

PLANT AGENCIES IN THE FORMATION OF THE
FLORIDA KEYS.

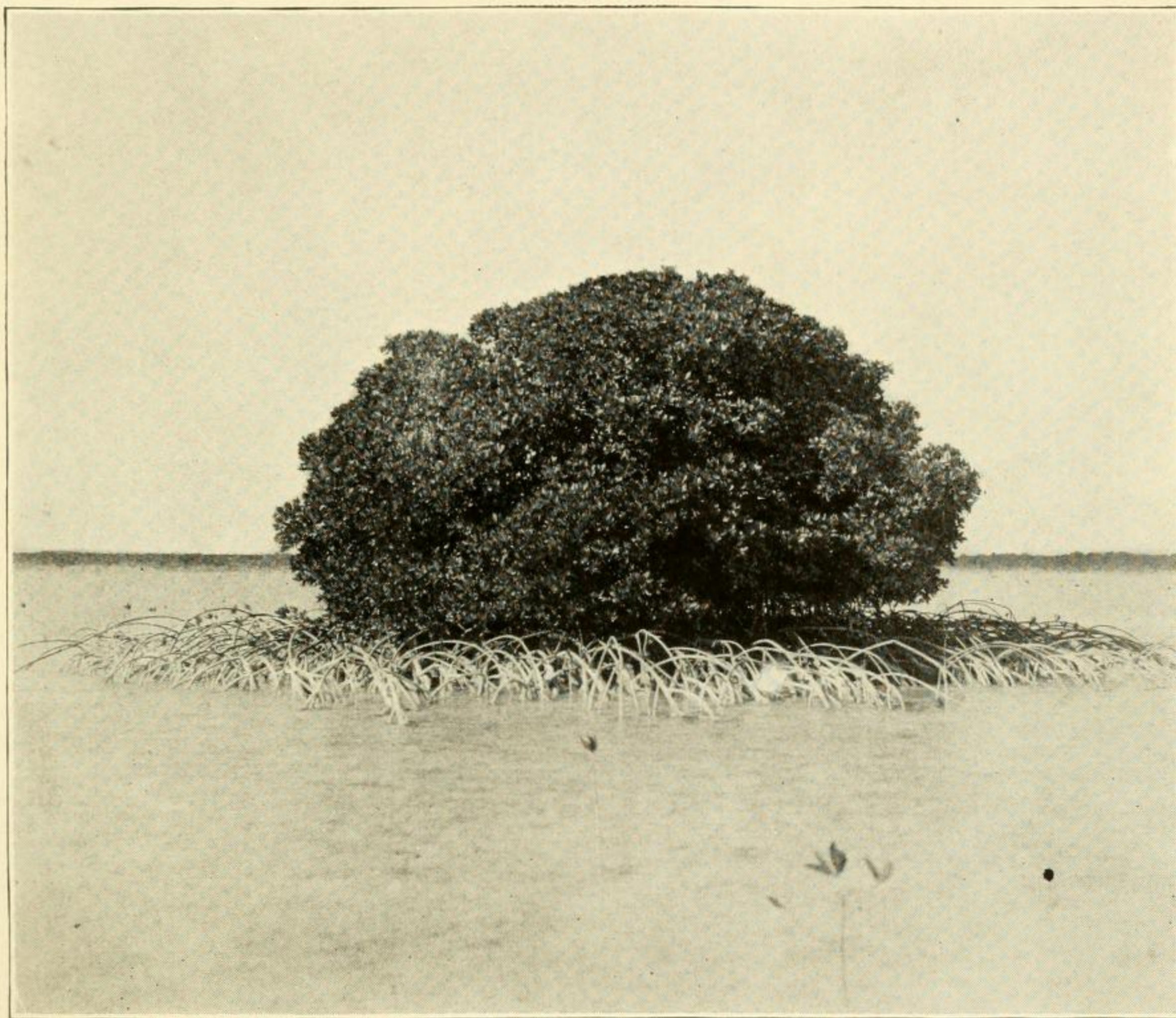
BY CHARLES LOUIS POLLARD.

THE long chain of coral islands popularly known as the Florida Keys extends in a southwesterly direction from a point near the head of Biscayne Bay, in more or less close conformity with the coast line as far as Cape Sable, and thence extending at a tangent to the westward, terminating in the cluster of small keys known as the Dry Tortugas. Most of the larger islands, such as Key West, Sugar Loaf, and Largo, lie near the center of this chain, the outlying westerly groups being small and scattered, while the eastern ones are less numerous and form practically a single series. The name "Key West" is thus, strictly speaking, inapplicable, but at the time of its discovery by Spanish wreckers and pirates the island was called "Cayo huesco," probably on the assumption that it was the westernmost extremity of the chain. Key West was not occupied by American settlers until the early part of the last century.

The Keys represent elevated portions of one continuous coral reef, about 200 miles in length, the south side of which is washed by the waters of the Gulf Stream flowing through the Florida straits. This reef contains numerous depressions affording navigable channels to sailing vessels passing from island to island; frequently, however, it presents large areas of fairly level surface covered at low tide with scarcely more than a foot of water, and quite impassable even for a small boat. It is therefore difficult to map out a course for a steamer of any size, although between the southern line of the reef and the island chain there is a clear channel, used by the steamer plying between Key West and Miami. This channel, being landlocked by the islands on the north and the reef on the south, is clear and quiet, presenting a startling contrast with the turbulent waters of the Florida straits on the other side of the reef.

While the coral polyp is naturally the active agent in reef construction, yet the building up of habitable islands thereon is due almost entirely to plant factors, the most important of which is the mangrove (*Rhizophora Mangle*) and its allies. The actual sea area annually reclaimed by the growth of this remarkable plant would no doubt be surprising if it could be correctly computed. Some explanation of the means whereby this is accomplished may not be inappropriate while discussing the general topic of island formation.

The seed of the mangrove germinates within the persistent pericarp while the fruit is still attached to the tree, and the radicle often attains a considerable length, occasionally even penetrating the soil before it



The Mangrove (*Rhizophora Mangle*). After photograph by Mr. G. N. Collins,
at Salt Pond Key, Florida.

becomes detached from the parent. The young plants thus formed grow rapidly and soon are able to continue the reproductive process. In addition to this method of development the plant emits numerous aerial roots from all parts of the main branches; these roots elongate rapidly, and attach themselves by rootlets as soon as the apex penetrates solid ground, whether above or beneath the surface of the water. If the depth of the latter exceeds a foot, the roots usually branch, and thus serve to support the plant in its progressive march seaward. The seeds retain their vitality after long immersion in salt water; and the projecting radicle very soon secures attachment upon a small portion of the reef that has been exposed at low tide. Here, then, is the beginning of an island; as soon as the plant has gained sufficient size to produce aerial roots, flowers and fruits, the formation of a thicket ensues with surprising rapidity, even though the inchoate island may yet be partly submerged at high water. Many of the smaller keys are still in this initial stage of formation, consisting of from one to several acres of mangrove thickets, with no other vegetation and but little solid ground beneath.

This intertwining mass of stems cannot fail to arrest and hold a large amount of tidal drift, consisting of decaying algæ, sponges and hydroids, fragments of the reef, shells, etc.; and this organic matter, as it decomposes and becomes amalgamated, affords a rich culture medium for the seeds of other plants which ultimately secure lodgment on the islet. The black buttonwood (*Laguncularia racemosa*), and the white buttonwood (*Conocarpus erecta*), two shrubs belonging to the Combretaceae, and having a habit similar to the mangrove, soon establish themselves, and by their annual contribution of dead leaves and twigs the interior of the island is built up so that it gradually dries out. Under these conditions another type of vegetation begins to thrive, and ultimately the interior of the island is converted to "hammock" land. The mangrove thicket, it must be remembered, is continually enlarging around the shore line, as the roots push further into water, while it simultaneously dies out in the interior. Thus the area of a small key increases wonderfully within a few years, so that it is difficult to preserve absolute accuracy in maps of this region. There are many islands whose dimensions at the present time are almost sufficient to warrant the establishment of plantations, that are entirely omitted from the older charts, or are indicated merely as shoals.

As might be expected, the soil constituents are similar on all the keys, disintegrated coral rock forming the basis of all soils, the admixture of humus varying in proportion to the extent of vegetation and the elevation above tide water. Although the depth of soil, even in the best plantations, is inconsiderable, it reaches a maximum of fertility owing to the large proportion of lime salts combined with the natural leaf

mold. The land is not usually susceptible of cultivation by ordinary implements, since it is covered with fragments of rock and intersected by numerous outcropping ridges; but the soil is extremely variable, owing to the absence of clay, and thus requires neither plowing nor harrowing. It is a source of surprise to northern visitors that such vegetables as tomatoes and egg plants, which in our latitude require careful cultivation in well-manured ground to produce the best results, thrive with little or no attention on the keys. Sturdy individuals, well laden with fruit, may frequently be seen growing from a crevice in the rock containing apparently only a cupful of soil. Of course, the climate is an important factor in the plant development on these islands, and it is not so much the increased mean annual temperature as the uniformity of the latter that promotes luxuriance of growth. The region is practically rainless during the late winter and early spring months, and on account of the total absence of fresh water streams and any artificial irrigation it would seem that most crops could hardly be productive unless grown at special seasons; yet tomato culture continues the year around, and other garden vegetables may be grown with equal ease, while the pineapple affords at least two crops in a season. The only necessary operation in cultivation is to keep the ground free of weeds, and in many plantations not even this precaution is taken.

With such natural facilities the development of the islands as a market gardening section would be very rapid if it were not for the fatal obstacle of inaccessibility. Fruits and vegetables must be transported in sailing vessels to Key West or Miami, and from either point the distance by steamer or fast freight to northern parts is far too great for perishable produce. Even this difficulty, however, may be surmounted in time, and the plantations on these islands could then compete with the best truck farms on the adjacent peninsula.

Southern France has long been known as well adapted to the growth of plants for the manufacturing of perfumery and essence. The centre of this industry is in the regions about Nice, Grosse and Cannes, where there is grown and treated annually about 2,500,000 kilograms of orange blossoms, 3,000,000 kilograms of roses, 200,000 kilograms of jasmine, and 150,000 kilograms each of violets, acacia, and tuberose, besides several thousand kilograms of geranium, mint, balm-mint, jonquils, mignonette, verbena, lavender, thyme, rosemary, etc.