

FIFTY YEARS OF TROPICAL FRUIT CULTURE

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Just in case any of you may be in doubt concerning the matter, let me preface my remarks by an emphatic denial that I was here fifty years ago and that I speak from firsthand experience. I have had to place much dependence upon the Proceedings of this Society for the information which I am to present concerning conditions during the past half century. My seven years in the state have enabled me to get a fairly accurate picture, or so I believe, of the situation today as concerns tropical fruit culture. It interested me, and I hope it will interest you, to see what progress has been made in the fifty years since this Society began its splendid work.

It so happens that the year 1887 marks also the date when the newly established Division of Pomology of the U. S. Department of Agriculture asked Pliny Reasoner and W. G. Klee to write a report on the "Condition of Tropical and Sub Tropical Fruits in the United States." We have, therefore, a reliable basis for the statements regarding conditions of that date in the famous Bulletin 1, issued in 1891. Furthermore, it was in 1887 that Reasoner Brothers issued their first big nursery catalogue of tropical plant materials. The year of the founding of this Society has, therefore, double or triple reason for being a logical starting point for considering the development of tropical fruit culture in Florida.

In 1887 there was only one tropical fruit grown on a commercial scale in Florida, and that was the pineapple. Red Spanish was the variety mostly grown, but Abakka, Smooth Cayenne and several others were also produced. Plantations were largely limited to the Keys, but smaller ones were found up both coasts.

Semi-commercial plantings were to be found of avocados and mangos, both of which fruits were already being shipped in small quantities to New York and Boston and bringing good prices. Seedling groves were bearing on Key Largo, although the shallow soil seems not to have been very favorable, and there were several seedling trees on the Pinellas peninsula and on Biscayne Bay, besides a nice grove on Marco Island. It is interesting to note that only one bearing tree was reported for California then. Mangos were being shipped from the West Indies to New York, and Florida growers were setting out seedling trees in Orange, Polk and even Lake Counties. There were a number of bearing trees on the Pinellas peninsula, at Bradenton and at Ft. Myers, and 1,000 young seedlings had just been set out on Pinellas. While the seedling varieties were not propagated other than by seed, Reasoners had imported seed of fine varieties from India and even offered three grafted Indian varieties. They had just begun propagation by inarching, and over at Palm Beach the mango had been budded experimentally by John Beach. More future was seen for mangos than for avocados by the horticulturists of that day, and such seedling races as Apricot and No. 11, which lacked the turpentine flavor of the common seedlings, were especially in favor.

Bananas of several kinds were also being grown on a semi-commercial scale in many

plantations along the coast, the fruit being sold to coasting schooners which carried it to Florida ports for local consumption. Sugar-apples were being planted on some of the Keys where the soil was exhausted for pineapples. Guavas grew wild all over South Florida, with many strains recognized already, but were hardly to be considered as cultivated. The Mexican lime grew wild on the Keys, but no groves had been established, whereas there were several small groves of the Persian or Tahiti lime in the "lake region."

It will be noted at once that the fruits which have become important cultural industries during the life of the Society were already being grown at least semi-commercially. Only a single new tropical fruit has been added to the list of commercial species in the past fifty years, the papaya, but great changes have taken place in some of the old ones. Pineapples, bananas and guavas stand today almost exactly where they were fifty years ago, except that each has diminished in importance relative to the whole tropical fruit situation. The same varieties of these three fruits were grown fifty years ago as are grown today. Only mangos, avocados and limes have gone forward and evolved into real industries. Let us see a little more of the path they followed.

The mango was considered the most promising tropical fruit in 1887, and its culture spread rapidly. Five years later there were bearing trees in Orange, Polk and Lake Counties, as well as all over Hillsborough, Manatee and Lee. In 1893 Pinellas shipped thousands of bushels of fruit to New York and glutted the market so that very low prices were received. The "big freeze" of 1894-95 killed these trees, as well as those in South Central Florida, and also the seedlings and in arched trees from India which Reasoner had imported. Similarly the freeze of 1886 had killed the first imported Indian varieties which Rev. D. G. Watt had secured in 1885.

In 1889, however, the U. S. D. A. had imported several inarched specimens of the Mulgoba variety, largely because of the insistence of the Rev. Elbridge Gale, who had settled at Mangonia on Lake Worth in 1884. Most of these trees failed to survive the cold of 1895, but one specimen on Gale's place did survive and finally fruited in 1898. The quality of its fruit was so remarkably superior to that of any of the available seedling varieties that it created a tremendous wave of enthusiasm for mango importation and propagation.

The beginning of the century was also the beginning of a real mango industry. In 1900 George Cellon discovered that patch budding could be used for mango propagation, and started the first commercial mango nursery. Back in 1893, Wm. Neeld of Pinellas had used the shield bud successfully, but had found it more difficult to bud mangos than citrus. The '95 freeze ended his mango aspirations. Reasoner and Beach were partial to inarching, but that is too slow and cumbersome for large scale propagation.

The year 1901 saw the first of the stream of importations of fine India varieties which followed in the wake of Mulgoba. The U. S. D. A. brought in Amini, Rajpuri and Sandersha, among others, and Beach imported Fernandez, Goa and Kavasji Patel. Reasoner was importing, too. Next year the U. S. D. A. imported Bennett, Borsha, Cambodiana and Paheri, with other less desirable ones. Many importations followed in later years, but none has been of permanent value other than these first ones.

In 1908 the original Mulgoba tree had a big crop, and Bennett, Fernandez and

Sandersha had fruited, whetting still more keenly the appetites of mango enthusiasts. But two years later the Mulgoba and Bennett are both reported as shy bearers, a reputation they have maintained ever since. A seedling from Mulgoba, however, had fruited that year on the place of Mrs. Florence Haden in Coconut Grove, and Cellon at once started propagation of the beautiful fruit which we know as Haden. No seedling or imported variety has been discovered since then which compares in attractiveness and prolificity with Haden, and it has been the commercial variety ever since its first propagation. Such mango industry as Florida has today is built upon the Haden variety, and consists of a couple of hundred acres only.

The avocado ranked third among tropical fruits in 1887, and like the mango was already being planted at that time in grove form. In 1892 there were reported bearing trees in Hillsborough, Orange and Polk counties, but the cold of 1894-95 ended the promise of many of them. The planters on the Pinellas Peninsula and along the Indian River gave up trying to grow avocados, but the settlers along Biscayne Bay were encouraged by seeing how well their trees had come back after the freeze.

Like the mango again, the avocado industry really dates from the first year of the new century, for it was also in 1900 that Cellon started the first commercial avocado nursery. Lacking an imported grafted variety such as the Mulgoba mango, for nowhere in the world has the avocado ever been propagated otherwise than by seed, he made selections among the numerous seedlings fruiting in the Miami area. Two of these seedlings, one of superlative quality and medium early, the other of very good quality but unusually late in season, he selected for propagation as named varieties. These were the Pollock and the Trapp, first budded in 1901. It was also in 1901 that seeds of Guatemalan type were imported for the first time by the U. S. D. A., but more of that later.

The first extensive planting of budded avocados was a grove of 20 acres of Trapp s, set out by S. P. Bliss in 1906 near Coconut Grove. Other groves followed rapidly, both in the Miami area and in the Redlands, Trapp being planted mostly because the highest prices were received in December.

The desire to extend the avocado season later into the winter, or even through spring, was ever present, and became stronger as the reports came from California in 1912 of the success of the Guatemalan varieties imported there. The Guatemalan seedlings planted at Miami in 1901-06 also began fruiting about 1911 and showed how late in the spring it was possible to have fruit. All of the promising California varieties, both Guatemalan and Mexican, were imported to Florida, and their offer to the Florida trade in 1914 gave a second impetus to avocado growing. Popenoe was sent to Central America by the U. S. D. A. to comb the native haunts of the Guatemalan type for the best seedlings, and sent in a large number.

In 1917 the Trapp variety still constituted 90% of the budded groves, and it is fortunate that the planting of Guatemalan varieties was not more precipitate, for most of them proved failures. They encouraged the planting of avocados in the Ridge section, however, and by 1920 there was as wide a distribution of avocado groves as there had been of seedling plantings prior to 1905. This gave a splendid opportunity for testing the hardiness of the many varieties then being propagated. There were groves in Dade,

Lee, Highlands, Palm Beach, St. Lucie and Polk counties.

The slow process of weeding out unsatisfactory varieties continued over many years and, indeed, has not yet ceased. There are today many Taft trees in the Redlands which should have been top worked to something else ten years ago or more. The fruiting habits of avocado trees became much more intelligible, however, when Stout came to the Redlands in the spring of 1925 and enlightened the growers on the peculiarities of avocado flowers and blooming. After the introduction of Guatemalan varieties, this work of Stout is the next important step in the development of a rational avocado industry.

Because the avocado plantings were so much more extensive than the mango plantings, they were more seriously affected by the boom of 1925. It has been estimated that prior to 1925 there were nearly 3,000 acres of avocados planted, with an annual production of over 50,000 bushels. The boom and the hurricane the following year left many of the older groves in wreckage, especially in Dade County, and production dropped to 5,000 bushels in 1928. There was renewed planting activity for a few years thereafter, but the demoralization of the market during the summer and early fall months by unrestrained Cuban competition has served to check avocado planting now for several years. There are probably about 2,000 acres of avocado groves in the state, and nearly all of these are of bearing age. Trapp accounts for only about 10% of the plantings now, but is still one of the leading varieties. Varieties of Florida origin, whether West Indian, Guatemalan or hybrid, constitute about 80% of all plantings, and this ratio will increase in the future undoubtedly.

While limes were the least important of the tropical crops grown in grove form in 1887, they have long since advanced to second place. The Keys were then considered as logical sites for avocado, mango, pineapple, orange, grapefruit, and various other fruits, but gradually these others passed out of the picture and left the little wild Mexican lime supreme. By 1916 there were 1,500 acres of these limes set out in such grove form as is customary on the Keys, mostly young trees. The boom was hard on these plantings, however, and today there are not over 400 acres remaining. Meanwhile the Persian lime, which had been longer cultivated but not so extensively, has come into prominence in the past few years. A grove of 300 trees in 1904 at Coconut Grove was an event, and probably in 1930 there were not over 100 acres of Persian limes altogether in Florida. Today there are probably 2,000 acres of this and the Perrine lemon, whose culture and requirements are very similar, planted on the Lower East Coast and in the Ridge.

The papaya is the only case we have of a semi commercial fruit industry today which was not started in a small way fifty years ago. It is a very small industry, but it is one. In 1913 there appeared the first paper on papaya culture in the reports of this Society, and the next was not until 1930. The growing of papayas took a great increase during the decade 1920-1930, and in 1929 a marketing association was organized. The acre age has never been large, however, and periodic cold winters reduce expanded plantings regularly. Thus far we have dealt only with commercial or semi-commercial fruits. But one of the joys of a Florida home is the tremendous number of non commercial fruits which can be grown for home use. The following list includes species known to have fruited in Florida by 1887:

Achras sapota
Anacardium occidentale
Annona cherimola
Annona muricata
Annona reticulata
Annona squamosa
Carissa arduina
Cyphomandra betacea
Eugenia jambos
Eugenia uniflora
Lúcuma nervosa
Malpighia glabra
Mammea americana
Melicocca bijuga
Monstera deliciosa
Phyllanthus acidus
Psidium cattleianum
Rhodomyrtus tomentosa
Spondias lutea
Tamarindus indica
Triphasia trifolia

In addition to these should be named the little Red Ceylon peach, which supplies the Lower East Coast with peaches for the home in May. It had been fruiting several years for its originator and was being propagated by a nursery. All but one of the above species are still common in Florida.

A slightly longer list can be made of tropical species which had not yet fruited in Florida but which were available for planting fifty years ago:

- ** Adansonia digitata
- * Aleurites moluccana
- Annona spp. (10 of them)
- ** Antidesma bunius
- ** Artocarpus incisa

- ** *Artocarpus integra*
- ** *Averrhoa bilimbi*
- ** *Averrhoa carambola*
 - Baccaurea dulces*
- ** *Belou triármelo*
- * *Calocarpum mammosa*
 - Carica candamarcensis*
- * *Carica papaya*
- * *Carissa carandas*
- ** *Chrysophyllum cainito*
 - Dovyalis caffra*
 - Durio zibethinus*
- ** *Eugenia dombeyi*
 - Feronia limonia*
 - Garcinia tinctoria*
 - Lansium domesticum*
- ** *Litchi chinensis*
 - Lúcuma caimito*
 - Mimusops elengi*
 - Mimusops kauki*
 - Nephelium mutabile*
 - Passiflora edulis*
 - Passiflora quadrangularis*
 - Pereskia aculeate*
- * *Phyllanthus emblica*
 - Platonia insignis*
 - Psidium araca*
 - Psidium cujavillus*
 - Psidium guiñéense*
 - Psidium peruvianum*
 - Sandoricum koetjape*
- * *Vangueria madagascarensis*

It is also of some interest to note that thus early *Albizzia lebbek* and *Melaleuca leucodendron* were being offered, and that *Casuarina equisetifolia* was already very common in Key West. Many other common and less common ornamentals of today were also available then, but they are outside the province of this paper.

By 1900 there had been several years in which to test these fruits, and many had proven suited for Florida culture. All of those which had fruited by 1888, and also those marked with a single asterisk in the other list, were considered by 1900 as proven. Those marked with a double asterisk were still considered promising, and there were also the following new species to add to that list: *Casimiroa edulis* and *Garcinia mangostana*.

It will be noted that many species have fallen by the wayside, and undoubtedly these either failed to grow or were killed by the "big freeze" of 1895. They are nearly all species which are very tender and of which the seed is especially hard to import viable. Most of them are still not to be found in Florida anywhere, at least not fruiting. Of those marked promising in 1900, only the lychee and perhaps the carambola are entitled to a higher rating today.

In the years that have gone by there has been a vast number of tropical fruits introduced to Florida culture, especially by the U. S. D. A., but few of them have persisted. The following include all of the species fruiting in Florida today and not in the above lists:

- Carissa grandiflora
- Dovyalis hebecarpa
- Eugenia jambolana
- Flacourtia rarnontchi
- Garcinia livingstonei
- Nephelium longana
- Spondias cytherea
- Spondias purpurea
- Uvaria rufa
- Zizyphus Mauritania

We have not made great progress these fifty years in the number of species available for planting in Florida, although we have learned a great deal about what species are not suited to our conditions. Only the leader of a forlorn hope would still plant the mangosteen and the breadfruit. On the other hand, the lychee has become firmly established in two sections of the state, and may even become a semi-commercial fruit.

The lychee is an interesting case of success after many failures. It was first introduced in 1886 into Orange County and probably was lost in 1893.

Then Reasoner obtained a specimen on a longan stock, and this tree fruited in 1902—

the first lychee fruit produced in this country. This tree died also, of unknown causes. Then in 1906 a number of lychee trees were imported by the U. S. D. A., and several of these on the West Coast survived childhood. One of these fruited at Oneco in 1916, and ever since then has been the source of propagating material for marcottage. Of the many rooted cuttings prepared and distributed in this way, a scant dozen have lived and fruited in Dade and Lee counties, with occasional trees elsewhere. There is also a small grove in Polk County dating from 1922. The lychee may be widely planted within the next ten years, for it endures a wide range of temperatures and soils, if it can be propagated more cheaply.

We have today some thirty or forty minor fruits which are grown in a very small way over a considerable territory, but which are as unimproved today as they were fifty years ago. What has been done with the avocado and mango may be done to some degree with them, although none of them has such great potentialities as they had. The steps of development are always the same: first, the selection of superior seedlings for vegetative propagation as varieties; second, the control of the diseases and insect pests which are sure to follow in the wake of any large scale planting; and third, the education of the public to appreciation of the fruit. We have made the initial importations of the species, although a vast number still await importation, but we have taken none of these developmental steps in the case of any of these minor fruits. That task confronts the horticulturist today as a challenge. Let me not be misunderstood, however, as intimating that the problems of our avocado and mango industries are solved. There is as much need as ever for finding better varieties in both cases, and the history of these fifty years teaches us that we must look to selection of seedlings from natural hybrids of our imported varieties for the answer to the variety problem. We need not expect to import directly any ideal variety. Our importations are of value only as the source of variations among which to make selections.

As the concluding portion of this paper, I wish to call the roll of those agencies or individuals which have been of special significance in the development of tropical fruit culture in Florida.

First must come the name of Reasoner Brothers. I know of nothing more remarkable or romantic in the history of Florida horticulture than the way in which these two Illinois farm boys, Pliny just over twenty and Egbert his junior by five years, with meager capital but boundless enthusiasm and ability, managed to develop so extensive a correspondence and to propagate unfamiliar plants so successfully that within five years from the start of their precarious adventure they were able to offer a variety of tropical plants never equalled before or since in Florida. If we except the avocado and mango, all but a dozen of the species and varieties found today, and many not available today, were offered by them in 1888. Only one who has tried to import seeds of tropical fruits, and has seen lot after lot arrive already dead because of the long time needed for the journey and the short viability of the seeds, or who has written repeatedly but vainly in search of a source of seeds of some species, can fully appreciate what that imposing list of nursery plants meant. That nursery remains to day the only source of any wide variety of tropical fruits.

The second name is that of our own David Fairchild. Organizing the office of Foreign Seed and Plant Introduction of the Bureau of Plant Industry in 1898, he was responsible

for the establishment of the Plant Introduction Garden at Miami, and in person explored all over the world for tropical fruits to send back. To his enthusiasm for exploration, introduction and utilization, tropical horticulture in Florida has not yet ceased to owe a large debt, and we are happy in having him still here to encourage us.

While Cellon and Beach were the outstanding early propagators of mangos and avocados commercially, I believe that the third name should be W. J. Krome, in whose honor this section of the Society is named. Both industries are in no small measure the result of his intelligent observations, his careful experiments and his wise counsel.

No list, however brief, could omit the name of Wilson Popenoe, not alone because of his explorations in Central and South America for plants, but also because his "Manual of Tropical and Sub tropical Fruits" is our only comprehensive treatise. I wish also to pay tribute to the many years of study of avocados and mangos by H. E. Stevens, whose work is almost our only guide in the control of their diseases.

It is obviously impossible to attempt to name all who have played more or less important roles in this field, or to evaluate their work. It is of more importance to think instead of what remains to be done, and to set about doing it. Even if no important industry results from the minor fruits, they will always add greatly to the satisfaction of living in Florida. The necessity of guarding against importation of foreign insects has greatly increased difficulties of importing seeds of tropical fruits, few of them surviving the ordeal of treatment, but by continued effort we can gradually increase the number of species available. We can select and propagate the best strains. And it is not too soon to begin. Horticulture of Florida for a record. I want to introduce now another speaker who has done much research and investigation on the life and work of one of the greatest plant men in history. Our speaker, T. Ralph Robinson, will bring us new information on his life:

Mr. Hume: It is particularly fitting at this time that we should have a review of the Tropical