

Plants are everywhere, from the massive oaks that decorate your local playground to the odorous flowers growing in your kitchen window. However, without legs, wings, or fins, how did our green friends get to where they now grow?

This is a long story and one that this summary will cover. In them by you, it will be found a charming natural history narrative showing how the herbs, trees, and grasses that constitute our gardens and side salads have progressed around the world for thousands of years.

By you, it will be learned how evolution, individual migration, and pure luck intertwine to spread specific species far and wide, from coconut to spruce trees and avocados. Moreover, by you, it will be divided into biology, genetics, and economics and discover that our photosynthesis friends have never been as deeply rooted as they seem.

## Chapter 1 - The products that have developed to survive in almost any circumstances are plants and vegetables.

November 1963. Sixty miles south of Iceland, the world thunders. A volcano explodes deep in the Atlantic. The mounting magma approaches the surface and quickly Iceland has a novel island. Although it's called Surtsey, and it's arid, it won't take long like that.

Life was formed within weeks. The pale green shoots of *Cakile*, an arctic flower genus, appear to emerge from the ground. These pioneer plants arrive on the island thanks to their special seeds that have developed to swim in ocean flows.

In the place, there isn't just one vegetation called *Cakile*. Black sedge also begins to grow. Thanks to migratory seabirds, seeds of it are carried and the coming way of the seeds is the stomachs of the birds. Soon the whole island is full of green life. It just is proof of how plants colonized even in the most isolated corners of the globe.

The abbreviation for all photosynthetic organisms belonging to the Plantae kingdom is called "Plants and vegetables". Even if you don't know and that's OK, these are some of the most accomplished strains in the globe. They are the kind of plants that can be found as they thrive in almost every ecological corner on the planet, from the highest mountains to the deepest oceans and the driest deserts.

This is partially under the auspices of the unbelievable variety of adaptations found within the group. Millions of years of evolution have decorated every species with the right talents to survive in their environment, no matter how tough. For instance, *Cakile* is a halophyte, which describes it as especially robust and evolved to improve in saltwater.

They are the kind of plants that can even survive the damage caused by radiation. Think of the Alienation Zone, the large field of Europe was evacuated following the Chernobyl nuclear disaster in 1986. While nearly everything in the area was destroyed by the first disaster, plant life has since returned and even improved. This extraordinary comeback is attributed by scientists to phytoremediation, a special process that some plants use to absorb dangerous particles named radionuclides.

An equally impressive event is the survival act in Hibakujumoku in Japan. This is a term given to trees in Hiroshima and Nagasaki that resisted nuclear explosions. That is a crying willow that has been raised just 600 meters from where the bomb landed on Hiroshima is one of these Hibakujumoku. The roots of this tree were so powerful that they survived to produce a novel trunk even after the bomb detonated the entire region above 10,000 degrees Fahrenheit.

## Chapter 2 - Every fresh habitat will be invaded by plants as long as they can.

Let's dream of sitting down to a typical Italian meal. What kind of foods are on the table? Some pasta or hot margarita pizza in a rich ragu is found probably. Of course, nothing is more authentic Italian.

However, what is truly more alien than it seems, is this feast. The basil on pizza does not belong only to Italy. In the beginning, it grew up only in Central India - until it was brought by Alexander the Great back to what was once now Italy in 350 BC. Then, what came later was tomatoes. By explorer Hernan Cortes, it was imported from America in 1540.

In case, most plants we consider to be local were once invading aliens. With people's actions and the plants' amazing adaptability and survival talent, many types of vegetables have been gone far from their assumed essential range.

Although plants generally adapt excellently to their essential habitats, they are not as immobile as they appear. In truth, the true one is the valid opposite. Like humans and animals, by plants, searching for fresh regions as throughout history have always been made. what accelerated the process importantly was the mass migrations of modern people.

*Senecio squalidus*, sometimes referred to as the Oxford Ragwort, is the perfect example of this. This tiny yellow flower is not unique to Oxford! It first grew on the rocky hillsides of Mount Etna in Sicily. In the 1700s, several samples were given a present to other botanists in England by the botanist Francesco Cupani. The plant was grown in the Oxford University botanical gardens and ultimately spread beyond these borders. Within a few years, its root was covered all over the city.

And *Senecio squalidus* wasn't even finished growing. A whole new way to spread was discovered by the plant. During the Industrial Revolution, which country got into a railroad building frenzy was Great Britain. The rocky gravel used under the train tracks had similar qualities to the plant's original habitat on Mount Etna. While the trains cover the land, the yellow flowers also spread.

However, trains don't get all the praise. Biology was also involved. Thanks to natural crossbreeding, by the alien *squalidus*, hybridizing with native flowers was managed and obtained some of their talents to withstand the milder northern climate. A few generations later, which color is admitted the best color in the English countryside is the pale yellow of these invasive leaves.

## Chapter 3 - Thanks to coconut species, it is confirmed the marvelous adaptability of plants.

In the early 1900s, by August Engelhardt, it was found the latchkey to endless life. At least he thought he made it. By the eccentric German nudes, it was assumed that a coconut-only diet would give them excellent health. To examine his theory, he started to live in the South Pacific, where he founded a colony committed to this vision.

Sadly, for Engelhardt and the dozens of students who obeyed his teachings, the hard-shell tropical delicacy did not bring immortality. The death cause from those who tried the all-coconut diet was because of malnutrition.

However, there was a correct side in a point by Engelhardt. Species that are marvelous organisms are the coconut palm and the distinct species of related plants. Even though they may not serve humanity to avoid death, they are extraordinary at survival.

Hence, why was it fallen so hard on coconut by Engelhardt? First of all, the coconut palm tree or *Cocos nucifera* is an incredibly unusual plant according to the European eye. For someone who is just used to seeing crops like wheat, cabbage, or apples, the large, hairy fruit of the *Nucifera* stands out as something special.

Well sure, there is a reason the fruit looks this way. Thanks to the coconut's heavy, and hollow shell, it is permitted to float on ocean currents for up to four months. With this adaptation, the plant can be transferred to spread all over the globe. In case, palm seas are so good at navigating that botanists had to trust advanced DNA tracking techniques to confirm it is native to Asia.

Compared with the wandering *Cocos nucifera* is the *Lodoicea maldivica* or sea coconut palm tree. This uncommon species just expands on a few islands in the Indian Ocean. While it also produces tough-skinned fruit, coconuts are much larger, their weights can be up to 90 pounds. As these fruits are so large, they can hardly travel. In the initial, the event that is tried to spread their seeds as far as possible by most plants makes scientists confused.

However, there is a cause for this weight: *Maldivica*'s local islands have poor quality soil. What is part of its matchless strategy to overcome this survival challenge is, the giant seeds of the plant.

What precisely is this strategy? First of all, the large leaves of the plant gather food sources such as animal manure and pollen. Thanks to the rain, this is transferred directly to the soil around the stem. When the large, heavy coconuts of plants fall into this more fruitful soil, their size and weight prevent them from rolling or being carried by animals. And so, the next generation too can take advantage of their parents' regular nourishing showers.

What a wonderful coconut!

## Chapter 4 - They are the seeds of a plant that can survive and be ergative after centuries of waiting.

The turn of the twentieth century. His last years were spent in Provence, France by the popular Impressionist painter Auguste Renoir. Here, he spends his days swinging in the shade and painting local olive trees. Although Renoir is long gone today, the trees were painted by him are still alive and growing.

This is charming. However, when these olive trees are compared to Old Tjikko, which is Norwegian spruce growing in Sweden, they are just babies. This tree started more than 9,000 years ago when humans were just finding agriculture. And what is just a baby compared to the Pando colony of genetically identical poplar trees in Utah is Tjikko himself. This organism can be tracked until its roots to about 80,000 years ago.

Live plants have amazing longevity. It can be said the exact thing for their seeds.

Plants have a distinct relationship with time than animals. Even if survival in the century is a success for most mammals, birds, or reptiles, rising to over a hundred in the Plantae kingdom is widespread. And the seeds of a plant - under the correct circumstances - can be just as hardy. What holds life in them inactive until the environment is just right for germination is these marvelously designed capsules.

How long can seeds hold inactive? Sure, think of this instance. In 2005, by two Israeli scientists, the palm seed found in a clay pot at the ruins of the ancient fortress Masada was successfully germinated. By experts, it is guessed that the seed was found as early as 155 BC, which means the seed is more than 2,000 years old.

However, there is more to this seed than impressive curiosity. With the help of it, a lost kitchen treasure can be revived. The area around Masada was recognized for its gorgeous tasting dates. However, native species disappeared because of climate change around 1100 CE. By scientists, it is hoped to animate the species and grow the famous delicious fruit once again, scouring historic sites for more seeds that preceded this extinction.

By a group of Russian scientists, a similar purpose has been achieved. In 2010, what was found by them was the seeds of the old *Silene stenophylla* grass frozen in Siberian frozen soil. Thanks to using modern cloning techniques, the plant could be regenerated and brought an organism that died 39,000 years ago.

## Chapter 5 - The proof of the Anthropocene is a lonely tree.

Imagine an endless and arid desert. A dry, sun-soaked panorama with nothing but sand to the horizon. Presently, think of a single tree among the sandhills. This is the Ténéré Tree, once recognized as the loneliest tree in the globe.

For centuries, the Ténéré Tree has survived in an isolated edge of the Sahara, the only plant for hundreds of kilometers. What gave it a poetic look is its unconventional isolation and it served as a landmark for lone camel caravans crossing the field.

Sadly, in 1973, a drunk truck driver hit a tree and displaced it - an ironic destiny in a region so far from traffic. However, lonely trees have got many more things than tragic endings. In case, thanks to their help, we can understand the influence we humans have on the globe.

The essential message here is: lonely trees are proof of the Anthropocene.

The world has subsisted for billions of years. By scientists, this long time is divided into several sections called geochronological units. Each unit is a separate period in which situations on Earth change significantly. We are currently living in the Anthropocene called humanity or Anthropos in Greek is the main driving force of global change.

If an example of our role in this age is given, this can be the Tree of Life or Shajarat al-Hayat. This solitary tree grows in Bahrain, a small island country in the Persian Gulf. However, the actual place of the tree isn't there. *Prosopis juliflora*, an herb native to Mexico. The reason for that only coming to Bahrain, Portuguese colonists were active in both regions in the 1500s. This out of place plant shows how much human activity is reorganizing life on the planet. Its unexpected existence is an important indicator of the Anthropocene.

Another remarkable illustration of humanity's influence can be discovered on Campbell Island, a small piece of land 605 miles south of New Zealand. This is an island that is home to a single pine tree. In the 1900s, European colonists planted the tree. The existence of the tree alone is striking adequately. Even more significant is what's inside your trunk.

Carbon-14 bands are found inside the rings of the tree. What is rarely found in nature is this radioactive isotope. However, even so, it is forced to manufacture in large quantities thanks to atomic explosions.

That the dense spikes of this rare element must be detected on the trunk of this isolated tree is important. It confirms that by humanity and our technology, obvious changes have occurred even in the most remote edges of the world.

## Chapter 6 - What is closely linked is the lives of plants and animals.

One of the most biological habitats on the planetoid is the Amazon. Despite all this life, it suggests violent competition for space and resources. Therefore, when the time comes to reproduce the novel generation of plants, they need to spread their seeds as far as probable. It is this pressure that has resulted in some surprising strategies.

Let's think of *Hura* pancakes, sometimes named dynamite wood. It takes matters into his own hands. What has developed special fruits that burst when ripe is this extraordinary organism. Thanks to these biological bombs, the tree's seeds are launched at a rate of over 200 feet per second. Seeds sometimes descend more than 120 feet!

By not all plants, it cannot be trusted on bursting fruits to spread their seeds. By many of them, spreading has relied on animals that share their habitat instead. However, this entails its strategic commerce.

The essential message here is this: The lives of plants and animals are closely linked.

The hitchhiking technique is a famous strategy for plants that rely on animals to spread their seeds. It is grown by plants with feathers and burrs attached to the fur of mammals whose seeds have passed. Seeds are grown by others with delicious fruits designed to be eaten and stored elsewhere in animal feces.

Although the delicious fruit strategy is effective, it is just valid as long as there are animals with an appetite for what plants have to offer. And if your initial consumer disappears, they are in actual danger. This is what happened to *Persea Americana*, better recognized as the avocado tree.

Although native to South America, by this plant, a single large seed is produced that is too large for any native fauna to consume whole. The reason for it, it developed to seduce animals that no longer exist, such as giant sloths and giant mammoths. Due to these mammals vanishing 13,000 years ago, there was no one left to spread avocado seeds. The number and range of the avocado tree started to decline.

Fortunately, a distinctive animal came to the scene: people. With our flavor for avocado, we kept going where large sloths left off and started growing fruits for our goal. Now, many avocado trees embrace more than a million acres spread over many continents.

This method of distribution is quite impressive. Yet trusting people also has its disadvantages. Thanks to modern farming techniques, no seed-free avocado varieties are produced. Although these are more attractive to customers, they are biologically sterile. All fresh plants are just clones of the original. Thus, although there are more avocados in total, they are too little talented to breed on their own - an unconventional fate and the latest turning point in a long, complex tale of plant evolution.

## The Incredible Journey of Plants by Stefano Mancuso Book Review

Plants have more than meets the eye. It is this amazingly diverse group of organisms that involves some of the most thriving species in the world. Thanks to amazing adaptations, clever partnerships with animals, and ingenious breeding strategies, which have spread to almost every corner of the world are plants. It is where they are now, how they got there, and where they eventually go which relies largely on our activities as human beings.

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