

used successfully in the slightly alkaline soils used in the nursery. Even the unreacted EDTA corrected iron chlorosis in the nursery when used in sufficient quantity. The most successful chelating agent tested thus far has

been EEDTA, the sodium salt of N-hydroxyethylethylenediaminetriacetic acid. Its iron salt corrected chlorosis even in the highly alkaline Rockdale soils. The proper rates of application must now be established.

BELAIR GROVES, SANFORD, PIONEER IN SUB-TROPICAL HORTICULTURAL INTRODUCTIONS

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"Belair, on the Sanford Grant, is so identified with the development of South Florida, has done such good work for it, that some account of its growth and experimental gardens . . . would be of interest." This is the opening statement of an old publication of the last century but it might serve as well for an opening statement of this present paper. The publication (1)—entitled "Some Account of Belair, also of the City of Sanford, Florida, with a Brief Sketch of the Founder," published in Sanford in 1889—brings to light some very interesting history regarding early introductions of sub-tropical horticultural plants into Florida. As shown by the signature on the cover, this publication was at one time the property of S. O. Chase, Sr., early pioneer in Florida agriculture, and cofounder of Chase and Company, Sanford. Belair, located three miles southwest of Sanford, is at present owned by the descendants of Sydney O. and Joshua C. Chase. The original publication was photostated and bound at the University of Florida Bindery, 1948.

General H. S. Sanford, world traveler and at one time Minister to Belgium (1861-1869), first came to Florida in 1869. In the following year he purchased some 23 square miles of land, including Belair. As a result of his contacts in Central and South America, Africa and southern Europe, he was able to import plants and seeds of citrus and many species of tropical and sub-tropical fruits and ornamentals for trial in Florida. By 1889, when this account was published, his collection contained a great number of species, many of which survived

the 1886 freeze. His groves attained national fame and by 1889 had attracted many visitors, including General Grant and President Cleveland, as well as representatives of northern newspapers. The latter wrote glowing accounts of the Sanford Groves. Four of them are printed in his publication.

General Sanford planted his first citrus trees at St. Gertrude, west of Sanford, in 1870, but was forced to move his groves to Belair in 1873 because of poor drainage due to a soil hardpan at the earlier location. These citrus trees, however, were not the first to be planted in the Sanford (Mellonville) area. A group of orange trees planted by Dr. Algernon Speer in 1845, and still standing (1953) in Speer Grove Park, Sanford, was twenty-five years old at the time of General Sanford's first planting.

BELAIR TROPICAL GARDEN OR EXPERIMENTAL TRACT

According to Mr. Donald Houston, Superintendent of Belair Groves, Sanford, 1887 (1), "The Tropical Garden or Experimental Tract is but a short distance from the present residence (of General Sanford). Long before Experimental Stations were thought of, General Sanford instituted the extensive and carefully conducted experiments which, up to the time of the great freeze (1886), promised such important results for other economic plants and trees. These experiments, while largely for his own satisfaction, were designed, more than all, for the benefits of the agricultural interests of the State."

"In January, 1884, he (General Sanford) went before the Committee of Agriculture of the House of Representatives at Washington to urge the establishment of an Acclimation or Experimental Station in Florida, stating that half of the large and unique collection of economic plants in the conservatories of the Agricultural Department could be grown in the

open air in Florida, and most valuable results secured to agricultural interests in establishing the practicability of new and amplified culture. Sectional or state jealousies had a good deal to do with his unsuccess at that time though he offered 100 acres of land as a gift for it, either in South or in Middle Florida—but the seed sown is producing, finally, good results in Experimental Stations, of which Florida's will be, naturally, the most important and valuable in the country."

"The space allotted to these experiments cover an area of five acres . . . along the borders of Crystal Lake. . . Here was to be found before the freeze (1886) fully one hundred varieties of the citrus family imported from all parts of the world."

The following "rare exotics" were listed by Mr. Houston as having been grown at Belair. Those plants which were killed by the freeze of 1886 are marked with a dash (-), whereas the others survived.*

-Alligator Pear	West Indies
-Arabian Coffee	Yemen
-Australian Banyan	Australia
-Black Pepper	East Indies
-Camphor Tree	Japan
-Caruba Palm	Brazil
-Cinnamon Tree	Ceylon
-Coco	Peru
-Coffee	Yemen
-Cuba Bast	West Indies
-Custard Apple	Guiana
-Date	Levant
-Edible-Fruited Passion Flower	Venezuela
-Kola Nut	Niger River
-Latanier Palm	Bourbon Islands
-Mahogany Tree	West Indies
-Mamme Apple	West Indies
-Mango	East Indies
-Netted Custard Apple	South America
-Para Rubber	Brazil
-Queensland Nut	Queensland
-Satin Wood	East Indies
-Sour Sop	West Indies
-Star Apple	West Indies
-Sweet Sop	Central America
-Turpentine Tree	Southern Europe
-Vanilla Aromatica (Vanilla of Commerce)	South America

"The ensuing miscellaneous list—plant, flower and tree—all survived the freeze (1886), and are doing well.

- Royal Palm—*Oreodoxia Regina*
- Osmanthus Fragrans*
- Illicium Anisatum*
- Grevillea Banksii*
- The Annato Dye Plant—*Bixa Orellana*
- Sapadillo
(Sugar apple, pawpaw, rubber tree, and Cordytino
Australis all succumbed to the cold.)
- Cattley guavas—*Psidium Cattlaeyanum*
- Olive Wood—New South Wales
- Abyssinian banana—*Musa Ensate*
- Elaeodendron*—Australia
- Prichardii Filamentoso*—palm

* Spelling of the common and scientific names as they appear in the original publication have been retained.

- Chinese palm fan—*Latania Borbonica*
- Forcraeya*—East Indies
- Banyan Tree—*Ficus Macrophylla*—Australia
- Ammonium Cardamonum*—(Cardamon seeds of commerce)
- Cocoas (in full bloom and fruit)
- Mexican Agave
- Date Tree
- Japan persimmon
- Century plants
- Avocado pears (replanted after freeze)
- Mangoes (replanted after freeze)
- Tacaranda—*Mimosa folio*
- Eucalyptus Robusta*
- Polyanthea folio*
- Eucalyptus Stewardii*
- Casuarina
- Rose apple—New Caledonia
- Date Palms—*Reclinata*, *Lyonesis*, and the Phoenix
- Dactylifera* or date of commerce—(Africa)
- Bamboo
- Cocoanut Trees (planted since the freeze)
- Cookii Wampee*
- Acacias
- Begonias
- Pecan
- Mexican pepper plant—*Schinus Molle*
- New Zealand flax—*Phorium tenax*
- Papayrus—Egypt
- Tamarind of Scripture
- Tamarindus Indica*
- Camelias
- Azaleas
- Oleanders
- Carnuba Palm—*Copernicia (Coryphe) cerifera*—Brazil—(Source of carnuba wax)

"The following is a list of some of the introductions at Belair, and includes the few definite selections from among over 140 varieties of the Citrus family, imported by General Sanford, and tested for permanent propagation and adoption in South Florida.

- Citrus Aurantium Dulcio*.—The Sweet Orange
- Jaffa
- Majorca
- Maltese Blood
- Maltese Oval
- Mediterranean Sweet
- Melitensis
- Sanquinese
- St. Michael
- Sweet Seville
- St. Michael Egg
- Exquisite
- Tardif.—Brown's Late. "Medium sized, round, skin smooth and thin; grain fine with a brisk and racy flavor; in quality, above the average; retains its juices until the middle of July, or even later, and is especially valuable on this account; tree prolific, a strong grower; branches thornless or nearly so; foliage somewhat distinct; imported from Thomas Rivers, of England, in 1871." (This represents the earliest introduction into this country of the present day Valencia, most important late orange in Florida and California today. E. H. Hart, Federal Point, Florida, made an introduction of the same orange from Rivers by way of New York shortly after the Sanford introduction. The same variety was introduced into California in 1876, also from Rivers' Nurseries. In California, a Spanish citrus grower identified it as being the same as the late orange grown in Spain, and it became known as Valencia (3)).
- Citrus Aurantium*.—Bergamium. The Bergamot Lemon.
- Citrus Medica Cedra*.—The Citron of Commerce.
- Tangerine
- The Kumquat
- Embiguo, or Navel Orange
- The Loquat.—Japan Medlar. *Eriobotrya Japonica*
- Olea Europae*.—The Olive Tree. (Although one acre of olive trees presented a "magnificent appearance" in 1887, and set some fruit at Belair, and large olive trees are still growing in the Sanford

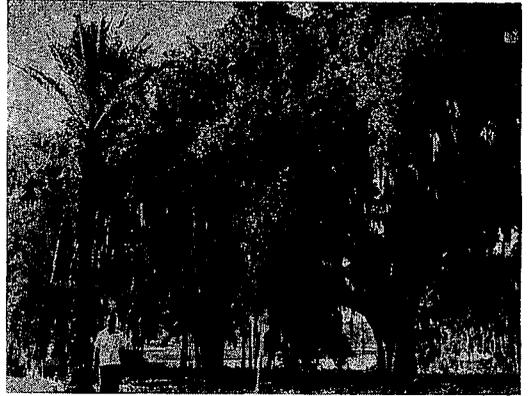
area, 1953, they do not set a commercial crop of olives under Florida conditions.)

Morus Alba Multicaulis.—The White Mulberry.
Chrysoyllum Cainitum.—Star Apple. West Indies.
Pomegranate.—*Paunica Nana*
Tamarindus Indica.—Spanish, Tamarindo.
Ceratonia Siliqua.—The Carob Tree, or St. John's Bread.
Erythroxylon Coca.—Peru. (Leaf chewed as stimulant)
Agave Rigida.—(sisal hemp of commerce)
Acacia Arabica. The gum Arabic
Hibiscus Rosa Sinensis.—Chinese Hibiscus
Sterculia
Feronia Elaphantum Yellanga.—Elephant Apple—Mountains of Coromandel.
Achras Sapota.—*Sapota Mammosa*
Laurus Camphora.—(Champhor of Commerce).
Illicium Religiosum.—The Star Anise.
Oreodoxa Granatensis
Phoenix Canariensis.—(Canary Island date).
Phoenix Rupicola
Raphis Flabelliformis
Corypha Australis
Cycas Revoluta
Anona Cherimolia.—Cherimoya, Jamaica Apple.
Anona Squamosa.—Sugar Apple or Sweet Sop.
Carica Papaya.—Pawpaw (papaya)
Musa Cavendishi.—Chinese dwarf banana
Ananassa Satina. The Pine Apple. (In 1887, three quarters of an acre was devoted to the growing of pineapples under shade. Some sixty varieties of pineapples had been introduced and grown at Belair by General Sanford. Previous to the 1886 freeze, the pineapples bore numerous fruits, some of them from ten to fourteen pounds in weight. The better varieties tested included:
 Black Antique
 Brown Sugar Loaf
 Envill
 Moscow Queen
 Broad Leaved Queen
 New Black Jamaica
 Ripley Queen
 Moontserrat
 The Mogul
 Abakachi
 White Pole

Smooth Leaved Cayenne.—(Principal commercial Hawaiian pineapple variety of 1953. Also grown in Florida to a limited extent.)

General Sanford
Trinidad
Charlotte Rothschild.

It was concluded that "in this latitude, pineapples are an uncertain crop on account of their extreme susceptibility to injury from frost."
Figs.—**White Adriatic,** the fig of Commerce "is the only variety remaining of several imported."
Grapes.—"Some 200 varieties were imported and tested, but the culture has been abandoned."
 (The grape variety best suited to this climate was listed as the Concord.)



Old Date Tree and Oaks on Crystal Lake; Belair, Sanford, 1953.

According to an old letter, General Sanford sent oranges from Belair to Prince von Bismarck in Berlin in 1885. Even with the shipping facilities in those days, the fruit was received in good shape and thankfully acknowledged by Bismarck (1).

The Lychee, *Litchi chinensis*, was evidently planted in Florida prior to 1880, for Charles Amory of Sanford sent fresh lychee fruit to the Massachusetts Horticultural Society for exhibition in 1883. A Mr. Whatley, living near Orlando, imported a tree in 1886, and Reasoner Brothers began importing lychees two years later (2). According to the Belair Groves publication (1), Mrs. Sanford showed Mr. Mack, President of the Ohio Editorial Association, the "Chinese lichi" growing in the open at Belair in 1882. Today, in 1953, lychees are being raised in Central Florida (Geneva and Merritt Island), as well as in South Florida, in commercial amounts.

General Grant is quoted as saying to General Sanford in 1880 in regard to Florida, "You have on this tongue of land, jutting into the tropics, the only soil under our flag capable of producing the rich tropical products the



Camellia Three Quarters of a Century Old; Belair, Sanford, 1953.

North needs, and must have, and must pay for."

General H. S. Sanford, who purchased Belair about 1870, near what is now Sanford, Florida, was a pioneer in the introduction of sub-tropical fruits and plants into the United States from all over the world. Sub-tropical fruits, such as oranges, limes, lemons, avocados, mangoes, lychees, and guavas, many of which were "rare exotics" to this country in those days are now established or potential commercial crops in Florida today.

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A PROGRESS REPORT ON RESEARCH IN TROPICAL AND SUB-TROPICAL FRUIT AT THE GOVERNMENT EXPERIMENT STATION, NASSAU, BAHAMAS

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Although research is being conducted at the Government Experiment Station at Nassau with such crops as onions, sweet corn, field corn, crowder peas, tomatoes, cantaloupes and watermelons, this paper will be confined to tropical and sub-tropical fruit tree crops.

The people of Florida, by the keen interest they have taken in tropical fruits during the past two or three decades, have stimulated greater interest among the residents of the American tropics and the Caribbean in the native fruits of their lands. Like many others who were born and brought up among tropical fruit, I took them for granted. After spending nearly four years in Florida, I returned home with a greater interest in the native fruit of my island and with a determination to try to improve them by selection.

MANGO (*MANGIFERA INDICA*)

During the past two years, a mango collection consisting of twenty-nine varieties has been established. Included are the well-known Florida varieties such as Brookes, Carrie, Edward, Florigon, Fascell, Haden, Irwin, Kent, Smith and Zill. Comprising the collection also are the Bombay Green from Jamaica, and the Mango Francis or Madam Francis of Haiti. The Bombay Green is a so-called free-stone mango. This fruit, although it has a pleasant taste, by no means surpasses in quality the leading Florida varieties. The fact that when it is cut crosswise the seed is easily removable, thus allowing it to be eaten with a

spoon, makes it popular with persons being introduced to the mango. The Madam Francis is a fairly consistent bearer and is of fair to good quality. The seed is polyembryonic.

The above mangos are grafted on rootstocks consisting of No. 11, Turpentine, Zill, Sander-shaw, Haden, Mulgoba, Sumatra, Saigon, Cecil and Mango Francis. Already, cases of partial uncongentiality have been noticed. It is hoped from this collection to find the rootstock and variety best suited to the Bahamas. The principal soil types are not unlike the Rockdale series of the Homestead region and the soils of the Florida Keys.

AVOCADO (*PERSEA AMERICANA*)

An experimental block of sixteen varieties of avocados, consisting of such varieties as Booth 7 and 8, Taylor, Lula, Linda, Hall, Nabal, Marguerite, Choquette, Areu, Hassock and Pollock has been established. It may be interesting to note that although the Itzamna will hold fruit in the Bahamas as late as the end of June, and are consistent heavy bearers, the fruit will mature with a water-soaked brown spot. Ten local seedlings of the West Indian race are also under observation. They are all good to excellent in quality but it will take a year or two more to determine their prolificness and regularity of bearing.

BREADFRUIT (*ARTOCARPUS ALTILIS* FOSB.)

Attempts have been made to propagate breadfruit on a large scale by marcottage with the use of "Air-Wrap." This has not proven too successful. A small percentage will root quite readily, but the remainder will only cal-