

Plant of Paradoxes

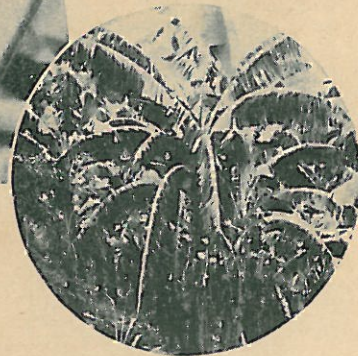
The Banana is a Decided Non-Conformist

by Alexander F. Skutch

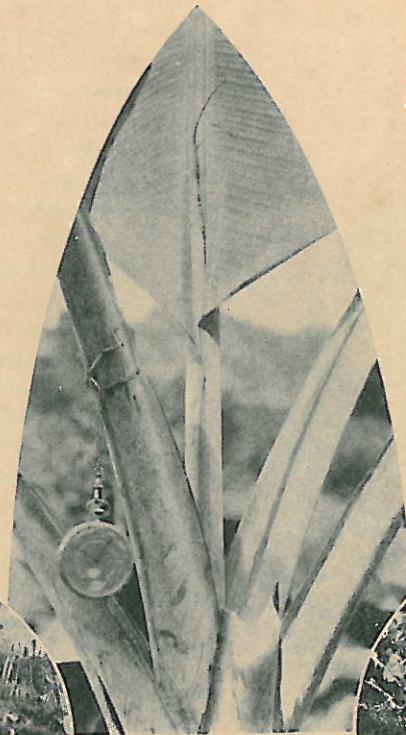
(Below) IN THE EARLY MORNING
The leaves are outspread at this time of the day



(Below) THE PLANT AT NOONTIME
The leaves have folded together beneath the midrib



YOUNG LEAF EMERGING
Coming out of the false stem. The watch gives an idea of the size



THE plant which bears one of the most familiar of exotic fruits is popularly called a tree, but a leading German authority has termed it a "hapaxanthous giant herb". The banana is, indeed, so different from any plant with which most are acquainted that the familiar names for vegetative types,—tree, shrub, herb and vine,—fail to form an adequate picture of it. And to call it a "hapaxanthous giant herb",—giant herb which flowers but once,—hardly helps. We will, then, call it a "plant of paradoxes".

Our yellow-skinned banana is referred to by planters as the Gros Michel, and is one among the scores of varieties of *Musa sapientum*, for this species, as most other important plants which have been long cultivated, has a bewildering number of varieties. *Musa sapientum*,—"Fruit of the Wise",—Linnaeus called our plant, because tradition has it that when Alexander the Great crossed into India he found the pundits discoursing under the shade of its giant foliage. It is but one of some sixty-odd listed species of the genus

Musa, all of them confined to the warmer parts of the globe. Bananas grow wild only in the eastern hemisphere, but the edible kinds are cultivated everywhere in the tropical and subtropical portions of the world where climate and rainfall, or irrigation, will support them. Our Gros Michel bananas come almost entirely from Central America and Jamaica, where they are grown on large plantations.

The first paradox about the banana is that it is a tree, by virtue of its size and height, without a true trunk. The tallest banana plants measure forty feet from the tips of the leaves to the ground. In Jamaica they attain about twenty-five feet, the first fifteen feet of which is approximately the remarkable "pseudostem" or false trunk; the remainder, the blades of the huge leaves which tower above it. In the banana the leaf has developed enormously at the expense of the stem, assuming many of its functions. In plants the flower bud of which has not yet begun to develop, what appears to be the stem is made up of leaves alone. Each



ON THEIR WAY TO THE BREAKFAST TABLE

Bananas are carried by truck to the seaport and sent northward on refrigerator ships



THE OLD LEAF WITHERS AND DIES

At the left of the old plant, however, is a sucker which will carry on production

leaf consists of the blade, the short supporting stalk and a long, moderately thin, open cylindric portion known as the sheath. These sheaths fit closely together, one overlapping another, and form the columnar false-stem. The sheaths are soft and succulent like other leaf tissue, and contain large air spaces. The false-stem is entirely without a woody portion, and may be cut as easily as a ripe apple or a potato.

Suppose we remove these sheaths one at a time, beginning with the outermost, which was formed when the false-stem was considerably shorter than now, and so does not reach to the top. Mature sheaths do not continue to grow as the younger and taller ones, which push up inside, add to the height of the plant. Pulling off the sheaths reminds one of removing the "skins" of an onion, or of breaking off the stalks of a celery plant. They are about the shape of a celery stalk, and do not completely encircle the trunk. The false-stem becomes more and more slender as we proceed. After we have stripped away the external sheaths, which are green or various tints of red from the influence of the sunlight, we find that the remainder are a beautiful ivory white, inside and out. When we have torn off these bladeless sheaths, we remove one or two whose old blades are just dying, and then tackle those which end in large, green blades. As these fall away the stem dwindles until it disappears, and nothing is left in the center except a young leaf just pushing up to take its

place in the crown. However, if our plant is mature, or almost so, we will find the true stem in the center of the false, of which more anon.

The leaves of a young plant all spring from an underground stem which takes the form of an enormous tuberous bulb, a foot or more thick. This bulb was originally an outgrowth from an older bulb, which either developed in contact with the parent, or was separated from it and planted in another field. It began its life as a bud on the side of the parent stem, like the eye of a potato. The first leaves were scale-like sheaths, but each succeeding leaf to be formed produced a larger blade than the last. The new leaf always pushed up in the very center of the layered structure formed by the sheaths of its elders. Its sheath always turned out to be just a little longer than that of its next older brother, so that when the blade expanded it was at the top of the plant. Finally, when the plant approached its full stature, it became necessary for the sheath to grow to a length of ten or twelve feet in order to reach the top of the false-stem, and spread its blade in the sun and air.

In the larger plants, each leaf has a long journey up the center of the false-stem before it can expand to the breezes. As a cautious shipper, the plant sends out its leaf-blades carefully packed. Each blade is rolled into a long, slender rod, and all in precisely the same manner, with the right margin innermost, and the left margin ending up the coil. But the skyward journey is not without obstruction, because the sheath of the next older leaf entirely surrounds the latest arrival, and closes off its path ahead. To overcome this difficulty, each leaf sets forth provided at its tip with a solid, gradually-tapering appendage much like an awl, which forces the passage through which the more delicate parts follow. Finally the furred blade emerges and stands stiff and stark, like a tightly rolled green shade, towering ten



A BUNCH OF YOUNG FRUIT

Some of the new leaves have not yet been frayed by the wind and are entire

or a dozen feet above the top of the false-stem. Then it unfurls.

Before it can spread out, the blade must tear away from the solid tip, which binds all the turns together, and so prevents the cylinder from unfurling. The tip, which has already performed the service for which it was intended, begins to shrivel and turn brown as soon as it reaches the outer air, but its final detachment from the blade is not accomplished without tearing away the entire right end of the latter for a length of often five inches. This is only the first of many scars which our leaf must suffer before it becomes perfectly at home beneath the tropical sun. While it was still furled up inside of the false-stem it was bordered by a delicate, white or crimson-flushed wing an eighth of an inch wide, which withered and died almost as soon as it came into contact with the air, leaving the blade surrounded by a margin of brown, dead cells. The next wounds are inflicted by the winds. The leaf-blade of the banana would need to be strong indeed to maintain its broad surface intact in the face of the vigorous breezes which often blow over the plantation, not to mention an occasional hurricane. The veins which strengthen the blade all run the same way, from the midrib almost straight to the margin. For this reason it is difficult to tear a leaf along its length, but it tears across, parallel to the veins, very readily, and the wind in the course of a few weeks rips each side into a number of ribbon-like strips. This is our second paradox. A simple leaf has been transformed into a compound leaf! It is interesting to compare the false compound leaves of the banana with the genuine compound leaves of the coco-palm.

The leaf-blade of the banana is among the largest in the world of those plants which have simple leaves. They attain over twelve feet in length, and are a yard broad at their widest part. How puny does an oak, a



THE NATIVE TRANSPORTATION SYSTEM

A pad of dry leaves serves as a rest for the bunch being brought in to ship



A BEARING BANANA PLANT

Weak of root, the plant is propped up with a stout bamboo pole to keep it upright

beech or a maple leaf appear beside this giant!

During a warm, bright morning, the leaf,—or the strips into which it has been torn,—folds downward along the midrib, so that the lower surfaces of the two halves of the blade are brought into contact. Most of the pores through which the leaf loses water vapor are situated on the lower surface, and are thus protected, and the amount of water lost is reduced. During the night, or if it rains later in the day, the leaves flatten out again. The difference in the appearance of the plant caused by the change of the leaves from one position to the other is very striking. All the nourishment we find in a banana is manufactured in just such leaves.

Now the stem, which we left in the form of a bulb. For a long while it hardly grew in length between the formation of successive leaves. But now that the plant is becoming mature a change has taken place, and the stem elongates more and more before giving off each succeeding leaf. Thus the true stem pushes upward through the center of the false-stem, just as dozens of leaves have done before it. Ever since it began its existence as a bud on the side of the parent bulb, each leaf produced by the stem was larger than the last, and it is while it is on its upward journey, and between one and three feet high, that it sends out the leaf with the largest blade of all. Although the stem bears leaves along almost its entire length, it would be utterly unable to support them without the support which itself re-

ceives from the sheaths of the false-stem around it. Although the stem is between two and four inches thick over most of its length, it is so weak and brittle that a rather short piece breaks under its own weight. It is a beautiful ivory-white throughout.

When the true stem finally breaks out on the world from the top of the false-stem, it bears at its summit a flower bud which has been forming for a long time. As the stem continues to grow, the weight of the large bud bends it over, and it hangs downward from the summit of the false-stem. Here the fruit is formed. The pendent bud is covered with a series of overlapping, thick, claret-colored scales, as large as one's hand. Beginning at the top of the inverted bud, each scale bends back in turn, exposing a cluster of large, yellowish-green flowers. Flowers under the first scales that turn upward are female, those following both female and male or else neuter, and finally male flowers alone are formed. It is only the female flowers which form useful fruit. The female and male flowers produce short, useless bananas, and the neuter and male flowers fall from the plant, along with the scales, after their period of bloom has passed. Since the bud, after forming a definite number of fertile flowers, goes on until the bunch is cut to produce the sterile flowers which fall, it is eventually separated from the developing fruit by a long length of naked stem, and hangs far below it.

The number of "hands" of fruit to be formed is usually from seven to nine, although bunches with eleven and even more are sometimes found. Each "hand" represents the fruit formed by the flowers beneath a single red bract. The individual fruits are called "fingers". Although the flowers point downward, toward the apex of the shoot, as the fruits develop they bend upward, so that each ripe finger points to the zenith. It is only when the bunch is hung inverted in the grocer's window that the fingers hang down on the stalk, a most unnatural position for them.

From two and one-half to four months after the bud has become visible to the outside world, the fruit has attained its full size, and is ready for the harvest. Even for home consumption, the fruit is cut while it is still green, and allowed to ripen while hanging from the rafters. The bananas one eats in the tropics are not incomparably more delicious than the best one buys in this country, as many people suppose, but on the contrary they taste much the same. It is only when the bunches are cut before the fingers have filled out, as must be done if they are to be shipped long distances under inadequate refrigeration, that fruit of inferior quality is sold.

The bunch of fruit hangs high above reach; to harvest it one cuts down the tree. A native laborer "touches" it with a sharp blow of his cutlass as far up as he can conveniently reach. Then he takes hold of one of the dying leaves which always drape the false-stem, and pulls until the stately crown gives way at the cut, and comes toppling over with a loud swish of vibrating foliage. The laborer catches the bunch as it falls, severs it with a single stroke of the cutlass, and carries it off on his head, as the native carries everything from his lunch to a packing case. The despoiled crown is now cut off four or five feet from the ground, chopped up, and strewn over the field to decay, while the stump is left

to give up its stored food to its suckers as it slowly rots away. Some may say,—a wasteful harvest surely, to sacrifice the tree for its fruit! But remember that the banana is hapaxanthous; each plant blooms once and once only. Moreover, despite its enormous stature, our banana is merely a gigantic herb, even as our maize and beans and potatoes. Every mature plant has around it several young plants or "ratoons", which spring from the buds on the sides of the bulb. One or two of the most promising of these are left to form the next bunch of fruit. By means of these a single planting would bear indefinitely, but in culture many considerations make it advisable to dig up the old stools and start afresh after about six years.

This brings us to our third paradox; the banana is a fruit which never contains a seed. Although other species of banana produce seed in the normal way, the common cultivated varieties *never* mature seeds when left to themselves, and this in spite of the fact that on sunny days numerous bees always gather honey and pollen from the flowers, and so the female ones would be pollinated, but the pollen is not capable of fertilizing the ovules from which the seed would be formed. Cultivated plants which rarely or almost never produce viable seeds are not rare, but flowers which mature fruit without having been fertilized are by no means common. The only way to propagate the banana is to cut off the suckers which sprout up at the base of a large plant and, after cutting away all but the bulb, set them out in a field by themselves, just as we cut a potato into pieces containing each an eye, and plant these. In this way all banana plantations are started. The fruit is ready to harvest in about twelve months after a six- or eight-month-old sucker is set into the ground. The ratoons, or sprouts which take the place of the first plant after it has been harvested, require longer, from fifteen to eighteen months, to produce their fruit. Naturally these periods vary greatly according to the soil and climate, and the cultural treatment employed.

One could go on to enumerate other ways in which this eccentric plant is a law unto itself, and radically departs from the generalities which one learns about plants in elementary textbooks of botany. The roots have their idiosyncracies as well as the rest of the plant. Most roots, when they meet a stone or other impenetrable object in their growth through the soil, grow faster on one side than the other and curve around it, but when the banana root encounters an obstacle, it persists in its course until the delicate growing tip is crushed against the barrier and destroyed. Then new roots spring from the sides of the old root just behind the injured portion, and some of these may succeed in evading the obstacle. The main roots are ropelike, and of approximately the same thickness throughout. They do not furnish a very adequate support to the plant, and the heavy bunch, weighing often from eighty to one hundred pounds, must in many districts be propped up with a bamboo pole to prevent its weight's toppling over the tree. Even a moderate breeze levies a toll on the banana plantation, and planters fear the strong gale which often levels the entire crop. The danger of windfall is one of the most persistent with which the banana grower is faced.

A banana grove is a pleasant place for an evening walk. Let us leave the palm and bread-fruit bordered

road and roam among the aisles between the straight, columnar trunks of the bananas. The giant spreading leaves of neighboring plants interlace above our heads and shield us from the sun's oblique rays, as we pass unimpeded along the clean aisles, in which grow only a few low weeds and grasses. Around us the cycle of the plant's activities is enacted in all its phases.

And so we pass on into a clearing in which the wild sensitive plants shrink away at our footsteps and betray the course which we have followed; pause next to admire the bizarre foliage of a bread-fruit tree, or observe curiously

an anolis lizard as he protrudes his brilliantly colored throat pouch impudently in our direction. Being thirsty, we order our barefoot negro boy to ascend the nearest coco-palm for a water coco-nut, from which he deftly cuts away the husk, and then removes one end so that we may drink the clear, refreshing liquid from the inside of the shell as from a cup. Refreshed by the draught, we make our way back to the road, and as we walk along in the deepening twilight the brilliant *Pyrophorus*, with its three distinct lights, commences its nocturnal flight over the neighboring fields, and ushers in the tropic night.