectioned and made into permanent slides for microscopic study. This method made it possible to easily separate genera and species formerly in doubt. Its effectiveness so impressed Swingle that he urged the University to undertake a long-range project to compile a reference collection of serial sections of the critical parts of all tropical economic plants and their relatives, including plants of potential economic importance. The collection was to be used in general anatomical and morphological studies, and as an aid to taxonomic studies of tropical economic plant groups. When the University expressed interest, Swingle suggested that I come to Washington to learn these techniques, which I did. The University began "The Swingle Project" in 1943 (it later became the Swingle Plant Research Laboratory), I was hired to begin the work, and was associated with Dr. Swingle for the remainder of his life. The Laboratory was discontinued in 1954.

* * * * *

What conditions and influences guide early mental development, and lead to the life work and toward the manner of man that was Walter Tennyson Swingle? The eldest child and only son of John Fletcher Swingle and Mary Astley Swingle, a young hard-working progressive farm couple, he was born to them on January 8, 1871, on a farm in Canaan Township, Wayne County, Pennsylvania. When farm commodities and property values fell in the panic of 1873, the family moved to Kansas. The Swingles bought a hill farm near Manhattan, a cheerless town with a waste of muddy, treeless streets lined with brick and wooden stores. The new Kansas State College of Agriculture was nearby. The community was made up essentially of conservative, Protestant, white, American-born, independent farmers with a strong bent for moral reform, a reaction to the scandalous goings-on in the cattle towns. Two-year-old Walter began to stammer badly.

The family's first full year of farming, 1874, coincided with a grasshopper plague and a severe drought; moreover, the hill farm proved to have very poor soil. It was eventually sold, and another was purchased on good prairie land. Miriam, his sister, was born. Walter was "five, going on six" when the news came that General George Custer had made his "last stand." In the fall, his parents sent him to the one-room rural schoolhouse, where he could hear the teacher give the children in all the other grades their lessons; he could listen to all of them recite. By the time he was nine he had sopped up the school's entire curriculum, so he stayed home and worked on the farm, and his English-born mother gave him lessons. In later years, Swingle looked upon this as an advantage; he felt that formal schooling was turning out children who were much too regimented and standardized; children would develop faster and with more originality if allowed to follow their natural interests.

As he grew up, Walter helped "Pa" cut wood, shock wheat, pick corn. He herded their cows on the prairie, helped "Ma" churn butter, gather eggs, pluck chickens — the commonplace everyday and seasonal chores of a midwestern family farm. It was not a lonely boyhood — there were neighbors nearby. They visited, gave each other a hand at harvest, and had children near Walter and Miriam's age who were his friends. He and the other boys fished in the creek, spent the night at each other's houses, made up games, slid down the haystack — did all the things young farm boys do. When he was ten, he came across a copy of *The Youth's Companion*, the magazine that generations of smalltown and farm boys eagerly looked forward to receiving each month. He wanted to subscribe, so "Ma paid me ten cents a churnfull for churning and I sent off for it."

Nor were the Swingles intellectually isolated. They could easily hitch up the buggy and ride into town. They were concerned about local, state, and national events, issues, decisions. The Kansas land boom of the early Eighties, and the depression that followed, placed a burden on the farmers. Discontent was strong among them, radical populist agrarian opinions were voiced, and issues were publicly debated in town. The Swingles often took Walter along, and he listened to "Resolved, that wealth has more influence upon the central government than labor," "Resolved, that Charles J. Guiteau was insane at the time of the asassination," and debates of similar questions. However, the Swingles were not as bent on moral reform as were their fellow Kansans. When Kansas went "dry" in 1880 (it stayed "dry" until 1949), "Pa and I gathered grapes in the woods, and he made us wine."

Swingle loved the plants and the wildflowers he saw. If nobody could tell him what they were, he made up names of his own for them. When he found out that you could "look them up," he stopped by the College and obtained a copy of Gray's *Manual of Botany*. He "looked up" his plants, and became highly proficient in systematic botany before he had much, if any, formal education. This set him apart as something of an intellectual prodigy.

When he was fourteen, he lost his mother. She had "set out his lessons" according to what she saw were his needs, had taken his interests seriously, and had encouraged him in pursuing them. He had no difficulty enrolling as a student at Kansas State College at the age of fifteen. In this environment he rapidly developed, and his acumen and character traits were revealed. He had a retentive memory and an intense, restless, intellectual curiosity. His nimbleness of mind and imaginative insight became apparent from the kind of questions he raised: "How long can a weed seed lie in a field before it sprouts?" (No one knew the answer.) "Why don't we try to get rid of weeds by introducing their diseases?" (No one had ever thought of that.) "If we tried to hybridize corn, when is the silk receptive to pollen? How long does it stay receptive?" (No one had experimented to find out.) He was fortunate to come under the influence of Professor William Ashbrook Kellerman, a pioneer in the study of plant diseases. Swingle entered this field with enthusiasm;

he was ambitious, hardworking, with a bulldog tenacity of purpose, and he had a flair for discovery. By his sophomore year he was doing original work, and published his first scientific paper jointly with Prof. Kellerman in 1888. Between 1888 and 1891 he published 21 scientific articles in joint authorship with Kellerman, varying from brief notes to papers of considerable length, in addition to six original papers of which he was the sole author.

When Swingle entered college in 1886, George Fairchild was the college president, and his son David, two years Swingle's senior, was a student there. When Swingle was just 16, he read a paper before the College Scientific Society. David Fairchild was present, and later described it:

"At one of the first meetings, a young classmate of mine, W.T. Swingle, amazed us by delivering a scholarly address on the fungi which cause such diseases as the wheat rust. It was an entirely new subject to us, and we sat spellbound while he presented his discourse. Entranced, we watched Swingle's long arms wave about and his piercing gray eyes dart from one to the other of us. It gave me my first insight into the great intellect of Swingle. It was from him that I first heard the word "bacteria", and with it he opened for me the door into the world of microscopic organisms. Delivering an address was a praiseworthy feat for Swingle, as he was easily embarrassed and inclined to stammer."

Swingle struggled to overcome his stammer. He never really lost it, but developed a way of speaking that kept it from being an impediment. He spoke in a soft voice, pronouncing consonants very softly, and occasionally omitted a glottal stop. His speech was fluent and rapid, but required his listeners' close attention. His voice did not carry, and he did not "come across" as a public speaker; if he raised his voice, or attempted to shout, the stammer became apparent. When he was only seventeen, two years before graduation, he was appointed to the position of assistant botanist in the Agricultural Experiment Station.

It should be kept in mind that in the nineteenth century, comparatively little scientific work had been done or was under way in botany or agriculture in America; it was, rather, the great period of European scientific research, discovery, and development, led principally by German and French institutions. As Swingle's familiarity with the literature increased, he quickly appreciated the importance of discriminating between original and secondary sources. He realized that familiarity with the American and English scientific publications was not enough — a reading knowledge of other languages was essential, beginning with technical German. He took formal German courses, but did not acquire the facility he wanted. It was typical of him to look for help elsewhere, and so he went to the immigrant German laborer whose job it was to feed the pigs at the Experiment Station! With this man's help and his own tenacity, he mastered the German language.

Swingle graduated from Kansas State in 1890 with a B.S. degree. Although only nineteen, he was already a competent plant taxonomist, an able research worker, had published original work in mycology and plant pathology, in genetic phenomena and characteristics of hybrids, and had become something of a bibliophile. Warm-natured but shy, he had shown little overt interest in girls. His steadiness of purpose did not permit emotional or physical distractions. Thrills came from accomplishment and discovery, excitement from sharing and discussing his findings with his peers.

To describe the next fifty years of Swingle's career in one short phrase one might say it was an astonishing accomplishment, accompanied by increasing frustration. Some insight into the reasons for his frustration is afforded by a critical look at his training and education. While growing up and while in college, he had never been confined within a planned, orderly, day-by-day routine; he had always had sizeable amounts of unorganized time for following up ideas, for spur-of-the-moment activities as his thoughts or interests led. He had no training in the principles of agricultural economics, economic theory in general, or in business or finance, nor did he ever take any interest in these subjects. He immediately recognized and appreciated fine craftsmanship in all its forms, but had little interest in or knowledge of the fine arts. Yet he was an artist, in the sense that a creative artist does not express ideas that are being expressed by everyone else.

Further insight is gained by keeping in mind that Swingle's formative years lay in the nineteenth century. His conceptual approach to solving a problem or turning an idea into reality was the linear approach of that century: To begin at one end and hope to come out at the other; not the three-dimensional conceptual approach of the twentieth century, which first envisions the completed whole, and then the elements required to achieve it. Throughout Swingle's career he was often out-of-step with his times, his ideas in advance of their time of acceptance, his method of approach seeming disorderly, wasteful, with ill-defined goals, in the eyes of the administrators of the twentieth century.

In 1891 Dr. Beverly Thomas Galloway, Chief of the Section of Vegetable Pathology of the U.S. Department of Agriculture, offered Swingle an appointment (David Fairchild had joined the Section in 1889). Swingle was only twenty, and unable to accept without parental permission. In 1891 he became the seventh member of that tiny group of research men, all scarcely more than boys. It was a time when the Department was beginning to concern itself with the great fruit-growing regions of the South and Southwest. Citrus grove owners had been complaining to the Department for a number of years about the diseases attacking their trees, and were urging that control measures be sought. In the summer of 1891, Swingle was sent to make a survey of the more important orange-growing regions of Florida. The town of Eustis, in Lake County, was in the heart of the citrus belt, and he started there. Oranges are such a common fruit today that it is hard to realize that at that time they were a rarity in the

northern markets, mostly imported from Spain and Sicily, a luxury not often on the tables of most Americans. Swingle used to tell of his first day at Eustis:

> I walked the hot sandy streets of that little town that afternoon, looking at all the strange plants. A house at the edge of town had an orange tree on each side of the gate, covered with big reddish oranges. I asked those people if I could buy some. 'Sonny', they said, 'you can have all those oranges you want; they won't cost you a cent.' So I went back to town, looked up the hardware store, bought the biggest pail they had, then went back to the house and started to pick. The people in the house waved and smiled, so I went ahead and filled my pail. I walked back to a shady spot, sat down and peeled an orange, and put about half of it in my mouth. For a minute I couldn't believe what was happening — it burned and tasted like a cupful of pure acid — I thought I was poisoned! I knew I'd made a bad mistake, and decided right then that I had a lot to learn about oranges, and I'd better get busy if I wanted to stay in business. (The trees were the Sour Orange, *Citrus aurantium*).

He did get busy; he examined groves and talked with growers at twenty-six towns in fourteen counties. He stayed two months, studied a number of diseases, and wrote to Dr. Galloway that "I found the reports of damage to citrus not exaggerated, and no substantial preventative measures being taken, due largely to the obscure nature of the maladies." The growers wanted a federally-sponsored program to eradicate the most prevalent and destructive diseases; Swingle had them sign petitions, and took these back to Washington.

There were no funds for further action until March, 1892, when Swingle was again sent to Florida. In June, he came across a grower who had made "many exceedingly valuable crosses" of citrus. He immediately sensed the new potentialities, and began to study orange pollination. Meanwhile, the citizens of Lake County offered to erect a laboratory at Eustis, and to donate enough land for experimental field work. When the Section's appropriation was increased in July to equip a laboratory, Swingle was recalled to Washington to plan the facilities and its work. There were funds for an assistant and he selected Herbert John Webber, a young graduate student at the Shaw School of Botany, studying under Dr. William Trelease.

Swingle and Webber returned to Eustis to supervise construction of the laboratory which was completed in 1893. They studied the anatomy and physiology of healthy and diseased orange trees, and Swingle began making new citrus hybrids — a slow, long-term project — hoping to develop new, disease-resistant fruits and rootstocks.

Swingle worked at Eustis until the summer of 1895. By 1894, sooty mold, a destructive disease of the fruits, had been controlled; lemon scab, another very troublesome disease, had been checked; and the more obscure diseases such as blight, foot rot, and dieback had been studied and much new information compiled. But these and other problems were not amenable to easy solution. By 1893, Swingle and Webber were convinced that to insure success, a scientific subtropical horticulture was needed, and that to achieve it they needed taxonomic, morphological, anatomical, and physio-

logical studies of the orange tree and its fruits — in short, science in the exact, pure form. Swingle conceived an ambitious long-range research program that also included the search for and introduction of new species and relatives of citrus, to be used for breeding experiments for disease resistance. He expanded this latter concept to formulate a program for the introduction and study of other foreign plants that might be useful in Florida. Swingle was pioneering when he proposed these programs, and the reaction was mixed. The growers wanted practical results in disease control, and that was all that they wanted. They did not see how all these new studies would be of any use to them; it was not the reason they had donated their land and their money. In Washington, his chief had to compete with other sections of the Department for appropriations, and practical results counted. He also had to assign priorities in his own section, which was responsible for federal plant disease studies and control throughout the entire country. Although Galloway saw merit in the proposal, execution of such a program implied a large budget over an indefinite number of years, to be spent in the hope that the information acquired would include data applicable to solving the problems.

Swingle saw that he had a public relations job on his hands. He had to prepare reports to Washington, explaining in detail his findings and reasons for including specific study projects in the program. He had to educate the public as well, so more time was spent giving addresses to growers and writing articles of a popular nature. All this on top of his regular work. From 1892 through 1895 he published 21 scientific papers, and was the sole author of all but three of them. He kept close track of literature in his field and was determined to study at the University of Bonn under Herr Doktor-Professor Eduard Strasburger, a leader in anatomical and cytological research. The great freeze in the winter of 1894-95 provided the opportunity. There had been no freeze like it since 1835, when hundred-year-old orange trees had been killed to the ground. In late 1894, the growers had been expecting to harvest six million boxes of citrus. The freeze arrived just before picking was to begin, freezing the fruits solid, and killing the trees back to mere stumps. All the new hybrids, laboriously made by hand pollinations and carefully nurtured, were killed. It would be fourteen years before Florida again reached the same level of production. Swingle did what he could, studying cold damage, and assessing the magnitude of the disaster. He then requested permission to take leave, and in late summer sailed to join Fairchild at Bonn.

The intense intellectual atmosphere of the University of Bonn was a surprise to Swingle. The students were thinkers, the professors leaders in their fields. His chemistry professor, Dr. Friedrich Kekulé, theorized that the carbon atoms in a molecule of benzene were arranged in a hexagonal ring — a revolutionary idea of fundamental significance. Strasburger's cytological discoveries, his concept that chromosomes were the carriers of heredity, his mastery of the new science of the cell, inspired his students, who spent their days and their nights bent over their microscopes. Strasburger greeted them each morning by asking, "Have you found anything

new?" One November morning he came in carrying a photograph, and instead of the usual greeting, said, "Gentlemen, my friend Röntgen has just made an amazing, unprecedented discovery. It will be of the greatest use to surgery." Strasburger then showed them the now historic first X-ray photograph of the key, the ring, and the purse.

Swingle's cytological research at Bonn proved for the first time the existence of centrosomes in plant cells, a subject that had been hotly debated. Although his proof settled debate, he was disappointed that his discovery was never found to be of any particular significance. But his studies prepared the way for his later work in genetics. He also learned a bit of philosophy from Strasburger that proved useful later on. One day an excited student ran into the laboratory with a new issue of a botanical journal, shouting, "Herr Professor! You've been attacked!" Strasburger calmed the student by replying, "Oh, that's all right. If what I said is true, it will stand up. But if there's new evidence that proves me wrong, we'll all learn something from it."

In the summer of 1896, Swingle occupied the Smithsonian Chair at the Marine Zoological Institute at Naples, Italy to continue studies of the cell, returning in the fall to the laboratory at Eustis.

On the basis of his studies abroad and his published reasearch, his alma mater, Kansas State College, conferred on him the Master of Science degree in the fall of 1896. The next twelve months were spent in plant-breeding work. The freeze of '95 convinced Swingle that cold-hardiness should be included among the objectives of the citrus breeding program. He also became interested in pineapple breeding. An idea of the intensity of his efforts at that time is gained from his monthly report for March, 1897: "I have just finished crossing the orange and the pineapple . . . Crossed nearly 600 flowers of the orange and over 700 of the pineapple. So far I have about 110 oranges 'set' and hope I will get about 75 to ripen."

This pioneer period of citrus breeding, begun by Swingle and Webber, was continued by one or both of them through 1899. They crossed choice oranges and other citrus fruits with the extremely hardy trifoliate orange (*Poncirus trifoliata*), which stands the winters well as far north as Washington, and is even grown out-of-doors in Philadelphia. The seeds obtained from crossing were sown in greenhouses in Washington. A total of 1,780 seedlings were grown, but not all of them proved to be hybrids; some seedlings originated from nucellar embryos. The hybrids were tested in Florida, mostly in cooperation with growers, by grafting buds of the hybrid seedling onto well-established citrus trees. This innovation hastened fruiting, so that most of them flowered and fruited within three or four years. Thus their quality and character could be judged much more quickly, and the hybrids could be used as parents for making more complex combinations. When tests proved that hardiness was transmitted to the progeny by the trifoliate orange parent, Swingle suggested the possibility of extending citrus culture as far north as the Carolinas. But resistance to

cold was not the only objective of this phase of breeding; crosses were made between lemons, limes, oranges, grapefruit, and tangerines, in various combinations, hoping for new improved fruits, and new disease-resistant rootstocks.

David Fairchild had resigned from the Department in 1893 to study and travel in Europe. Continuing east to Java, he traveled in Southeast Asia and the South Pacific, and arrived back in Washington in the fall of 1897. By then it was apparent to some officials of the Department that they needed a systematic plant introduction program, and Fairchild was hired to plan and organize it. He sought Swingle's help, and the two men took the lead in securing the creation, in 1897-98, of the Office of Seed and Plant Introduction. Fairchild was placed in charge. Both he and Swingle conceived of this work as an integral part of the progressive program of experimental research being expanded in every division and laboratory of the Department. That same fall of 1897 Swingle and Webber established the first Plant Introduction Garden, on the land donated by Mrs. Brickell in Miami.

The new Office could not be funded until Congress appropriated funds for the next fiscal year, which would begin in July, 1898, at which time it was understood that Swingle would transfer to plant introduction work. Meanwhile, the Office of Pomology wanted introductions of European table grapes and Swingle was interested in a term of study under Pfeffer and Ostwald at the University of Leipzig. The two objectives were combined, and Swingle went to Leipzig in the spring of 1898. This date marked the beginning of his research as an agricultural explorer. He remained abroad through 1900, the work taking him to France, Sicily, Italy, North Africa, Greece, and Asia Minor. Before starting out on his travels, he and Fairchild drew up plant lists. Swingle was to emphasize crop plants suitable for the South and especially for the Southwest, where crops tolerant of desert conditions and saline or alkaline soils were needed. The list included Egyptian cotton, melons, wine and raisin grapes, citrons, olives, pistachios, Smyrna-type figs, and the like, but when Fairchild said, "Tenny, you've got to bring back some good date palms," Swingle exclaimed, "My land, David! We'll be old men before we can get a date industry going." Nevertheless, date palms went on the list.

Merely collecting and introducing a new crop plant is not enough. Successful cultivation requires scientific knowledge and practical understanding of the crop. Swingle planned to study in the libraries of France and other nations, to consult agriculturists and growers, to study the crops in the field — in short, he wished to obtain all available information on ecological and cultural requirements, production and preparation techniques. There would be problems enough in launching new crops or improving old ones; to begin without the available information could lead to disaster.

That spring, while studying at Leipzig, Swingle sought a tutor to increase his proficiency in French, and was referred to Mlle. Lucie Romstaedt, a well-educated German-Alsatian who had "gone French". Lucie was an accomplished pianist, skilled in the art of conversation and

other social graces. She liked the shy, handsome "rich American" and his boyish seriousness. Reluctantly, although more confident of his French, he left Leipzig for the libraries of Paris.

One of the tasks Swingle now undertook was to solve the enigma of Smyrna-type figs. Private Smyrna fig orchards had been set out in California, but the fruits did not ripen properly. A fig is hollow inside, and flowers cover the surface of this cavity; a single fine pore leads outside. A tiny wasp, a Blastophaga, enters this opening and pollinates the flowers; only this insect can do it. Furthermore, Smyrna fig trees bear figs containing only female flowers; they will not ripen without pollination, and the insect does not live in their fruits. Where was the wasp, and where did it get pollen? When existing literature and scientists could not give him the answer, Swingle went to talk to peasant farmers who grew Smyrna figs. They all told him the same story. The wasps live and develop inside wild inedible figs called caprifigs, and over-winter in them. Caprifigs have only male flowers, full of pollen. The farmers showed him how they gathered caprifigs just before the wasps emerged, and hung them in their Smyrna fig trees, or how they grew caprifigs among the Smyrnas in their orchards. Swingle was convinced he had the answers, but when he discussed it with European scientific authorities, they disagreed. It was unthinkable that the peasants should know something they did not know. He was told that these were only peasant superstitions, that nothing would be gained by introducing caprifigs and Blastophagas into California.

But as Swingle saw it, he had to do two things. He had to introduce caprifig trees to California so that the insects could be perpetuated — no great problem — and he had to get living fig insects to California at exactly the right time. In 1898 he faced, and in 1899 overcame, difficult problems to accomplish this goal. The wasps lay dormant inside caprifigs during winter, but once they emerged their lives were short. They developed rapidly in warmth. The insects had to arrive in California at just the right stage of development, so that their emergence coincided with the flowering of caprifigs and Smyrna figs. He succeeded by working his way from Sicily up the Italian boot, and from lowland to mountain-top orchards along the way, collecting caprifigs with wasps in different stages of development and wrapping them in the only suitable material he could find, the foil liners in packs of Italian cigarettes. To insure arrival, he sent hundreds of separate collections via steamer in the diplomatic pouches. By 1900 the Smyrna figs in California ripened good crops. It was a noteworthy accomplishment, and he was proud of it.

But this was not to be the end of the story. In California, the figs had thicker, tougher skins than when grown in the lands of the Mediterranean. Although excellent when eaten fresh, the cured figs did not compete with imported Smyrna figs. And then a curious thing occurred. A sustained effort was made to prove that the Smyrna fig insect had already been established in California prior to Swingle's introductions in 1899. Although there is no doubt that the insect's general distribution in the Smyrna fig orchards of California dates from Swingle's work, there is evidence that

Mr. George Roeding, a private grower near Fresno, had successfully established the fig insect in his orchards in 1896, and that the wasp had become accidentally established on the Gates farm near Modesto, about 1866. Swingle's interest in and work on improving fig production in California continued through 1910. Between 1899 and 1910 he published 12 studies pertaining to Smyrna-type figs.

It was also in 1898 that Swingle began his now classic studies of date palms. At that time (and today as well) the United States imported thousands of tons of dates each fall from Basra, Khorramshahr, and Muscat. These dark brown dates were mostly of the Fard variety, a very sweet sticky date, that was stamped into large, oozing, rectangular masses by the Arabs' feet, then wrapped in burlap, and shipped. Although every American grocer had a block of them on the counter and sold them by tearing off chunks with an icepick, most of the tonnage was for the baking industry. Fairchild and Swingle did not envision an American date industry in competition with these cheap bulk imports. Their aim was to develop the production of select fresh table and dessert dates, none of which had ever been avilable on the American market.

Each traditional date-growing region in the world cultivates varieties chosen to some extent for their suitability to a particular set of climatic conditions. Swingle began by making comparative ecological studies of North African date-growing regions and of the available areas for date culture in Arizona and California. He then made a detailed study of date varieties and cultural methods in Algeria and Morocco, living with Bedouins and Berbers, visiting the oases of the interior, and obtaining all pertinent information, even detailed descriptions of tools and implements and how they were used. His U.S.D.A. Bulletin 53, *Date Palm* was the first comprehensive monograph on dates and date culture; even the French savants were impressed.

In the date, male and female flowers are borne on separate palms. When cultivated, only a few males are kept, and the females are pollinated by hand. Young date palms produce suckers or offshoots near the base, and these are used to propagate a selection or variety; seedlings are too variable, and half of them are males. A date palm produces only a few offshoots each year. An offshoot starts to send out roots of its own after three to five years' growth on the parent palm, and at this stage will weigh 40 to 75 pounds or more. It can now be cut free from the parent, grown in a nursery for a year, then be set out in the date garden. An offshoot will usually reach full bearing by its tenth year in the garden, and will continue to bear until its hundredth year, but by then it is so tall that the owner's assets have grown out of sight. A single rooted offshoot of a choice variety, requires fifty years or more to accumulate enough offshoots to make a one-acre test planting of 48 palms to the acre.

The problems and responsibilities Swingle faced are obvious. A number of promising varieties could be introduced on a small scale for future consideration, but to get the American date industry started, it would have

to be based on a few standard top-quality varieties, in order that the consumer be educated as to their names and characteristics, and learn to rely on them. It was necessary for Swingle to make judgments as to flavor, texture, desirable size, keeping qualities, sweetness, susceptibility to insects, diseases, rain, yield ability, evenness of ripening, adaptability to the Southwest — a myriad of factors to weigh in choosing the best varieties with which to start. Then he had to locate, inspect, buy, pack, crate, and ship enough rooted offshoots of each, so that trials could begin without delay. His introductions included the Deglet Noor, a sweet, semi-dry dessert date of rich, distinctive flavor but easily damaged by rain, a variety that now dominates the plantings in the Coachella Valley; the Medjhool, another semi-dry dessert date, which is gaining importance among American growers; and the Thoory, an excellent large dry date, tolerant of humidity and not sticky, which can be carried loose in a coat pocket without harm to date or pocket. The latter is little known outside the Southwest.

In the year 1900, Swingle was put in charge of establishing the American date industry; he also was to continue his work on citrus and on other crops. The Office of Crop Physiology and Breeding Investigations was established, with Swingle appointed Principal Physiologist in Charge, a position he held until 1934. But the immediate decade to come, 1901-1910, was the most tumultuous in his life.

The American phase of the date project was not clear sailing; unforeseen problems came thick and fast. Establishing the industry was not going to be a mere routine of testing, then multiplying and distributing offshoots. Date work took much of Swingle's time through 1907, and he continued research on the date until 1932. But the first decade was the hardest, nor were all the problems of a technical nature.

Seeding date palms had long been grown in the Southwest for ornament or as curiosities; when promoters and nurserymen heard that a date industry was contemplated, they tried to cash in by selling offshoots of these seedlings to prospective growers. But these were a miscellany of unstandardized types, and most were similar to Fards, the cheap imported bulk dates. The Department recognized that plantings of these mixed, largely inferior varieties would lead to commercial disaster, but even some prospective growers were enticed because offshoots were available, and no one knew when they would be able to get offshoots of the new introductions. These people were persistent; they put pressure on Swingle, on the Department in Washington, on their senators and congressmen. Swingle found he had an educational campaign and a long battle on his hands. He handled it by making tactful, closely-reasoned replies, and finally won his point.

Then it was discovered that although the imported offshoots had been fumigated and declared free of insects, the North African Marlatt scale insect had penetrated deep within the layers of the terminal buds, had survived fumigation, and was flourishing in the experimental plots. Existing fumigants and insecticides killed it on the exposed parts of the palms, but none reached it down inside the buds. After much trial, it was found that

the scales could be killed by prolonged heating at a temperature nearly lethal to the offshoot. The technology was worked out, large ovens built, temperature controls developed; the offshoots were dug up, slowly heated to high temperature, soaked in this heat, then slowly cooled. Most offshoots survived, and the scale was eradicated. It was a slow discouraging setback.

An embarrassing problem arose with the Deglet Noor, on which Swingle had pinned such high hopes. In the trial plantings, it set bumper crops of dates, but they would not ripen. Treatment after treatment was tried, singly and in combination, all without success. Each season, new treatments were devised and tried, but Deglet Noors still did not ripen. Finally, Swingle was asked to call on the Secretary of Agriculture. When he was shown in, the Secretary shook hands, offered him a chair, and said, "Mr. Swingle, I called you in to congratulate you." As Swingle told it, "When he said that, I sat up straight! I didn't know what was coming. Then the Secretary said to me, 'I think you have proved, beyond the slightest doubt, that the Deglet Noor will not succeed in America.' I said, 'Mr. Secretary, I confess that up to now it hasn't been too promising, but could you give us one more year? We've set up some new tests, and think they might give us the answer. If they don't, I'll be ready to call it quits with the Deglet Noor." The Secretary concurred, and Swingle went ahead. The new tests involved treating the bunches of dates, while still on the palm, with gasses which might induce ripening. A glassblower had made large cylinders that could be slipped over the bunches and the ends sealed, but big as the cylinders were, a part of the cluster had to be pruned away to fit the rest inside. To their amazement, all of the dates in all of these tests ripened, no matter the treatment. They had the answer: Under American conditions, the Deglet Noor set far more fruits than the tree could ripen, but did not drop part and ripen the rest; all that was needed was to thin the bunches as a standard cultural practice.

By 1904, the citrus hybrids were coming into fruit; as they did, Swingle studied, tested, and described them in thirteen papers published between 1905 and 1910. The tangelos (crosses between tangerines and grapefruits) showed great promise as a new fruit for commercial production; the citranges (crosses between sweet and trifoliate oranges) were variable, but some had acceptable fruit, and were hardy enough to grow 400 miles north of the Florida citrus belt. Other hybrids were described, but none proved valuable as fruit; they were of genetic interest. Florida growers had mixed emotions about these new hybrids. Apparently they ought to be prepared for any number of new, possibly very superior, citrus fruits to appear at any time; the tangelos gave some growers a feeling of insecurity. A bearing orange grove represents a large capital investment. Might not these new fruits make their groves obsolete and consequently reduce the value of their property? Nevertheless, in 1908 Swingle launched a new citrus-breeding program in Florida, assisted by F.W. Savage and his son, Maurice, and produced a large number of hybrids from many combinations of varieties and species.

Although dates and citrus were Swingle's major concerns at this time, his work was by no means restricted to them. He believed in using every

branch of science that might conceivably throw light on a biological problem. In cytology, he studied and published, with Dr. O.F. Cook, on the evolution of cellular structures. Recognizing the resemblance between the mitotic figure in dividing cells and a magnetic field, he wondered if a magnetic field were involved and persuaded Dr. Lyman J. Briggs to join him in subjecting dividing animal cells to high electromagnetic fields. Coming across a paper by Sir Oliver Lodge, that claimed a great increase in yield from plants subjected to high-voltage static electricity, he sent one of his cytologists, Dr. William Seifriz, to work with Dr. Briggs in testing Lodge's findings. For three years they stimulated everything, but only Dr. Briggs and a government mule were visibly affected. With Briggs, Swingle worked on developing the ultraviolet microscope and ultraviolet photography as new cytological research tools; he became interested in optics and persuaded Zeiss to make a lens of diamond based solely on his calculations. Other "minor" activities included breeding experiments with Egyptian cotton, studies on pistachio-nut cultivation, the prevention of smut in wheat and oats, and work on Smyrna figs. By the close of the year 1910, he was the sole or joint author of a total of 96 separate publications.

As the chief of an office, Swingle was saddled with administrative duties for the first time in his life. He had a way of inspiring his employees, conveying to them the joy of scientific research and the mental satisfaction of observation and discovery, and he helped them to develop into highly-qualified professionals. But nothing in his background or experience had prepared him for other aspects of administration, nor did he have the temperament or point of view of an administrator. Yet in this position he was required to make plans several years in advance, prepare budgets in advance according to those plans, determine staffing needs, give work assignments, supervise and manage employees, evaluate their job performance, set up routines, develop an organization. All of this was foreign to his way of doing things. New ideas were constantly whisking around in his head (in fact, the saying became commonplace throughout the Bureau, "We'll never run out of ideas as long as Swingle's around"). He was always impatient to try out his ideas and the Department was often put to it to decide whether to try to curb his enthusiasm or let him have his way at the risk of a fiasco. Under his management the office budget was always spent before the year was out. He would cancel employees' vacations at the last minute, make spur-of-the-moment trips to California, Arizona, Florida, wherever, not knowing how long he would be gone; he would leave the staff to pick up and carry on without instructions, and then rage when he got back if they had not known all that he had in mind. At the same time, his superiors were storming at him for undertaking unscheduled projects, for not documenting methods and objectives, for running out of funds at midyear. He never actually mastered the art of administration, but this first decade was the most trying period.

Not only was Swingle's career tumultuous between 1901-1910; so also were his personal life and affairs, for on June 8, 1901, he married the beautiful and charming Mlle. Lucie Romstaedt, the young lady who had

tutored him in French at Leipzig. He completely lost his head, and was helplessly in love.

Money had never meant much to Swingle. He knew nothing about managing it, and had never needed to learn. He was not a hedonist, had conservative tastes, a quiet lifestyle, had no interest in accumulating personal possessions other than useful books. Since his salary had always been generous in relation to his needs, he had always spent whatever he wanted whenever he wanted, without having to consider if he were keeping within his means. He continued to handle his personal finances in this way after his marriage.

The Swingles set up housekeeping in Washington. Lucie was smart, stylish, social. She dabbled in botany to please him, but her idea of the good life did not include a quick meal at the corner café, followed by an evening of him and his friends "talking shop." She wanted parties, dancing, clothes, furs, jewels, opening nights at the theater, and champagne suppers. She would go with him on his trips, but now they stayed at the grand hotels, sent the waiters for vintage wines and fruits out-of-season. Eventually the Swingles were deeply in debt, the rent was always due, the mails a flutter of unpaid bills.

When they got so far behind in the rent that the landlord began proceedings to evict them things finally came to a head. Swingle found himself in the humiliating position of having to go to his colleagues, hat in hand. They lent him the money, and he and Lucie set out on the short walk to the landlord's. On the way, they passed a bookstore with a brand new edition of the Encyclopedia Britannica in the window. They stopped to look, went in for a closer look, then spent the evening back home thumbing through their new Britannica. When Swingle found himself in the ridiculous position of going to his colleagues again the next day for the rent money, older, wiser heads took him in hand. They found how chaotic his finances were, pointed out where he was headed, showed him that even his career was threatened, and talked some sense into him. He came away shaken and chastened, but grateful to them.

When he explained their position to Lucie, and what they had to do — the cutting back, the budget, the new quiet life — she paid no attention, but kept right on spending, running up bills they could not possibly pay.

In 1910 Lucie died of typhoid, whereupon Swingle moved to a room in the home of his good friends Dr. and Mrs. O.F. Cook. He plunged more intensely than ever into his career, and gradually paid off his debts.

By this time work on the date was becoming routine, and Swingle was turning to the problems of citrus. He now had twenty years' experience with this crop, and a broad knowledge of what was needed.

A knowledge of plant diseases and their control was still a major concern; there was a constant threat that diseases from elsewhere could be introduced accidentally. Stringent inspection and quarantine measures were necessary for all plants and seeds introduced into the country. And

studies were needed of citrus diseases in other parts of the world, so that they would be known, recognizable, and thus more easily kept out, or better controlled if they did get in. An example had just appeared in Florida — citrus canker, a destructive Old World bacterial disease of the tree and its fruits, which was spreading unchecked.

The breeding experiments had given such promising results that they should be continued. It appeared that disease-resistant trees and rootstocks could be developed. Swingle saw that a great horticultural industry based on just two or three susceptible varieties could be totally wiped out by the introduction and spread of a new disease. So far, the breeding experiments had been based on the relatively few genera, species, and varieties of citrus and citrus relatives available in this country, whereas he felt the breeding program should have available all citrus relatives that offered desirable characteristics, in other words, a much larger pool of genetic material. But how many relatives were there? What were their characteristics? Where were they found? How could living material be obtained? The botanical literature was confusing, the descriptions of genera and species inadequate. It became clear that yet another task was required. To determine what the germplasm bank contained, it was necessary to straighten out the taxonomic confusion.

By 1911 Swingle was working on all these problems. He presented his findings of imperfect dominance in first-generation citrus hybrids at the IV International Genetic Congress in Paris, then studied the type specimens of citrus and its relatives in the Paris herbarium; he went on to Spain to study citrus canker and how it was controlled there.

Canker appeared in Florida in 1910. If uncontrolled it would wipe out the citrus industry, for there was no cure. Only a few tangerines appeared safe. In cooperation with the Federal Plant Quarantine Board, Swingle devised stringent control measures. Infected trees were dug up and burned, roots and all, the soil sterilized. Antiseptic methods were adopted to prevent spread of the disease on hands, tools, or clothing. All groves and nurseries, all dooryard trees were inspected. Both federal and state agencies carried out the control measures, and canker was finally eradicated from Florida in 1926, after an expenditure of over six million dollars and the destruction of 257,745 trees and 3,093,110 nursery plants. According to Swingle, it would have been eradicated much sooner, except for a problem with a nurseryman:

> We had the disease mapped out over the whole state, the infected areas quarantined, and were inspecting and cleaning up district by district. We were taking the strictest precautions. But canker kept breaking out in districts that had been thoroughly cleaned up, and it would turn up in districts declared free of it. We couldn't understand it. Finally a pattern emerged; it had to be coming from infected nursery stock sold by a nursery we had inspected right along without ever finding any trace of canker. We called in, one by one, all the inspectors who had ever been there, and had them tell us all they could remember about that nursery. They all remembered it well, and the story was always the same: the owner was friendly, cooperative, and

hospitable; always inisted they come to the house, his wife fixed refreshments or a meal, he always wanted to hear all the details of the program and its progress. Afterward they'd go out and inspect the nursery, and it was always clean, they'd never found any canker on a single leaf of his plants.

It all sounded fine. The only thing we could put our finger on was that there was always a two or three hours' delay from the time they arrived until they got into the nursery. Was it possible that . . . ? So we sent out the regular team again, told them to do it the usual way. We sent a second team behind them, to go straight to the nursery after the first team was inside the house half an hour. We got the answer. That man had his whole field force going down the rows, picking off every leaf that showed a canker, putting them in sacks. We put him out of business in a hurry.

The year 1911 held a pleasant surprise for Swingle. He had the great good fortune to meet Miss Maude Kellerman, the youngest daughter of his former professor, W.A. Kellerman. Kellerman had left Kansas State during the radical Populist takeover of the college in the early 90s, and was chairman of the Botany Department at Ohio State University. His son, Karl, had come to work for Swingle several years earlier. Mrs. Kellerman and Maude came to Washington to visit Karl. Swingle had not seen Mrs. Kellerman since his school days in Kansas, and had never met Maude, who was only twenty-three. Mrs. Kellerman, a strongwilled independent woman, was flattered and pleased with the attention Swingle showed them. She was something less than pleased when she found that his attentions were actually directed at Maude, who was also strongwilled and independent, but who had the good sense not to make a point of it. Swingle found himself more than interested in this pretty, vivacious, sensible, and intelligent girl. They had much in common. At eighteen, Maude had successfully taken over editorship and publication of the *Journal of Mycology* and the *Mycological Bulletin*. Although she had traveled with her family in Europe in lieu of finishing high school, she was admitted to Ohio State University, where she completed her B.A. degree in just two years, picking up a Phi Beta Kappa key along the way. She did further study at the University of Lausanne and in Madrid, and was fluent in French, German, Spanish, and Italian. She did not claim to be a botanist, but knew more botany than most botanists. She liked Swingle, and when the Department offered her a position as a botanical translator, she accepted, partly to see how things developed, partly because her mother was so outspokenly opposed to the whole idea. Swingle was in and out of Washington over the next three years. When he was in town, he saw a lot of Maude. She understood his work, and could talk with him about it, adding some helpful ideas of her own. He was enormously impressed when she demonstrated that citrus pollen could be kept viable long enough to ship half-way around the world, or could be held in good condition to bridge the time gaps between flowering of different species, making their hybridization possible for the first time. It was clear to everyone that he was captivated by her, but was afraid to trust his heart. Realizing finally that he could not live without her, he saw that the only thing to fear was not winning her. They were married

October 2, 1915. Swingle never ceased to wonder at her versatility, her adaptability, the seeming ease with which she could accomplish things, and he came to depend more and more on her advice and help in his work. He was always amazed at her talent as a manager. She was, as he said, "a truly remarkable woman."

The Swingles' first children, boy and girl twins, John William and Stella, were born in 1920. He was a proud father, and wrote in his notebook "*Red letter day!*" A second son, Frank, was born in 1923; a second daughter, Mary, in 1928. He was devoted to them. He and John loved to argue about every subject under the sun. With Stella, there were long walks while they conversed in French. Frank was becoming an engineer while still a boy, and they had long talks about the "dozenal" system of counting — Frank even made a slide rule for this system. With Mary there were long chess games.

But to return to 1910: Swingle's studies to straighten out the classification and descriptions of citrus and its relatives had led him to explore the history of the cultivated varieties. The genus *Citrus* is native to Southeast Asia, and has long been cultivated in China. There were records and descriptions in the Chinese literature and a collection of Chinese books at the Library of Congress, so he had sought help there. By a series of coincidences, this led to his taking on and accomplishing in fifteen years, merely as a sideline, what would have been a fulltime career for most persons, the guidance of the development of the Oriental Collection in the Library of Congress.

Until 1898, the Chinese collection in the Library of Congress was a miscellany of minor books, mostly uncatalogued and therefore unavailable for general use. The collection had never been rounded out to cover any special fields of knowledge and could not be counted on to serve the needs of special investigators. In it, however, were some choice, basically important and valuable items. The first American commissioner to China, Caleb Cushing, had personally collected Chinese books, and had given them to the Library in the late 1840s. A classical Chinese herbal, edition of 1655, was presented by the Emperor T'ung Chih in 1869. In 1898 the famous Chinese Ambassador Wu Ting-Fang inspected the collection, and through his courtesy arranged for it to be "catalogued by some learned gentlemen connected with the embassy." At that time, the collection contained 2,888 volumes.

In 1904, the Chinese Government had exhibited 1,965 volumes at the Louisiana Purchase Exposition; in 1905 it presented them to the United States. The learned William Woodville Rockhill, Orientalist and special American Minister to China, personally purchased and presented an aggregate of 6,000 volumes. There followed, in 1908, the gift of a sumptuous set of the Imperial Encyclopedia, in 5,041 volumes, brought to Washington by a special ambassador and presented on behalf of the Empress Dowager to the American government as a memorial tribute of China's appreciation of the remission by the United States of the last of

the indemnity for the destruction that had occurred during the Boxer uprising. With these gifts, the collection numbered 15,894 volumes, and was on the way toward becoming one of the important Oriental libraries in the West. This was where things stood in 1911 when Swingle began using the collection.

The Chinese botanical and agricultural literature held records of economic plants going back many hundreds of years, but the old volumes accessible to Swingle referred to still older works. When he would ask to consult these, he found that most were not in the collection. Many were known to have survived in China or Japan, or might turn up if searched for. The Library kept adding these titles to its list of desiderata, but had no operating plan for developing its Orientalia. By his intensive use of the materials and his requests for titles not held by the Library, Swingle was, *de facto*, guiding its development.

In 1915 Swingle was preparing for his first trip to China. Foreigners now had access to some official Chinese libraries. Swingle needed to consult these older references, and queried Herbert Putnam, the learned and far-seeing Librarian of Congress, as to where he might find them. Putnam was interested in systematically rounding out the Library's holdings so that it would serve scholars adequately, and here was Swingle with a long list of herbals and encyclopedias not in the collection. Would Mr. Swingle be willing to accept a commission authorizing him to buy important books that would supply these deficiencies? Mr. Swingle was mightily pleased at such a prospect. Together the two men worked out the broad outlines of a program, and Swingle undertook his commission with typical enthusiasm.

From this point until 1928 the growth and development of the Division of Orientalia, Library of Congress, was systematically guided by Swingle, and his interest continued for the rest of his life. The ability to transmit his enthusiasm to others enabled him to obtain efficient collaboration in the task, not only from friends in the Bureau of Plant Industry, but from persons he knew only through correspondence. From 1916 to 1928 he wrote the Annual Reports on Far Eastern accessions for the Librarian. He continued to contribute to the reports for the botanical, agricultural, and geographical accessions until 1935. His reports were brief but highly effective, and actually constitute a history of Chinese science. In them, he enumerated the most significant Chinese, Korean, Japanese, Mongol, Manchu and Annamite accessions, adding inspiringly enthusiastic annotations. They gave our American botanists and agriculturists an inkling of what they might find in the ancient herbals, encyclopedias, and gazetteers, of Chinese economic botany and ethnobotany. Others reading these reports caught his enthusiasm and offered to collaborate.

From the herbals and encyclopedic agricultural works, Swingle turned his attention to the gazetteers that the Chinese periodically compiled for the country as a whole, and for provincial and lesser subdivisions. These gazetteers include not only geographic descriptions, but annals of each

general or local administration, detailed local history and biography, records of the utilization of natural products, development of manufactures, reports on official tours of inspection, and such a vast amount of information that they are an inexhaustible mine of facts bearing on every phase of Chinese culture. When Swingle's good friend O.F. Cook travelled widely in China in 1919 to investigate the cultivation of cotton, Swingle asked him to buy any gazetteers he came across to help build up the already notable collection in the Library. With the help of his assistant, Mr. Yeh Yuen-Ting, Cook secured no less than 108 official gazetteers in 1,239 volumes. As a result, Swingle was able to report with pride in 1920 that "the Library of Congress now contains the largest collection of official gazetteers to be found outside of China." In the same year, a professional copyist began copying valuable selected manuscripts in the great library of Canton. And Berthold Laufer, the great Orientalist of the Field Museum of Chicago, cooperated in the acquisition of Mongol books.

Swingle also sought out Chinese "ts'ung shu," or collectanea. These consist of sets in which are reprinted rare books long out of print and unavailable as separate volumes. Individual "ts'ung shu" usually cover a special field of endeavor, and are ambitious undertakings. The bulkiest of them all, the *Yung Lo Ta Tien*, had the objective of including all "serious works" of Chinese literature extant in the year 1400, excluding novels and plays. It comprised 11,095 volumes, and was never printed. It existed at first only in the original draft and one final copy. Later a new copy was made. Swingle stated that "some 8,000 years' labor of scholars was spent in compiling, copying, and proofreading the original work, and that another 2,000 years' labor went into the copies and transcripts. So far as is known, only scattered volumes of this monumental "ts'ung shu" have survived, of which the Library of Congress has 33; only the Library of the Chinese Ministry of Education has more, holding 60." (Annual Report, 1922).

There is a historical study of the *Yung Lo Ta Tien* by the Chinese scholar, Sun Chuang, in the Library of Congress. A dedicatory foreword in this book says that "during a visit to Peking, Shih Yung-kao (no other than Walter T. Swingle) had recognized the value of the work and had urged that a copy be made for the Library of Congress." The obliging author complied, and sent it with the annotation that "the task had been completed on the 20th day of the 10th month of the 7th year of the Chinese Republic" (October 20, 1918). It had been requested when Swingle first visited China in 1915. The Library of Congress holds the largest collection of "ts'ung shu" outside of China and Japan.

In 1926 Swingle was a member of the official American delegation to the Pan Pacific Science Congress held at Tokyo, and was able to visit China and Korea as well as Japan. It was a banner year for the acquisition of Oriental books. By 1928 the collection had reached a size where it became the Division of Orientalia, and required a fulltime chief; Dr. Arthur W. Hummel was appointed to the position. Librarian Putnam expressed unstinting appreciation of Swingle's work in his Annual Report for 1928: "From 1910 the collection has been developed systematically,

chiefly through the efforts of Dr. Walter T. Swingle, in whose constant interest its present eminence is due. It now numbers over 100,000 Chinese volumes, unsurpassed outside of China and Japan."

At the same time work on citrus and the date had continued. Swingle's ideas were still generating controversy. He stirred up a hornet's nest at the Pan Pacific Science Congress at Tokyo, and at the International Congress of Plant Sciences at Ithaca, N.Y., in 1926, when he read a paper describing his findings about pollination in dates. Unable to resist making some date hybrids, he had used pollen from other species of the genus *Phoenix* to pollinate the female flowers of specific varieties of the commercial date, *Phoenix dactylifera.* These were controlled pollinations, carefully made and observed. To his enormous surprise, the fruits containing the developing hybrid seed differed markedly in size, texture, quality, sweetness, time of ripening, and in other ways from the normal fruits of these date varieties. This was an unheard-of, unreported effect in any plant; the developing hybrid seeds in some way modified the tissues of the fruit of the female parent. The effect differed from cross to cross, according to the species used as the pollen source. Swingle proposed the term "metaxenia" for this effect.

Both meetings erupted in violent controversy after Swingle presented his paper. Most geneticists and physiologists held that his observations had been wrong, that a hybrid seed had no effect on the fruit in which it developed, that his findings were imaginary and nonsensical. What especially galled him was that although he had been studying genetics and plant breeding for over forty years, although he had made and described thousands of hybrids and had even been instrumental in developing the ultraviolet microscope and ultraviolet photography as a cytological tool, yet some of his critics refused to discuss his findings, and were dismissing him as a scientific moss-back who might not have understood elementary genetics, whose conclusions need not be taken seriously. But Swingle was confident of the accuracy of his observations; he had seen those dates, his critics had not. He published on the subject again in 1928, suggesting that the effect might be caused by a hormone from the embryo or endosperm acting on the developing fruit, but plant hormones were not yet being talked about, and the old theory of "formative staffs" was seldom mentioned. Swingle continued to study metaxenia in the date, published further descriptions of its effects in 1930, and in 1931 read additional papers before the Physiological Section of the Botanical Society of America and the National Academy of Sciences. By then his evidence was overwhelming; even the diehards were beginning to think there might be something in it. In 1932 he was able to publish an account in the semi-monthly news letter of the Division of Horticultural Crops and Diseases, entitled "Metaxenia at the first denied then accepted by many leading physiologists and scientists." (Metaxenia and its effects are now recognized as occurring in many kinds of fruits, and the effect has considerable horticultural significance.)

The work with citrus and its hybrids, begun in 1908, was turning up

new information of genetic and physiological significance, and of horticultural importance. Swingle was a keen observer, with the ability to note a commonplace event that everyone else overlooked, and by comparative observations then draw a conclusion. He was well versed in the experimental method, but his experience had taught him that it was not the "be all and end all" of scientific investigation. From his observations, he formulated three new theses.

There were many geneticists and physiologists in the audience who had "eaten crow" in the metaxenia debates, when Swingle read three papers before the VI International Congress of Genetics at Ithaca, N.Y., in 1932. He was confident of their attention, and sure he would be under fire again. He therefore sought to forestall this by bringing with him an elaborate exhibit of living citrus hybrids, seedlings, fruits, and varieties to illustrate his papers.

His first paper presented the theory of *neophyosis*: the rejuvenescence or loss of senility in nucellar bud seedlings of citrus. It had long been thought that when some varieties of flowers or fruits were propagated by cuttings, budding, or grafting over a number of years, the variety petered out — it became senescent or "senile" — and no longer had the vigor or the same characteristics it had had originally, and would finally have to be discarded. This was also true of cultivated citrus varieties. But in the seeds of a few plants, including most citrus, there is more than one embryo. One of these is the "true" or gametic embryo; the others develop from the tissue surrounding the nucellus, and are genetically identical to the mother plant. Swingle had found that when seedlings grew from these nucellar embryos in a variety that was senescent or petering out, the nucellar seedlings reproduced the variety as it was originally; the variety was rejuvenated. He called this effect "neophyosis." It had profound horticultural implications for the citrus industry, and it raised a lot of physiological and genetic questions as well. But many members of his audience were out of their depth with this paper. Even today, nucellar embryony is unknown to many geneticists unless they happen to be working with the relatively few plants in which it occurs. Many plant physiologists are unaware of the phenomenon. The paper generated a lot of questions, most of which asked for amplification. The exhibit of plants received gratifying attention.

Swingle's second paper also dealt with nucellar seedlings. He reported that no matter how many diseases, including viruses, attacked or lived in the mother tree, its nucellar seedlings were disease-free. Some mechanism in the nucellus was destroying or screening them out. He had found also that a diseased hybrid could be indefinitely reproduced disease-free by use of its nucellar seedlings. These findings, when taken with those in the first paper, implied that ageing or senescence might be caused by a gradual accumulation of diseases or viruses, or caused by them in part. Again, there were enormous genetic, physiological, and horticultural implications. Again, he had put together a good exhibit of living plants illustrating these findings. There were highly controversial ideas in these papers, but, unlike their reaction to his theory of metaxenia, his fellow scientists found that it was

not so easy to ignore him this time, or to dismiss all those plants he had brought along.

Swingle's third paper claimed that some of the seedlings obtained from bigeneric crosses exhibited remote ancestral characteristics, features outside the range of characteristics shown by the parent lines. Now this was against all the rules — it was as if he had claimed to have mated an alligator with a crocodile, and some of the eggs hatched into dinosaurs. Again, he had brought along an exhibit of parents and progeny, and it was impossible to deny that the offspring showed characters outside the range of those exhibited by either parent. But there was considerable debate as to whether these were "remote ancestral characteristics."

Today, 45 years later, nucellar seedlings of citrus are recognized as vigorous, with juvenile characters, relatively free of diseases. They are widely used both as rootstocks and for scion sources in the United States. And it is agreed that some bigeneric citrus hybrids exhibit characters beyond the range of those manifest by either parent, although their appearance is as yet not adequately explained.

Meanwhile, Swingle continued to publish descriptions of the new hybrid fruits obtained from the citrus breeding program. He had been able to introduce more of the wild relatives, and include these. As a result, horticulturists, nurserymen, and growers confronted an increasingly bewildering array of new fruits: Cicitranges, Citradias, Citrandarins, Citranges, Citrangedins, Citrangequats, Citrangeremos, Citrangors, Citremons, Citrumelos, Citrumquats, Eremolemons, Eremoradias, Eremoranges, Faustrimedins, Ichandarins, Lemandarins, Lemonanges, Lemonimes, Limequats, Oramons, Orangequats, Orangelos, Procimequats, Segetranges, Tangelos, Tangemons, Tangors. Citrus hybridization had been begun at the Federal Citrus Experiment Station at Riverside, California, in 1914-1916 by Dr. Howard B. Frost. This work dealt largely with crosses of varieties and species within the genus *Citrus* itself. In Florida, the State Citrus Experiment Station at Lake Alfred began a hybridization program in 1924, aiming at producing new acid citrus fruits better adapted to Florida conditions. Work began in other countries (Java, the Philippines, the U.S.S.R.) during 1927 or later.

But Swingle's program was far more extensive in scope; it was still organized as a "linear" program, without specific short-term goals. He came under increasing criticism from all directions. The growers did not want to bother with more than two or three standard varieties, and were becoming increasingly fearful of the economic implications of these new fruits; they didn't want their groves devalued. Swingle felt that botanical interest alone justified making these new hybrids, and that they should be held in reserve. He maintained that the growers should be educated up to the point of insuring their own interests, no matter how resistant they were to the idea. He advocated that all known citrus allies should be collected, grown, and tested for resistance or immunity to the prevailing diseases of all citrus-growing areas of the world. This was to be followed by production in each country of new disease-resistant varieties which were to be intro-

duced to commercial production if possible, but in any case to be held in reserve for emergencies. He was determined to have a disease-free citrus experiment station on an island of the Inland Sea of Japan, and others elsewhere. The Department was staggered by the scope of these proposals; it was said in Washington that "If we don't clamp down on his budget, Swingle will breed more projects in half a day than 100 men could keep going in a lifetime." True. But those who kept him in check are unknown and unacclaimed today.

By early 1933, at the age of 62, Swingle was at the apogee of his career in the Department of Agriculture. He was a valued member of many national and European professional societies, belonged to the Cosmos Club, had received an honorary Doctorate of Science from Kansas State. As Chief of the Office of Crop Physiology and Breeding Investigations, he had instituted programs and projects across the entire southern part of the country, and was outlining new programs in broad, bold brushstrokes. In addition, he had authored 230 publications. His tenacity of purpose and intense interest in the work of his Office, however, kept him from seeing it in perspective to the agricultural development and needs of the country as a whole.

In the first two decades of this century, the frontier disappeared and settlements increased; more and more land was used for agriculture. The growth of large cities created bigger markets, and the importance of farming as a business increased. With the development of motorized farm machinery, still larger areas were brought under cultivation. By 1930 the staple crops were overproduced, glutting the market; their price fell below production cost. The stock-market crash of 1929 and the deepening economic depression that followed had plunged the nation into suffering and distress. Most of the country's farmers confronted disaster, and were in despair.

Franklin D. Roosevelt came to the White House on March 4, 1933, at the height of the crisis, when the financial structure of the country seemed to be tottering. He quickly set up agencies to reorganize industry and agriculture under Federal controls. Henry A. Wallace was appointed Secretary of Agriculture and the Agricultural Adjustment Administration was set up within the Department under his supervision. This agency was given precedence to cope with the emergency in the agricultural sector of the economy. The basic policy adopted was to help farmers by cutting supplies of staple crops, thus raising prices through the law of supply and demand. A further goal was to change the agricultural pattern from overproduction of staple crops to more diversified farming. All the old-line bureaus concerned with production were ordered on standby. Instructions were to hold the status quo, undertake no new programs or projects, wait for further orders.

The new agency had action programs under way by late 1933, and Wallace turned his attention to the Department. A high-level review concluded that it had "just grown up like Topsy"; that its policies, programs, projects, and objectives were often uncoordinated, that far too much

emphasis had been given to production, far too little or none to economic consequences, marketing, credit, new uses for farm products, soil conservation, the well-being of farm families. A shift of emphasis was needed, together with an efficient dynamic research program, to render the Department capable of guiding all aspects of agricultural development in a logical, coordinated way. A sweeping reorganization was ordered in 1934; Swingle fared far worse in the outcome than he would ever have believed possible. When the New Deal "brain-trust," involved as it was with the immediacy of a vast nation-wide agricultural disaster, reviewed his work, to their eyes much of it seemed irrelevant, of no practical consequence, extravagant, futile. They took a ruthless position; his past record of accomplishment meant nothing. The Office of Crop Physiology and Breeding Investigations was summarily abolished. Swingle retained the title of Principal Physiologist, but was without staff, budget, or travel allowances. He had no control over any of the programs or projects he had started. In effect, he was another employee, without authority, to receive work assignments at the discretion of an unsympathetic superior. It was an exceedingly bitter pill, and it stuck in his throat for the rest of his life. His contemporary colleagues, appalled at the treatment he received, were sympathetic, but their heads were rolling, too. Their opinions carried no weight with the new powers.

Many another man would have resigned under these conditions, not Walter T. Swingle. Three traits in his character were misread by his new superiors. He had a deep and abiding interest in his work for its own sake, he had a tenacity of purpose that would shame a Missouri mule, and he was an optimist — he felt certain that the new administration would eventually come to its senses and reinstate him to his former position, or that the electorate would come to theirs and vote the rascals out. His optimism was ill-founded, the result of a curious blindness to the new realities, but he never lost it. Meanwhile, he was especially irritated to find that he was being shunted aside, was not receiving assignments, not being consulted, his advice and opinions largely ignored. He continued work on the citrus monograph, kept looking over his superior's shoulder as action was taken in the projects he had controlled and carefully pointed out the errors being made. At 65 years of age, in 1936, he chose not to retire, and the department could hardly refuse him this. He continued to publish on metaxenia, neophyosis, and the remote ancestral characters being exhibited by new citrus hybrids. He was not allowed to continue work in Florida on his remaining hybrids, however. In 1939, the Department decided to consolidate all Federal citrus work in Florida at Orlando. In June of that year, over his violent protests, an official ordered all of his hybrids dug up, hauled to Orlando, set out in the field under the broiling summer sun with no provision to water them. It didn't rain for the next three weeks and they died by the hundreds. Most of this collection, representing years of labor, was lost. It broke his heart.

Despite these latter years when his authority was in eclipse, Swingle's professional reputation as a scientist and agriculturist continued to gain in

stature. His advice was sought and listened to in many quarters. After retirement in January 1941, he remained as a Collaborator of the Department, as well as becoming Consultant for Tropical Botany at the University of Miami. He continued to be as prolific of ideas as ever. When Dr. Ashe formed the Post-War Planning Commission at the University in 1944, to supply background studies for the economic and sociological planning of the Greater Miami area and its integration and coordination into South Florida, he invited Swingle to participate in one of the early meetings which was concerned with an evaluation of natural resources. The meeting lasted the better part of a morning. Afterward, one senior scientist remarked, "I've never heard anyone come up with so many ideas on the spur of the moment in my life! Some of them were way out, but he gave us a lot to choose from!" A younger man came by and said, "I've decided that the way to succeed in this world is to have a lot of ideas! I don't think it much matters what they are, just so you have a lot of ideas. I'm going to be an idea man from now on!" Still later, a senior economist came by. "Swingle stole the show this morning," he said, "and in all that thicket of ideas, I think his main points were right. He talked about the horrible things that were happening in Los Angeles because of poor planning. He told us that the same things can happen here unless we make sure of our water supply from Lake Okeechobee, stop filling in the mangroves and building on the beaches, keep some green space, do something to make it easy for people to get to work without having to use an automobile." When Swingle came back from the meeting he said, "Dr. Ashe asked me to write down some of the things I said in that meeting. You should have heard the fuss when I told them that Miami had to fill in some of those canals and stop draining the Everglades or they'll be pumping sea water out of their wells. The trouble is, none of those men have been here long enough to know what the place was like; they can't see what's been happening to it!"

Swingle lived to see the American date industry well established. He was pleased to note that in the year 1945 alone, the income taxes paid by date growers to the Federal Treasury totalled a greater sum than all of the research and development costs expended on it by the Federal Government from its beginning in 1898 through 1945!

Undiminished activity and publication continued through the end of 1947, an eventful year for Swingle. He remained nimble-witted and spry, quick to take action. On February 16th, he wrote Fairchild:

Dear David,

I had quite an experience about 7:45 Friday night when the Orange Blossom Seaboard train lost two cars, ran off the tracks going at high speed and tore up the ties for nearly a quarter of a mile.

I was suddenly thrown on the floor of the club car, from a seat running from the window to the aisle.

In about one-half second I saw the window heave up several feet and was thrown into the aisle and several people fell on me, holding me down so firmly I could not move my legs!

As soon as I got up I went outside and built a fire on the rails ahead of our set of four cars, so no train would run into it. Half a dozen or more ambulances rushed down from Jacksonville (22 miles away) and took about 30 wounded to the hospital.

I have a bruise, but not serious; but lost my glasses in the fall. By 11:15 we were picked up by the main part of our train and reached Jacksonville at midnight. Left at 2 A.M. and reached Washington at 7:15 P.M. Saturday.

No luck — I did not see my whole life unroll when I fell.

As ever,

Tenny

When on campus, Swingle took on an aura of boyishness, undergoing a kind of "neophyosis." The Frank N. Meyer medal was awarded him that summer in recognition of his outstanding service in plant introduction work. The ceremonies were held at the U.S. Plant Introduction Garden at Chapman Field, Miami. He and a former colleague were being so honored. When his colleague stood before the assembly, Swingle turned in shocked surprise and said, "Why, Harry's an old man! Do I look as old as that to you?"

That fall, the government of France was celebrating the Golden Jubilee in the career of their most illustrious botanist, Professor Auguste Chevalier, an old friend in whose honor Swingle had named a new species of *Aeglopsis*, back in 1912. The French Government invited Swingle to attend the festivities, and the University sponsored his trip to Paris. (Swingle had long been a member of the Societe d'Acclimatation de France, a corresponding member of the Academie d'Agriculture de France, and a collaborator with L'Institut des Fruits et Agrumes Coloniaux in researches to improve the culture of tropical and Mediterranean fruits.) He was warmly received, and the Cercle de la France d'Outre-Mer held a special reception in his honor, during which he warned of the ravages to citrus in California by the "Quick Decline" virus, and of its similarity to the "tristeza" virus of Brazil. He had a grand time, staying for some weeks at the urging of Prof. Chevalier, and working over the new specimens of citrus relatives in the herbarium of the *Muséum*.

He returned home to learn that the Library of Congress had named him an honorary consultant for development of the Division of Orientalia, in recognition of his labors in building up their collection of oriental books.

By the end of 1947, he had authored throughout his career, over 256 separate publications. It was his last full year of unstinting activity. His final trip to Miami was in 1950, when, accompanied by Mrs. Swingle, he was honored by the Fairchild Tropical Garden and was awarded the Thomas Barbour medal. Twenty-five years have passed since his death on January 19, 1952. He is remembered by the world at large for his contributions to science and to oriental literature, but to those who knew him and worked with him he remains "ein grosser Geist" — greater than a scholar, more human than a genius.

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