THE PINEAPPLE INDUSTRY IN THE UNITED STATES.

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The pineapple is indigenous to South America. For many years it has been generally recognized as one of the finest of the tropical fruits, and may be safely said to rank first among those supplied to the markets of the United States. It is true that certain other tropical fruits, such as the mangosteen and durian, may probably be considered superior to the pineapple, but as yet these have not been sent to American markets.

EXTENT OF PRODUCTION.

The pineapples consumed in the United States have been and are still largely imported, the West Indies and Bahama Islands being our main sources of supply. Three-fourths of the pineapple crop of these islands comes to our markets. It is estimated that Cuba alone sends annually about 1,200,000 fruits. The Bahama Islands export each year about 7,800,000 fruits, most of which are sent to the United States. San Francisco and the markets of the West Coast are largely supplied from the Sandwich Islands.

For a number of years pineapples have been grown to some extent in Florida, but it is only within recent years that the quantity produced has been worthy of consideration. During the last decade railroad extension and the improvement in shipping facilities generally have led to a rapid development of the pineapple industry in the southern portion of the peninsula. In the year 1894, 56,209 whole or barrel crates, or about 3,000,000 fruits, were shipped from the State. In 1875 the number of imported fruits received at the port of New York was 5,785,755, and in 1882 the number received at the same port was only 2,533,320. These figures are a good illustration of the rapid decrease in the number of fruits imported, and the correspondingly rapid increase in home production.

The pineapple is a very tender fruit, and therefore easily injured. As the regions where it is grown are mostly isolated from general shipping lines, it is often difficult and sometimes impossible to secure proper means of transportation, and on this account Europe and North America have to be supplied by the pineapple regions lying near them.
With proper refrigeration and fast steamers, however, the pineapple could be shipped safely from any part of South America to the United States or Europe. In Florida the growers have the advantage of being near the principal American markets and of having direct railroad communication with many of them, and notwithstanding the fact that they have to compete with foreign pineapples, which are now entered free of duty, the industry is considered very profitable in Florida and is rapidly growing.

DEVELOPMENT OF THE PINEAPPLE INDUSTRY IN FLORIDA.

Pineapple culture, according to the statement of Mr. Reasoner, was introduced into Florida about the year 1860.

The pineapple, which is strictly a tropical fruit, is very easily injured by low temperatures. Usually it is impossible to grow it in open field culture outside of the tropics, unless in regions protected by water and tempered by warm ocean currents, as in the case of the Bahama and Azores islands. The pineapple can not stand even a light frost. Selmer, in his Tropical Agriculture, cites Florida as an illustration of a region where light frosts occur and where pineapple culture consequently can not be made successful. However, in view of the thirty-five years' experience now had in pineapple growing in Florida, the gradual but very great extension of the industry, and its uniform success in the southern portion of the State, it is safe to conclude that Selmer was somewhat hasty in his judgment. The pineapple can not be successfully grown in all parts of the State, and the portions where open culture can be safely adopted are indeed limited.

Fig. 62.—Field of pineapples growing under shed, showing newly set plants and illustrating the methods of setting.

1 Bull. No. 1, Division of Pomology, U. S. Department of Agriculture.
This method of growing the fruit, however, has generally proved successful south of about 27° 30', below which frost seldom occurs, and has succeeded even 1 degree north of this in certain localities having water protection.

If severe freezes were of common occurrence in Florida, pineapple culture would have to be abandoned, but fortunately the freezes of 1886 and 1894–95 were the only severe ones which have taken place since the introduction of the industry. Certain localities have, however, been injured at other times. In general, the Gulf Coast is slightly colder and more subject to injury during the lesser cold spells than the Atlantic Coast, and for this reason the industry has spread almost entirely on the Atlantic Coast. There seems to be no reason, however, why the pineapple should not be extensively grown in the vicinity of Myers and farther south, for although light frosts slightly injure the leaves, they do not necessarily impair the fruiting of the plants the next year.

In the early period of pineapple culture in Florida a considerable number of plants were grown in the central part of the State, in Lake, Orange, and Volusia counties. Although in this section it is frequently possible to secure three or four crops in succession in one season by covering the plants during the winter, as a whole the industry has proved unsatisfactory and has been largely abandoned. In the vicinity of Orlando, however, the pineapple is grown by a few with apparently excellent results. Here the plants are grown wholly under sheds, which are ample protection against light frosts. Somewhat farther south, at Avon Park and Pabor Lake, in the central part of the State, the industry has spread considerably, nearly 100 acres being...
now planted. In this section open culture has proved fairly successful, but as yet is in an experimental stage.

At present most of the pineapple fields of Florida are located on the east coast south of Fort Pierce, in a strip of comparatively high land. This ridge is 1 to 2 miles wide and forms the west bank of the Indian River and Lake Worth. West of this ridge the land is low, marshy pine, which merges into the Everglades south of Jupiter Inlet. This entire strip of land, running along the east coast for over 150 miles, could be made a compact pineapple field if necessity should demand. Already fields of pineapples, containing from 50 to 100 acres in a block, may be seen here. Considerably north of this, on Merritts Island, which is protected by the broad waters of Indian River, there are some plantations, and these could be greatly extended. Plate IV shows a thrifty pineapple plantation at Jensen, Fla.

On the keys the soil on which the pineapple is grown consists of a very thin layer of leaf mold, which usually covers the ever-present coralline rock, although frequently the latter is not covered at all. The method followed here is to make a clearing, burn the brush and trees, and set out the plants wherever sufficient soil exists for their support. At about the time of the first planting, some tropical fruit, such as avocado pears, limes, sapodillas, etc., is set out among the pineapples. These reach bearing about the time the fruitfulness of the pineapple ceases, which is usually in about five or six years. After one planting of pineapples runs out, the soil is no longer fit to grow them, so that year after year the virgin forest is destroyed to give place to the pineapple. From the destructive nature of this method of culture the industry can have only a limited extension on the keys, for soon all the available forest land will have been planted.

At present there are about 2,389 acres in the State planted to pineapples. This area, as may be seen from the above statements, may be greatly extended as the demand for the fruit increases. South Florida is the only region in the United States where pineapple culture has succeeded or is ever liable to succeed. The demand for the fruit is rapidly increasing and can not at present be supplied, and as foreign markets are open to Florida producers an outlet would be found in them should our own markets become overstocked. Our consul at Rheims, France, writes as follows: "Pineapples are almost unknown in France and the price is out of all proportion, but there is sale for them." There seems to be no probability, however, in the near future of an oversupply of this fruit.

CONDITIONS INFLUENCING GROWTH.

Heat.—The thermal conditions governing the successful growth of the pineapple have been discussed above. This fruit can not

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1 This estimate is based on lists of growers and the acreage cultivated by each, which were kindly furnished by growers in the various localities and may be considered as fairly accurate.
PINEAPPLE PLANTATION NEAR WEST PALM BEACH, FLORIDA.
withstand freezing temperatures, and the extension of the industry depends most largely on this condition. The mean annual temperature must also be high, as a region may seldom have frosts and yet be too cold for the successful growth of this fruit. The best pineapple regions in the world have a mean temperature of from 75° to 80°. The mean annual temperature of the Bahamas is about 76°; Key West, off the coast of Florida, has a mean annual temperature of about 76°; and Jupiter, in the midst of the pineapple region, about 73°. The annual mean in a large part of the pineapple section of Florida is thus comparatively low.

Soil.—Some difference of opinion exists among planters as to the quality of the soil best suited to pineapple culture. Selmer, in Tropical Agriculture, says: "A light, sandy, dry soil does not suit the pineapple, and even less a stony or marshy soil. The most suitable soil is a rich humus, with a clayey subsoil."

In Niihu and the Philippine Islands, where pineapples succeed well, the soil is disintegrated lava covered with a layer of humus. There is but little cohesion in such soils, particularly when, as in this case, they contain considerable lime. When clay is present, it is said to be important that it should not be so abundant as to hinder root penetration or hold the soil water, but a certain amount to increase the water-holding capacity of the soil is apparently very desirable.

The soils in Florida which have uniformly given the best results are composed mainly of fine sand and are extremely poor in the elements of plant food. Artificial fertilization is used in all places except on the keys, where the soil is a rich humus. It might be supposed that the soil in most places acts only as a basis for artificial fertilization, but such is not the case, as all soils will not answer. Coarse, sandy soils and shell lands are not suitable. Many plantations have been put out on shell land, but have uniformly failed, and therefore care must be used to select suitable soil. The land in Florida which planters generally consider best is that known as "hickory scrub." The surface soil is fine white sand, from 5 to 6 inches deep, and contains from 94 to 99 per cent of silica; the subsoil is a yellowish sand, of about the same chemical and mechanical constitution. The more abundant spruce pine (Pinus clausa) scrub land, where the soil can scarcely be distinguished from the hickory scrub, also gives good results. The pineapple lands of the Indian River and Lake Worth region are principally scrub lands of the above kind. The so-called high pine land, which is usually gray surface soil, underlaid with a subsoil of yellow sand, is also considered good pineapple land. The flatwoods land, which is probably the most extensive of the various soil formations south of Lake Worth on the east coast and the Caloosahatchee River on the west coast, has been planted to pineapples to some extent and has given fair results. Hammock lands, which of all Florida soils are the richest in humus,
have not proved very satisfactory in most places. The rich humus of
the keys, underlaid with coralline limestone, has given good results.

Moisture.—The pineapple requires considerable moisture for its
successful growth, but there are only a few places in Florida where
the lack of moisture can be considered a serious drawback. Some
high ridges, however, such as are found in places along the Indian
River, are too dry for the best growth of this plant. There is no doubt
that the majority of the plantations would be greatly benefited by more
moisture at times, but the effects of its scarcity are usually not very
noticeable. An average yearly rainfall of about 100 inches is said
to be typical for a pineapple country. The rainfall in Florida is in
general about 50 or 60 inches.

METHODS OF CULTURE.

The climatic conditions existing in Florida have led to the prac-
tice of growing the plants under sheds, particularly in the case of
fine varieties. At present there are about 100 acres of plants grown in
this way in Florida. Some of these sheds cover from 7 to 10 acres.
This method of growing, it is claimed, prevents excessive evapora-
tion from the soil and plants, thus conserving the moisture; protects
the plants from frosts, freezes, and winds; and prevents the fruit from
sunburning.

When grown in this way, a larger percentage of the plants fruit
within the usual time and the fruit is larger and of better quality.
Usually the sheds are made about 7 feet high, to allow of perfect free-
dom in working. Some of the larger varieties, such as the Porto Rico,
attain a height of 5 feet or more when grown under cover, and in such
cases high sheds are necessary. The posts, which are usually of 3 by
3 inch pine, are set a short depth in the soil to give firmness, and are
generally placed 9 by 14 feet apart. Stringers of 1 by 8 inch material
are attached to the tops of these standards the 14-foot way. These
support the cover of the shed and should be braced at each post. A
narrower strip, placed below the main stringers, is nailed to the posts
the 9-foot way to give greater firmness. The cover is made of 3 by
1 inch pine boards 18 feet long. These are nailed to the stringers,
leaving between each board a 3-inch space. The method of growing
under sheds is illustrated in fig. 62.

Most of the pineapples in the State, however, are grown by open
culture; that is, are not covered with sheds. While growing the plants
under sheds gives rather better results, open culture has also usually
proved profitable. A field of the Porto Rico pineapples grown by the
latter method is illustrated in fig. 63.

Irrigation is not as yet much practiced, and is not growing in favor.
Those who have irrigating plants are usually inclined to believe that
growing under sheds is preferable. Both methods, however, would
probably be desirable, but would be too expensive for general use.
Of the many varieties of pineapples which are known, something over 25 have been introduced into Florida, and are now being cultivated there. Among these are many of the best varieties known, so that there is no lack of good varieties from which to select. The variety which is most widely cultivated in Florida, and which is spoken of as "the common" pineapple, is the Spanish, or Red Spanish. The fruits are of medium size, ranging from 2½ to 6 pounds, and usually sell at from 4 to 10 cents each. Formerly this variety was extensively cultivated in the West Indies, but there it has rapidly given way to other and better varieties.

In Florida, it is believed, the majority of intelligent planters are inclined to favor the cultivation of certain other varieties of the so-called fancy sorts, although many still claim that the Spanish is the best variety for general culture. The fruit of the Spanish is admitted by all to be inferior in quality to many others, but growers claim that it is the hardiest, is the easiest to cultivate, and best suited to varying conditions. This claim may be true, but in general it is as easy to raise a good fruit as a poor one, and the cost is about the same. Fruit grown in Florida can be placed in the New York market in from seven to ten days. Simmonds, in Tropical Agriculture, says that the average time of passage of pineapples from the Bahamas to London is from thirty-one to thirty-five days. As our best varieties are good shippers, enduring transportation to New York or Boston with little loss if properly handled, this can not be urged against the growing of the fine varieties.

Of other varieties, the Queen, or Golden Queen, is probably the most commonly grown, and is very good. The fruits are of medium size, weighing from 3 to 5 pounds, and usually sell at from 10 to 25 cents each.

Of the so-called fancy varieties, the Abbaka (Abbakacha), Smooth Cayenne, and Porto Rico are probably the most general favorites. The Abbaka is a tall, robust plant, with large, cylindrical, golden yellow fruits, which usually sell at from 30 to 40 cents each. The only serious fault with this variety is that the slips are so closely attached to the fruit that it is difficult to separate them without injuring the fruit. Most Florida planters, the writer believes, consider this the best variety grown.

The Smooth Cayenne is a large, broad-leaved variety, almost free from spines, a character which is of no little importance. The fruit is slightly conical, yellow when ripe, and of fine flavor. It weighs from 4 to 10 pounds, and sells usually at from 30 to 50 cents. This variety seldom produces slips, and this is a serious drawback to its general culture.
The Porto Rico is the largest and most robust plant and produces the largest fruit of any variety yet introduced and grown in Florida. The fruit usually weighs from 8 to 12 pounds, and packs from seven to nine to the half crate. Although rather coarse and sour, the fruit pays well, selling at from 50 cents to $1 each. This variety endures shipping very well, and forms abundant suckers and slips.

The Enville, or Enville City, Sugar Loaf, Ripley Queen, Lord Carrington, Moscow, Black Prince, Prince Albert, Giant Kew, etc., are other varieties grown, but with varying success. The Enville is a large fruit, of fine flavor, and is a general favorite. Unfortunately, it is a poor shipper, and is thus not generally planted. The Sugar Loaf, which Selmer says is the most prized of all varieties in the West Indies, has not met with general favor in Florida.

The Pinas de Cahuipa, which is said to be the favorite variety in Mexico, and which is largely cultivated in the State of Jalisco, has not yet been introduced into Florida, so far as the writer knows. It is claimed that not a trace of acid can be discovered in this fruit. The Ananassa Bracamorensis also has not yet, as far as known by the writer, been introduced. This variety, which was discovered a few years ago by Warscewicz at a small place known as Jean de Bracamoras, situated on the heights of Marañon, in South America, was first grown at Ghent, and from there introduced into England. The fruit is described as being very large, weighing 25 to 30 pounds, and of exceptionally fine quality and flavor.

**METHODS OF PROPAGATION.**

The pineapple is propagated principally by offsets from the parent plant. These offsets are of several kinds. Some of the axillary buds near the base of the parent plant push out vigorous sprouts, which are known as suckers. Two or more of these are formed, and when broken off and set out form new plants. The suckers which spring from buds below the soil are spoken of as "rattoons." These are usually left attached to the parent, and grow into new plants without transplanting. Good suckers usually fruit the first year after planting.

The so-called slips are produced from buds on the fruit stalk under the fruit. They are smaller than the suckers, but are more abundant, from five to fifteen being produced on a plant. If many plants are desired, they can be obtained by removing the slips immediately after the harvesting of the fruit. In this way from two to five new slips appear in the place where the first slip was broken off. Not more than two of these slips should be allowed to grow, and when these have attained sufficient size they may be broken off and planted. In general, however, slips should not be removed from the parent plant immediately after cutting the fruit, but should be allowed to remain until they mature. One may judge when to remove them by the turning brown of the stem under the leaves at the base. They should be
planted as quickly as possible after they mature. Slips fruit usually in twenty months after planting. Although they take more time than the suckers, they are said to produce better fruits, and, considering the expense involved, are in general preferred by planters.

The crowns produced at the apex of the fruit may be used to propagate the plant, but these require from two to five years to mature. As they are usually marketed with the fruit, however, they are seldom used in propagation. Seeds are occasionally produced by pineapples, but seedling plants require so long to mature (ten to twelve years) that they are used only when it is desired to secure new varieties.

**PLANTING.**

It requires less care to prepare the sandy soils of Florida for planting than is necessary with humus and clayey soils, which are liable to be lumpy. The trees and brush are cleared off and the stumps and roots grubbed out. The pine stumps, however, may be left in, as they rot in a few years. It is best not to burn the brush on the ground to be planted, as this destroys the productiveness of the soil by burning out the vegetable matter. After the land is cleared it is plowed and the trash again raked together and carted off. Some plant the pineapples immediately after clearing the land, while others wait for some months. It seems to make little difference when the land is planted, but when convenient it is probably best to let the land remain idle for a time after clearing, so that small limbs, weeds, etc., may be allowed to rot on the soil and form nutrition.

The plants are set in beds of varying size. It is important to have pathways at least every 25 or 50 feet to facilitate work in gathering the fruit. Some plant in long beds, about 14 feet wide, which are narrow enough to allow of cultivation without walking among the plants. In this way the leaves are saved from the injury which would otherwise unavoidably result. The distance left between the plants is important. Florida growers set them much closer than English planters. In Florida the Spanish variety is usually set from 18 to 20 inches apart each way, Queen 20 to 22 inches, Porto Rico 30 to 36 inches, and so on with the other varieties, according to size. The tendency is to decrease rather than increase the distance. The reason usually given for close planting is that the plants when close together support each other and prevent the fruit from falling over and becoming sunburned on one side. It is urged that pineapples do fully as well when set close, and, moreover, in this way the difficulty in keeping the weeds down is removed.

In general the methods of growing pineapples are different in Florida from those practiced in other pineapple countries. According to Selmer, it was formerly the custom in the Bahamas to plant the Spanish about 2 feet apart each way, but among the intelligent growers it is
now more common to plant them 3 feet apart. Selmer recommends planting them 2½ feet apart in rows 3½ feet apart. This would allow of cultivation with plows or cultivators, and is worthy the consideration of the growers in Florida, where labor costs so much. English planters also uniformly insist on giving the plants more space. In defense of the methods followed in Florida, however, it may be said that here planters do not depend on the natural richness of the soil, but on artificial fertilizers. In Florida soils the roots of the plants form in a dense cluster and do not spread to any great distance. Even in the closest planting, 18 inches square, the roots would probably not fully cover the space. Where artificial fertilization is used, the soil should be fully occupied to prevent loss. If crowding the tops produces no injury, but on the contrary is, as claimed, a benefit, there would seem to be no reason why close planting would not be profitable and successful.

To facilitate planting, the land is marked with a plow or "marker" such as is used in marking cornfields in the North. The marker may be made by taking a board 12 inches wide, 1 inch thick, and 12 feet long, and attaching to it, at the distances at which the plants are to be set, small runners similar to those on sleds. A tongue attached to the center completes the marker. If it is desired to have the plants set exactly the same distance apart—and this is important under sheds, where the space is very valuable—it is probably best to mark the rows by a line run the length of the bed. The distance which should intervene between the plants in the row is then easily marked with an apparatus like that represented in fig. 64. This has pegs 1½ inches in diameter and about 5 inches long, which may be set at the desired distance. This instrument, which is easily made, is used like a spade. Following the marking cord, guide the instrument at one end of the row, putting the first mark where desired. Then with the foot thrust the pegs into the soil. Continue down the row in this way, each time placing one of the end pegs in the last hole made, to guide the distance.

Planting is done principally in July, August, and September. The plants should be set out, however, as soon as possible after the fruit is removed, but the slips should be allowed to mature before they are removed from the parent plant. It is desirable to plant them early, so that they may have the advantage of as much of the summer rains as possible. Planting is frequently done in the later months also, but in this case the grower is not so sure to obtain good plants.

When removed from the parent plant, the slips and suckers usually have contracted, hard ends, covered with reduced leaves or bracts. It is a general practice in Florida, as well as in other pineapple coun-
tries, to strip off a number of the basal leaves and cut off a portion of this hard end before planting them.

Fig. 65, a, represents a sucker trimmed ready to plant, and b the base of a properly trimmed sucker. Many claim that it is quite necessary to trim the suckers high to prevent what may be called tangle root, otherwise roots start out under the bases of the lower leaves and do not penetrate into the soil, but are deflected by the leaves and wind around the base of the plant, as shown in fig. 66. Many think that this is not at all injurious, and it must be admitted that in general little difference can be seen. However, the quite general occurrence of tangle root in connection with the pineapple blight, of which disease it is probably a symptom, leads the writer to think that it is not a desirable condition. The stem is usually larger above and below where the roots wind around it, which indicates that the winding prevents the stem from growing to its normal size. In general it

![Fig. 65.—Pineapple suckers. a, pineapple sucker trimmed ready to set; b, base of a properly trimmed sucker.](image)

would be well to strip off the leaves sufficiently to cut the base off above where roots have started.

The plants when properly trimmed are ready to set. They should be planted deep enough to give them a good hold upon the soil when rooted, so that they will not be blown over and injured. Usually slips should be set from 2 to 4 inches deep, and suckers from 3 to 5 inches, according to the size.

**METHODS OF CULTIVATION.**

In Florida the pineapple is cultivated almost wholly with the scuffle hoe, the ground being usually kept as nearly free from weeds as possible. Mulching has been used to some extent, but is not generally thought to be a good practice. The question of how to fertilize the soil to give the best growth is one of great importance to Florida pineapple growers, but is at present little understood. Cotton-seed meal, ground tobacco stems, and blood and bone are the fertilizers most
generally used. Although probably not the best fertilizers, they have an advantage in that they may be spread broadcast over the beds without injury to the plants. Cotton-seed meal is more used than any other fertilizer, and apparently gives good results. The chemical manurial elements, sulphate and muriate of potash, kainit, nitrate of soda, sulphate of ammonia, etc., burn the leaves. For this reason these can not safely be spread broadcast, but must be carefully put on the soil between the plants, care being taken not to get them on the leaves to any extent. Some growers claim that acid phosphates are very injurious, while others use them with apparently good results. Kainit and sulphate of potash are the forms of potash most generally used. The ammonia is commonly derived from cotton-seed meal, blood and bone, tobacco stems, nitrate of soda, and sulphate of ammonia; the phosphoric acid from cotton-seed meal, ground bone, and untreated phosphate rock. Where a complete fertilizer is used, from 1,500 to 2,000 pounds per acre is applied within the year or twenty months required for the development of the suckers or slips. It is put on at two or three applications and worked in by scuffle hoeing.

After the plants have fruited they form suckers from the base. Those coming from below the soil (in this case called rattoons) are allowed to grow in order to continue the field without replanting, but the others are removed, to be planted in other fields. In this way fruiting and suckering may be continued on the same field for a number of years without replanting. With the Spanish variety this method will give good results for six or eight years, and to all appearances longer if proper care and proper fertilization are given. Some growers have fields considerably over eight years old. If the suckers are not largely removed, old fields become an almost impenetrable mat of plants. The plants even thus crowded,
which seems to be their natural mode of growth, are said to produce abundant and good fruit. In such fields all cultivation becomes impossible, the fertilizers used being spread broadcast without any attempt to work them in. In fields thus planted the decay of the old tops furnishes considerable nutrition.

GATHERING AND PACKING THE FRUITS.

The fruits ripen generally in May and June, but are usually gathered and shipped before fully mature. In gathering, the fruit of the Spanish variety is usually broken off, while the fancy kinds are cut or broken off, a long stem being left attached, which is cut off smooth after breaking. All possible care should be taken to avoid bruising. Before packing, the fruit is usually taken into the packing house and cooled. In the fancy sorts some careful packers coat the cut end of the stem with paraffin. The crowns are left attached and sold with the fruit. In Florida the fruit is packed in crates of a standard size, 12 by 20 by 36 inches. These are known as whole or barrel crates. For the fancy varieties half crates, 12 by 10 by 36 inches, are generally used. In packing, each fruit is usually wrapped separately in thin paper. Shipping in bulk, which is the usual method in the Bahamas and West Indies, is not practiced in Florida.

DISEASES OF THE PINEAPPLE.

"Sanding."—The malady known as "sanding," which is caused by sand blowing into the apex of the plant and collecting around the young leaves, is of frequent occurrence. If the sand is not removed, it checks the growth of the plant. There is not much danger from sanding after the plants have become well rooted and are growing vigorously. It is a very common practice in Florida to put a handful of cotton-seed meal in the apex of the plant shortly after setting to prevent it from becoming sanded. The advantage of this is that the cotton-seed meal catches the sand, and when wetted by rain or heavy dews the mass becomes more or less cemented together. When the plant starts to grow, this mass is carried up on the ends of the new leaves, and is finally washed off onto the ground, where it serves as a fertilizer. This is a cheap and apparently a very effective preventive. If plants become sanded, they may be taken up and the sand removed, or the same result may be accomplished by directing, with considerable force, a small stream of water into the heart of the plant. Close planting, shedding, and wind-breaks are other preventive measures.

Long leaf, or spike.—The so-called long leaf, or spike, is very abundant in many places. Plants affected with it become stunted and dwarfed, and the leaves which develop are narrow and crowded. The cause of the disease is not known, but is probably primarily
due to improper soil conditions. The best thing to do, so far as at present known, is to destroy the plants which become diseased and plant others in their places.

**Blight.**—The pineapple blight, a symptom of which is a gradual withering of the ends of the leaves, is also a serious malady, and one which is at present little understood. It is particularly destructive to Queens and Porto Ricos and apparently affects all varieties to some extent. Different varieties usually assume different colors when attacked, the reddish color of the Queen becoming deeper, and the Porto Rico turning a pale yellow. Blight, as before stated, is frequently accompanied by tangle root, which is probably a symptom of this malady. Digging up blighted plants, pruning them thoroughly, removing the basal leaves, and cutting off the end of the stem with all the roots which have started, as in the case of preparing a sucker for planting, and finally transplanting, are said to restore the plant to health. Whether or not this treatment results in complete recovery of the plant has not yet been definitely proved.

**Pineapple mite, or red spider.**—Probably the most serious disease of the pineapple in Florida is that caused by the minute red mite, or red spider (*Stigmœus* sp.), which works at the base of the leaves near the stem. They work on spots, which become slightly elevated and brownish, feeding around the edges of the spots and gradually extending them until the whole base of the leaf becomes diseased and the leaf dies. The characteristic spots resulting from the injury of these insects are shown in fig. 67. It is difficult to combat these insects, owing to the fact that they are usually below the soil and well protected by the closely overlapping leaves. No careful experiments have as yet been made toward conquering this pest, but sulphur wash poured or sprayed into the apex of the plant, or a small quantity of tobacco dust thrown into the apex, is said to have proved beneficial.

**Mealy bug.**—The mealy bug, which works principally on the leaves and stems, sometimes becomes troublesome by getting under the scales at the base and in the flower eyes of the fruit. They may probably be controlled by spraying with resin wash.

Several other diseases besides those above mentioned are known, but are not of common occurrence, and as yet cause only slight damage.