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THE ATKINS INSTITUTION OF THE ARNOLD ARBORETUM, SOLEDAD, CIENFUEGOS, CUBA*

THE most distant of Harvard University's separately endowed and widely scattered units forming its botanical empire is the Atkins Institution of the Arnold Arboretum. It is situated at Soledad, about ten miles from Cienfuegos, on the south shore of Cuba, and approximately 190 miles from Havana. With the exception of the Harvard Forest at Petersham, Massachusetts, the remaining seven botanical institutions are located in Cambridge, Jamaica Plain, and Forest Hills, reasonably close to the holding body, the University itself. As the Atkins Institution, administratively a branch of the Arnold Arboretum, and like the Arboretum, based essentially on a great collection of living plants, is relatively little known to the botanical and horticultural public of the United States, it has been thought desirable to prepare this short paper summarizing its history, development, and objectives. Essentially the Atkins Institution is a botanical garden, one of the few in tropical America, and the only one not government supported. In this latter respect, being essentially a private foundation for the benefit of the public, it is unique in tropical America, and is thus in a strategic position to render important services not only to Cuba and its people, without cost to Cuba, but also to biologists in general particularly in North, Central, and South America.

Mr. Edwin F. Atkins, then a young man, left Boston for Cuba in 1869 to learn Spanish and Spanish business methods, and in 1875 he assumed full charge of the Cuban affairs of his father's firm, E. Atkins & Company. Commencing in 1882, various tracts of land were acquired in connection with business matters, and previous to the Spanish-

*See also **Barbour, T.** and **Robinson, H. M.** Forty years of Soledad. Sci. Monthly **51**: 140-146. illus. 1940.

American war in 1898, these tracts had been consolidated and organized into one of the most modern and progressively managed sugar estates in Cuba*. The Soledad Sugar Company which he organized is still a family corporation, and one that has been outstandingly successful in its field. Mr. Atkins died in 1926 at the age of 76 years, but in the meantime he had initiated and provided for the future support of a project that is proving to be of increasing value to the country in which it is located and to biology in general.

Mr. Atkins becoming interested in the possible development of better strains of sugar cane through selection and breeding, consulted with Professor George L. Goodale of Harvard University and with Professor Oakes Ames in 1899, the latter then a young man recently graduated from Harvard. These conferences resulted in an arrangement by which Professor Ames undertook to supply a certain amount of supervision and advice; Mr. Robert M. Grey, an experienced plant breeder, then in charge of the Ames collection of living orchids, was engaged for actual work at Soledad; eleven acres of land were set aside for experimental purposes; and Mr. Atkins undertook to provide the necessary financial support. Thus began the botanical development at Soledad, some 40 years ago, which in 1932 officially became the Atkins Institution of the Arnold Arboretum, Harvard University. In addition to the work on breeding new varieties of sugar cane, an early project was the introduction and acclimatization of vegetables with view to selecting and breeding varieties adapted to Cuban climatic conditions.

From the time the work was initiated at Soledad until he retired as Supervisor of the Arnold Arboretum in 1935, Professor Ames continued his interest in the project, operating it first as an adjunct to the Botanic Garden in Cambridge, later in connection with the Bussey Institution, with the advice of a special committee, and finally as an official part of the Arnold Arboretum.

Both Mr. and Mrs. Atkins were interested in plants for their aesthetic and economic values, and Mr. Grey, a very keen plantsman, encouraged and supported by them, commenced to assemble a representative collection of tropical species. Among the first accessions was an important collection of orchids and various other tropical ornamental plants transferred from the Ames greenhouses in North Easton to Soledad. Thus over a period of years the so-called "old garden" was developed, which now forms a section of the existing plantings at the Atkins Institution. Gradually through Mr. Atkins' continued interest and support the acreage was increased, the last boundary adjustments

*Atkins, E. F. Sixty years in Cuba i-xii. 1-362, illus. 1926.

PLATE VIII

1. Harvard House
2. Casa Catilina

having been made in 1938, when important adjacent tracts were added to the garden holdings by Mr. William H. Claflin, son-in-law of Mr. and Mrs. Atkins, President of the Soledad Sugar Company, and Treasurer of Harvard College. The total area of the garden is now 221.6 acres, about 40 acres less than the Arnold Arboretum holdings in Boston. Well over one half of the Soledad area has been developed on an approved planting scheme; roads, paths and bridges have been constructed, dams built across the small stream flowing through the garden to form a series of small ponds, a water tank and irrigation pipes installed, and ample propagating facilities provided. A great number of tropical plants that have been drawn from the warmer parts of both hemispheres have been established and are now thriving at Soledad.

A list of plants in cultivation at Soledad was published in 1933*. In this work 1970 species were enumerated, representing 921 genera and 165 families; the number actually planted out is now between 2500 and 3000 species. Accessions for trial have been very large in the past few years. Thus in the period 1933-35 a total of 2250 species were received for trial, while in 1937 six hundred thirty two additional ones were accessioned. These figures suffice to give some idea of how rapidly the plantings are being enriched with both native and exotic species.

Established plantings include a large palm garden, a fine cycad collection, water gardens, areas for marsh plants, a large succulent garden, a rock garden on an exposed limestone outcropping at the end of the *seboruco*, a large cactus garden, a special place for native and exotic orchids and bromeliads, a vine section, a bamboo collection, and special areas designated and now under development for representatives of the great families of tropical flowering plants. Forming as it does an "oasis" surrounded by pasture land and sugar cane fields, and including a small permanent stream, the garden site forms a natural wild life sanctuary in which bird life is particularly abundant and interesting.

Since the garden is located in a region where most of the native arborescent vegetation has been largely destroyed, it is fortunate that a considerable tract of native forest is included. This area, a rocky outcropping known as the *seboruco*, is being maintained as a characteristic representation of native lowland Cuban forest. The entire region is characterized by a relatively dry tropical climate, the annual rainfall averaging about 50 inches. Because of prolonged dry seasons, we

*Gray, R. M. and Hubbard, F. T. List of plants growing in the botanical garden of the Atkins Institution of the Arnold Arboretum at Soledad, Cienfuegos, Cuba. i-vi. 1-245. 1933.

PLATE IX

1. View across one of the ponds in the Palm Collection
2. Ceiba pentandra, Ceiba or Kapok Tree

thus have the opportunity of developing tropical plantings of those species that are more or less characteristic of those parts of Asia, Australia, Africa, Mexico, and South America which have somewhat similar climatic conditions; all of these regions have contributed extensively to the rapidly expanding plantings at Soledad. At the same time, with irrigation, it is possible to grow a great many tropical species that are adapted to regions of higher humidity and a greater or more evenly distributed annual rainfall.

To provide for the future support of the growing garden, Mr. Atkins in 1919-20 presented to Harvard University the initial payments on an endowment fund. This was increased by additional gifts from 1921 to 1925, until the total amounted to $185,141.00. This fund was designated as the Atkins Fund for Tropical Research in Economic Botany, the annual income to be expended at Soledad. Naturally with an assured annual income limited to that received from this endowment, the activities at Soledad must of necessity be restricted, and much highly desirable work must be deferred. Again as the planted areas are increased, the cost of maintenance also increases. In 1924 the Cuban unit was designated as the Harvard Biologic Institute in Cuba, and eight years later, in 1932, under the administration of Professor Ames, to simplify administration and to bring about a somewhat closer affiliation with the northern units in Massachusetts, the name was changed to the Atkins Institution of the Arnold Arboretum. Thus in effect the general field of the Arnold Arboretum in its attempt to maintain a great collection of hardy plants in the not too hospitable climate of New England, has been extended to the tropics, where, with the income from the Atkins fund, a great collection of tropical plants is now established, and is being maintained and increased.

In 1924, Mr. Atkins provided for the construction of Harvard House, as a combined headquarters building, laboratory, and living quarters, and here, since that date, many scientists have been entertained for longer or shorter periods of time. Here staff members of Harvard University, and graduate students, recipients of Harvard Fellowships for work at Soledad, and representatives of other institutions have made their home. The facilities include desk space, microscopes, glassware and other laboratory equipment, an herbarium containing a large collection of Cuban plants and representatives of species cultivated in the garden, a reference library, plant presses and driers; in fact that general type of equipment that is normally needed for biological laboratory and field work, so that visitors need take little with them other than what is needed to meet their special personal requirements. Yet from the time Harvard House was constructed, in spite of the limited

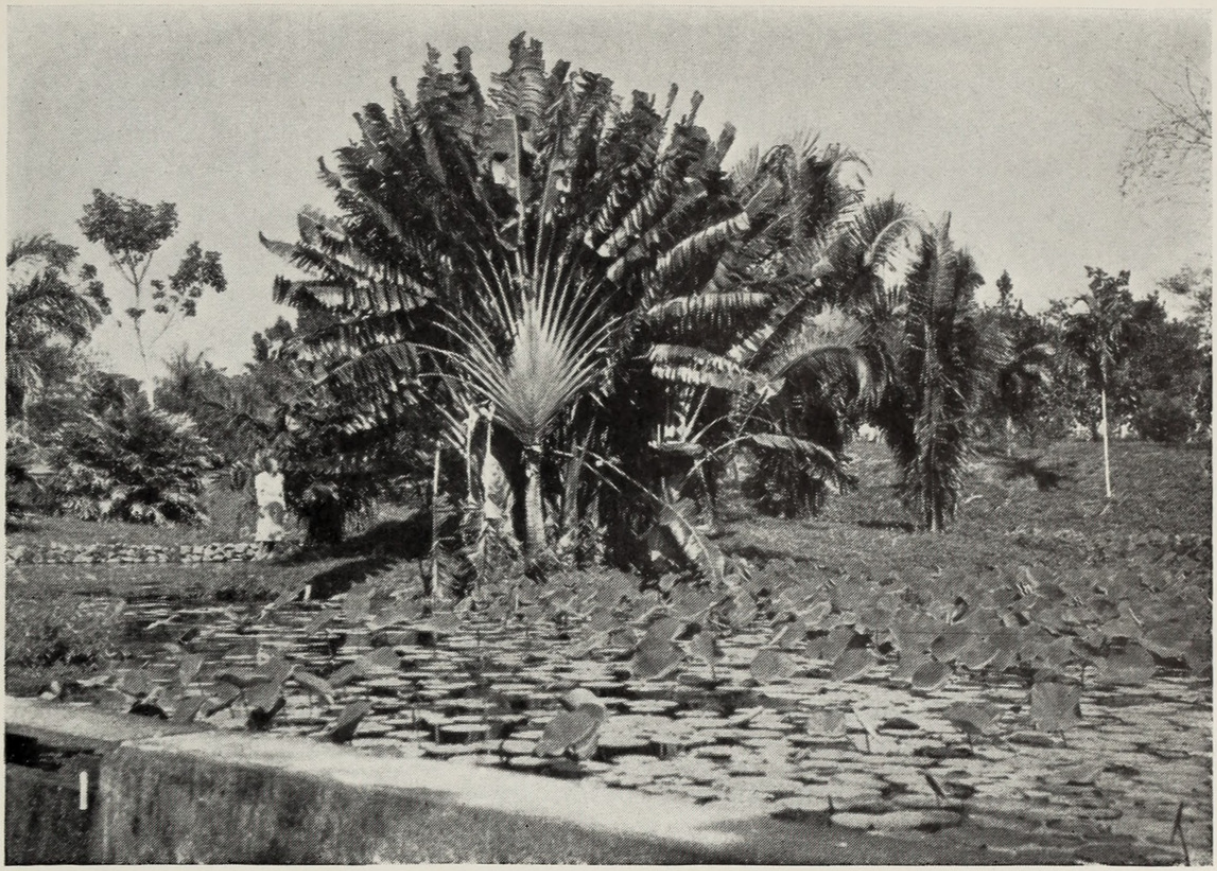

PLATE X

1. Ravenala madagascariensis, Travelers' Tree
2. Bamboo at its best

facilities available therein, an incomplete list of registrants who have lived and worked there exceeds 130 individuals, about half of whom were botanists and half zoologists.

A new dormitory, Casa Catalina, was constructed in 1938, with funds generously provided by Mrs. Atkins and Dr. Thomas Barbour, Director of Harvard University Museum and Custodian of the Atkins Institution. This is beautifully located at the crest of the ridge overlooking the garden, with a magnificent view of the Trinidad Mountains beyond. Casa Catalina now provides sleeping accomodations for at least twelve persons so that there is no reason why the facilities at present available at the Atkins Institution should not be more widely utilized.

Up to the time that Casa Catalina was constructed it was, of course, necessary to limit the number of residents or workers at Soledad, and naturally preference was given to the officers and students of Harvard University. Three Harvard University Fellowships for work at Soledad are available annually to graduate students registered at the University, and from time to time others have been made available, either from the income from the Atkins Institution endowment, or from gifts received for this purpose. In the summer of 1940, nine graduate students and one instructor worked at Soledad on various botanical and zoological problems. Representatives of other institutions and individuals interested in general biological problems, in botany, and in horticulture, are always welcome up to the limits of available space in Casa Catalina and Harvard House.

Aside from the excellent facilities now available at the Atkins Institution for biological work based on material cultivated in the garden, there are, of course, a great number of problems appertaining to the native flora and fauna of the region as a whole. The Atkins Institution forms an excellent center for biological field work on these wider problems, for many interesting regions are accessible from Soledad, including the Trinidad Mountains, with their tropical vegetation, a short distance north of the garden, which attain altitudes of between 3000 and 4000 feet; while for individuals more interested in marine zoology the brackish reaches of the Caunao, Arimao and Anaya Rivers and the salt waters of Cienfuegos Bay and the Carribean Sea are accessible. Or again, one interested in floristic studies can reach the extensively developed xerophytic vegetation characteristic of coastal areas, the mangrove swamps, and farther along the largest fresh water swamp in Cuba, the *Cienega de Zapata*, with many interesting endemic plants and animals; and to the north and east, in Santa Clara Province, between Cienfuegos and Havana, the extensive palm barrens with their characteristic plant and animal life.

In 1927, Dr. Thomas Barbour, because of his long interest in Cuban biology, his knowledge of the Spanish language and of Cuban conditions, was appointed Custodian of the Atkins Institution. Since then he has continued to direct its general program and handle its budgetary details. Because of increasing interest on the part of leading Cuban officials and citizens in the progress of the work at Soledad, on the recommendation of Dr. Barbour, the following Cuban citizens were officially appointed as Collaborators of the Atkins Institution by the President and Fellows of Harvard College in 1938: Dr. Juan T. Riog y Mesa, Brother Léon (Joseph Sylvestre Sauget y Barbier), Dr. Gonzalo Martinez Fortun y Foyo, Dr. Julián Acuña y Galé, Dr. Alberto J. Fors y Reyes, Dr. Jorge Dechapelle, and José Perez Carabia. Thus we have the sympathetic interest and support of a group of Cuban citizens who are alive to the benefits that the Atkins Institution can bestow on Cuba.

As an example of what may come through the pioneer work of the Atkins Institution, our experience with teak, first introduced in Cuba at Soledad, may be cited. This tree grows with remarkable rapidity, and its timber is highly resistant to decay and to the ravages of termites. Some of the officials of the Soledad Sugar Company, intrigued by this and by other exotic and native tree species, have established extensive forest plantings on land not particularly adapted to, or needed for, the cultivation of sugar cane, with view to providing for a future supply of durable timber for railroad ties and general construction purposes. It is evident, because of the extensive deforestation of many parts of Cuba, that in the future this problem of local timber supplies will become more and more important, and it is highly probable that other sugar estates will follow the lead of Soledad and establish similar plantings. It is very important to have a body of knowledge available regarding the cultural requirements of selected tree species, and at the same time a ready supply of fresh viable seeds.

A project that is now engaging the attention of Mr. Sturrock, the present superintendent, is the amplification of the collection of tropical plants that produce edible fruits, supplementing the large collection assembled by Mr. Grey. The objective is to have available breeding stock from widely scattered sources that may be used to produce better varieties by selection and hybridization. Mr. Sturrock is also interested in the possible utilization of tropical fruits and their products* and as was his predecessor, Mr. Grey, in the introduction and establish-

*Sturrock, D. Tropical fruits of southern Florida and Cuba and their uses. 1-131. 1940 (published by the Arnold Arboretum).