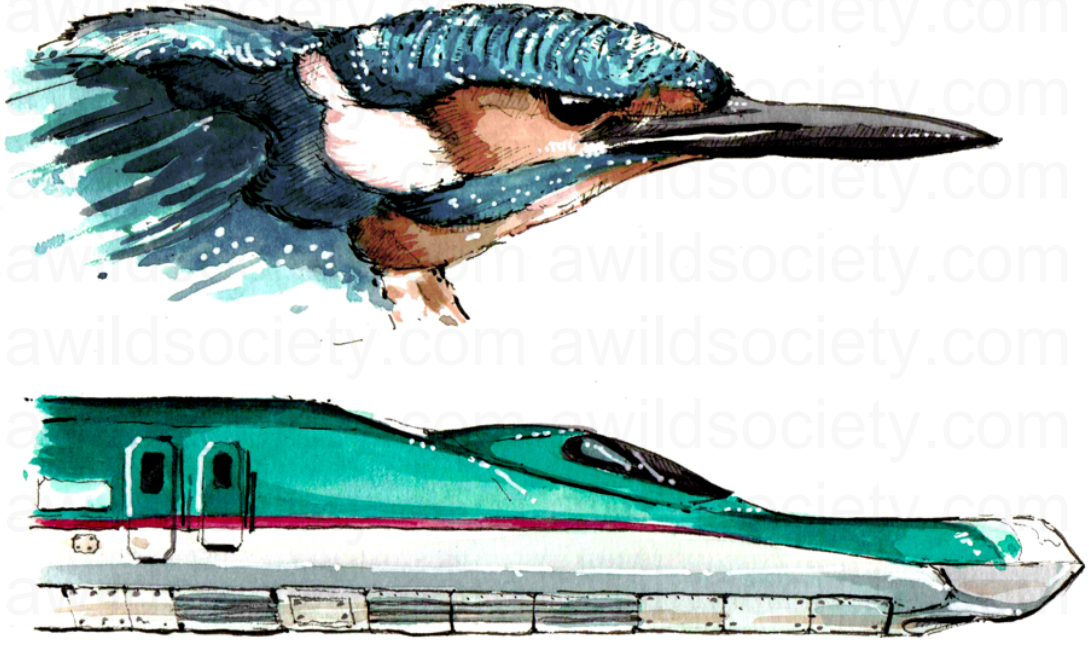


A Wild Society

By Aiden McKinnon

Have you ever noticed how beautiful nature is?

The way water beads off a duck's feathers, or the way a tree's branches scoop up the light?

If you have been inspired by the beauty of nature, you're not alone.

Nature has inspired artists since some of the first art was created. Early cave paintings often depicted natural scenes.

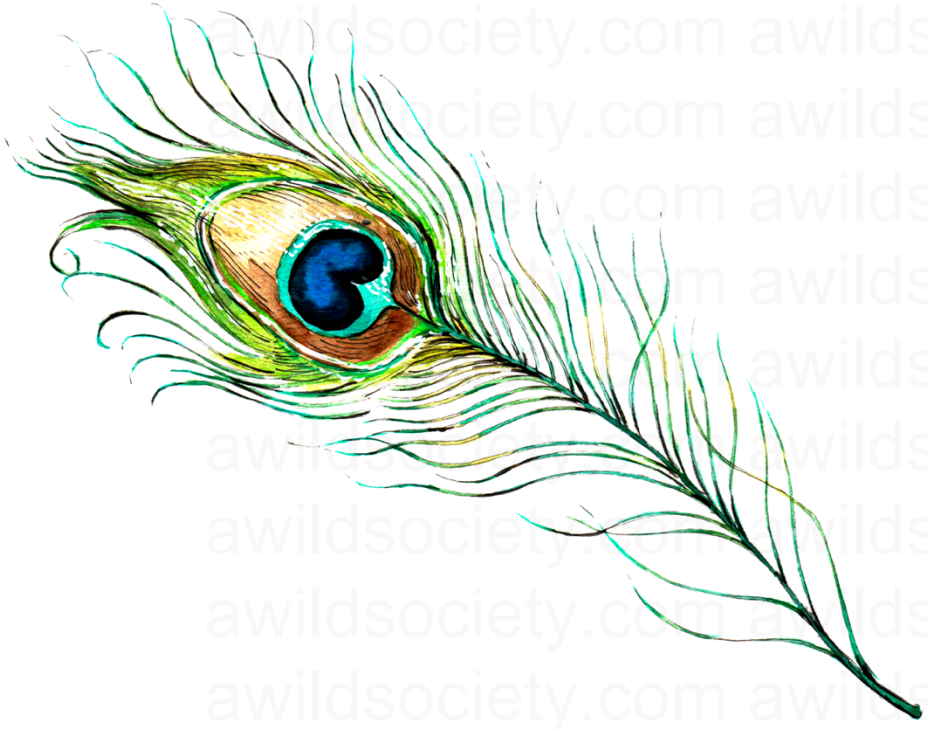
Humanity has taken inspiration from nature in many more ways than most realize.

The reason why we have airplanes today is likely because people looked toward the skies at birds, bats, and insects, and were inspired to try to fly.

When people noticed how well the many tiny hooks on a burr (a specialized seed pod) stuck to their clothes, the idea for an invention that became the hook and loop fastener was born.

Today, many shoes and other common product use this nature inspired invention.

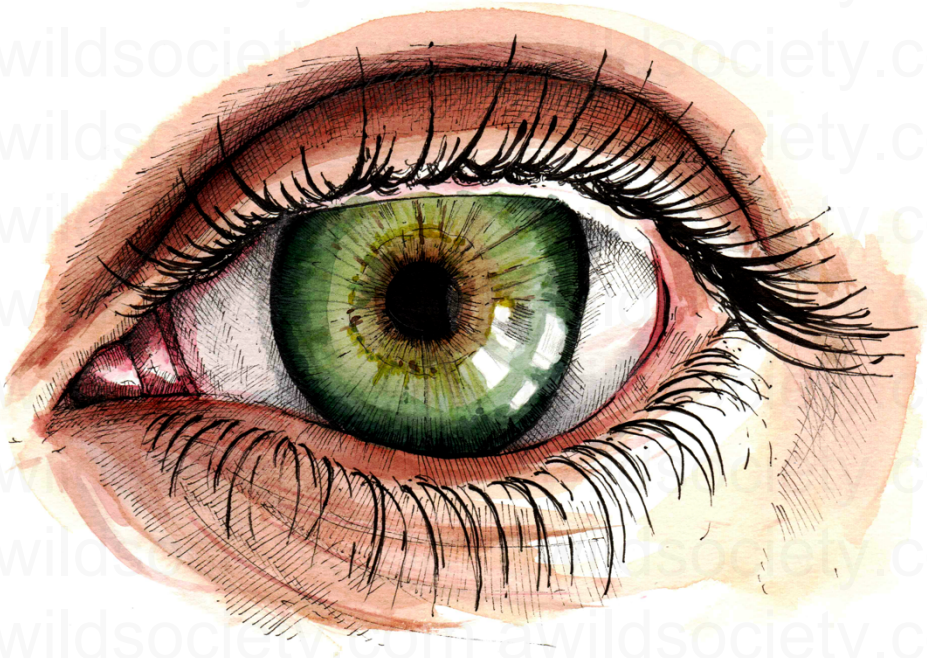
There is also a significant amount of untapped inspiration in nature. Take the color of a peacock's feathers for instance.



The color that you perceive in a peacock feather is caused by the light refracting off microscopic structures.

This is one example of what is called structural color. Structural color is different than true color which is the result of pigment.

Structural color is also responsible for the color of green and blue irises in human eyes.



These microscopic structures that create color could later be harnessed to produce brighter colors and colors that don't fade over time.

Deoxyribonucleic acid or DNA is another untapped marvel of the natural world.

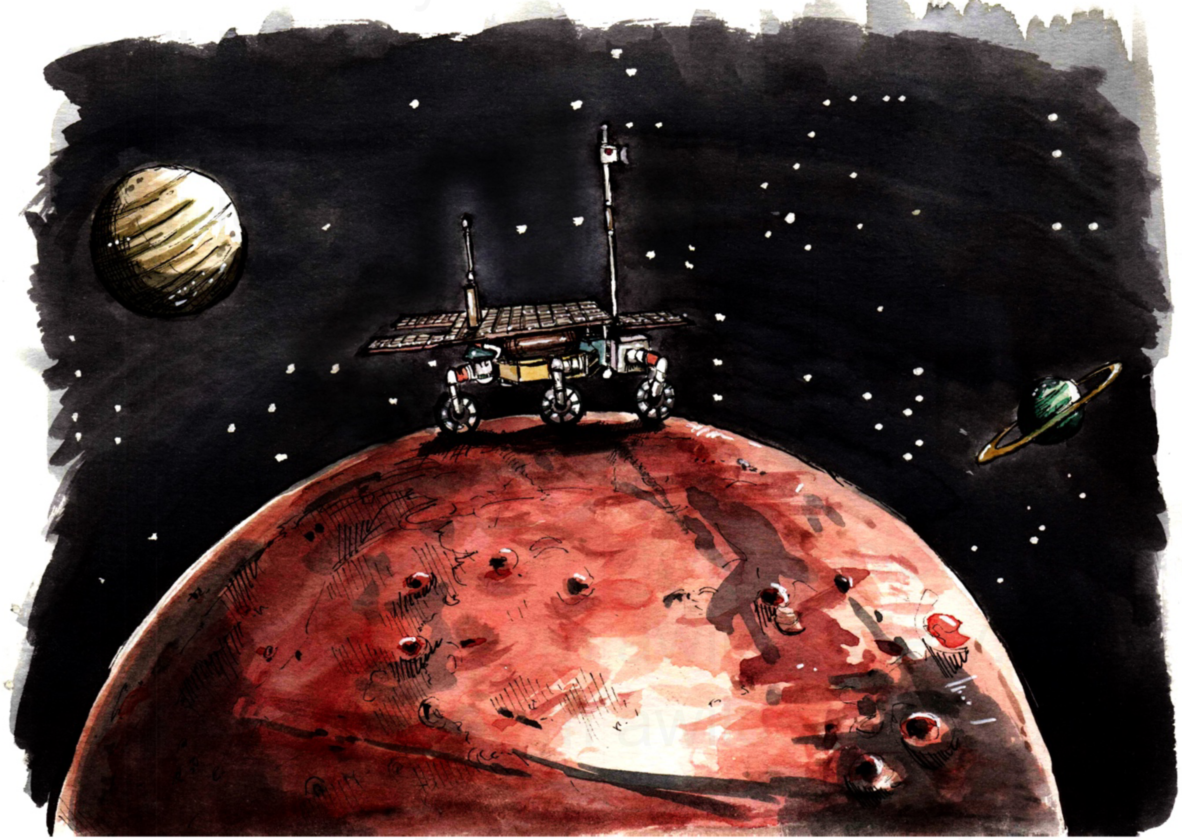
It is estimated that one gram of DNA can hold up to up to roughly 215,000,000 gigabytes of information! This far surpasses even the densest of current common data storage methods.

These inspirations are mostly yet untapped because they are difficult to implement, but when inspirations like these are tapped into, there can be amazing results.

Lotus leaves are covered in thousands of bumps that cause them to be hydrophobic. Because the leaves are hydrophobic water doesn't stick to the leaf, but instead it beads off taking dirt and dust with it.

This helps the plant keep its leaves clear of dust and dirt which might inhibit the plant's ability to photosynthesize.

Because the Lotus leaf's hydrophobic coating was so effective, it was recreated to be used on different equipment in space.



The coating based on the Lotus leaf was created to help prevent dust, ice, and liquid accumulation on equipment such as rovers being used in space. Inspiration from nature can be used to solve a multidue of problems.

There was a problem in Japan. Trains in cities made loud booms while exiting tunnels due to the buildup of air pressure. These booms could be heard from far away and were a significant source of disturbance for people living nearby.

Unsure of how to fix such a problem, engineers searched until they found the solution —the Kingfisher bird!

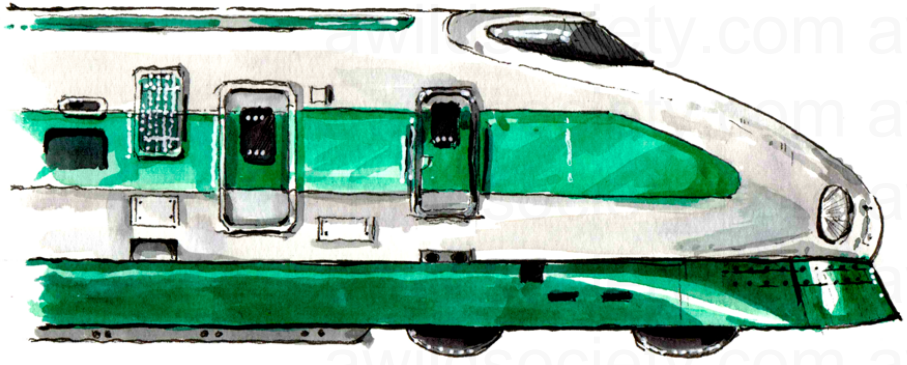
The Kingfisher might seem like an odd choice. After all, what could a small bird possibly have in common with a large train?

Despite their differences, the Kingfisher, and the trains in Japan have a similar challenge of moving quickly into something: trains move quickly into tunnels, and the kingfisher bird dives fast into water.

When Kingfishers dive into water after fish, they need to be able to do it smoothly so that they have the best chance of catching the fish.

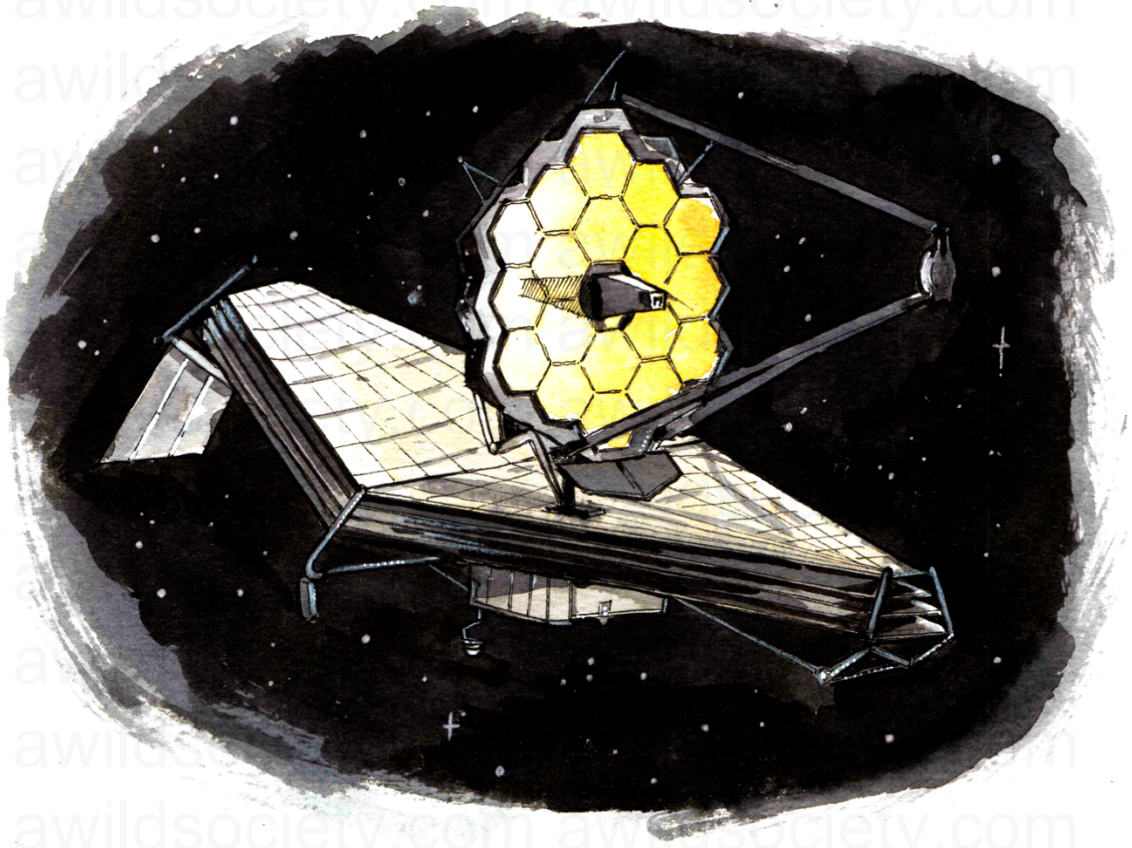
When trains enter tunnels, the air needs to be able to move past them, so that the air doesn't compress and make a loud booming noise on the other end.

After realizing this similarity, engineers were able to design a better train based on the Kingfisher's beak and face.



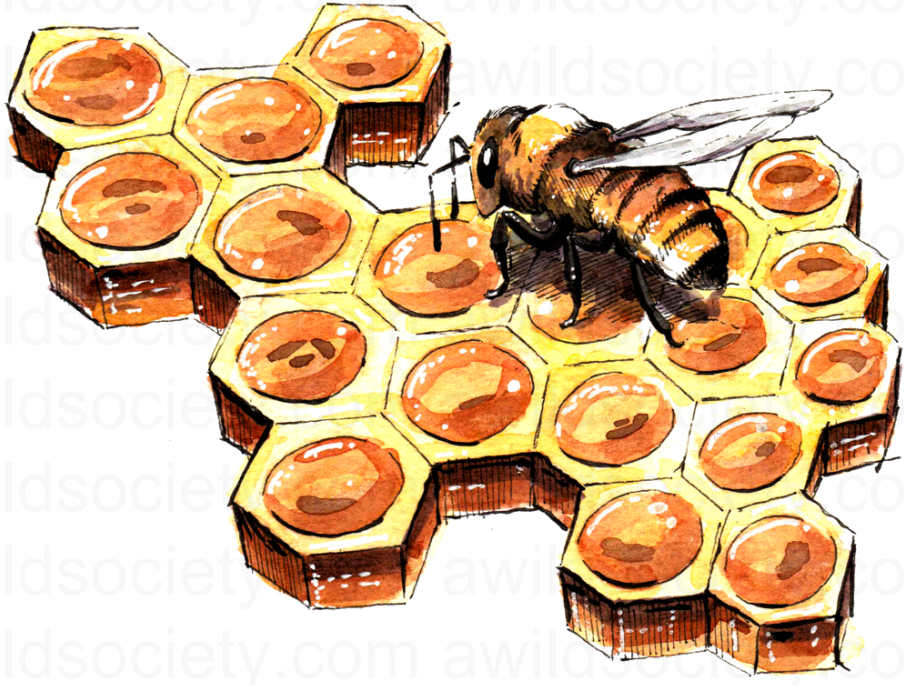
The resulting train was sleeker and allowed the train to move through tunnels without creating loud booms.

In many cases, designs found in nature don't function the same way when they are mimicked in man-made inventions.



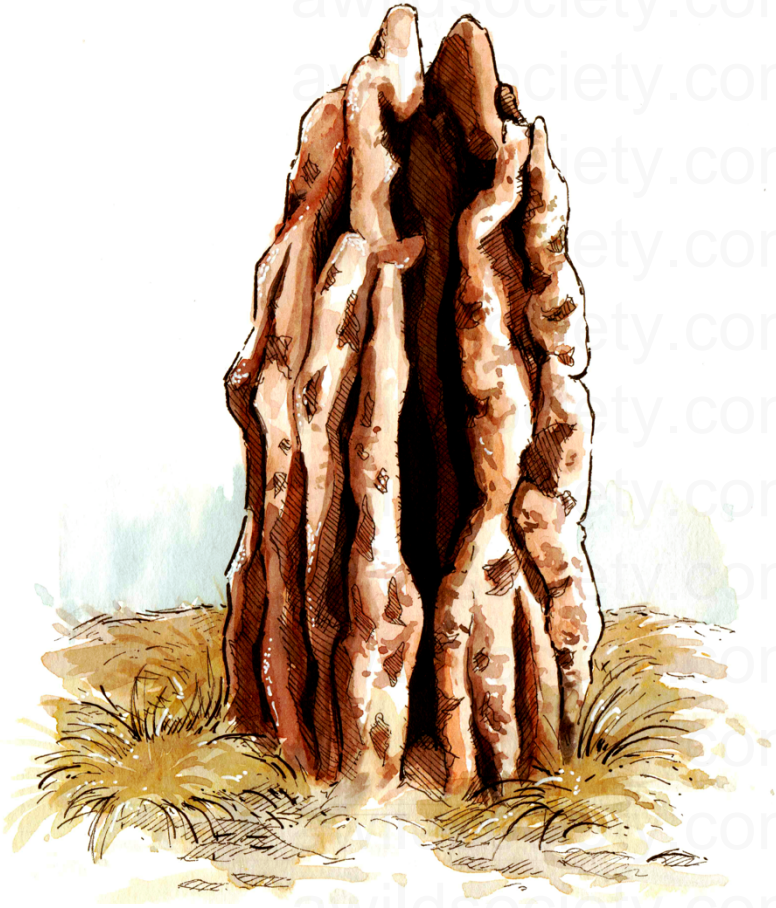
For example, a large space telescope uses a honeycomb shaped mirror so that it can fold small enough to fit into a rocket to get into space, and then once in space unfold into a large concave mirror. The honeycomb pattern is the best shape for this as it allows for minimal gaps between the folding portions.

Conversely, bees use a honeycomb pattern because it efficiently uses space, and it is a strong shape for their comb.



Even though both bees and the telescope use the honeycomb pattern, they use it for almost entirely different reasons. Both the telescope and bees use the honeycomb pattern for its space saving properties, but the telescope primarily uses it because of its ability to fold and then unfold, whereas bees never need to fold their comb. Still some nature inspired designs are used in almost the exact same way that they are used in nature.

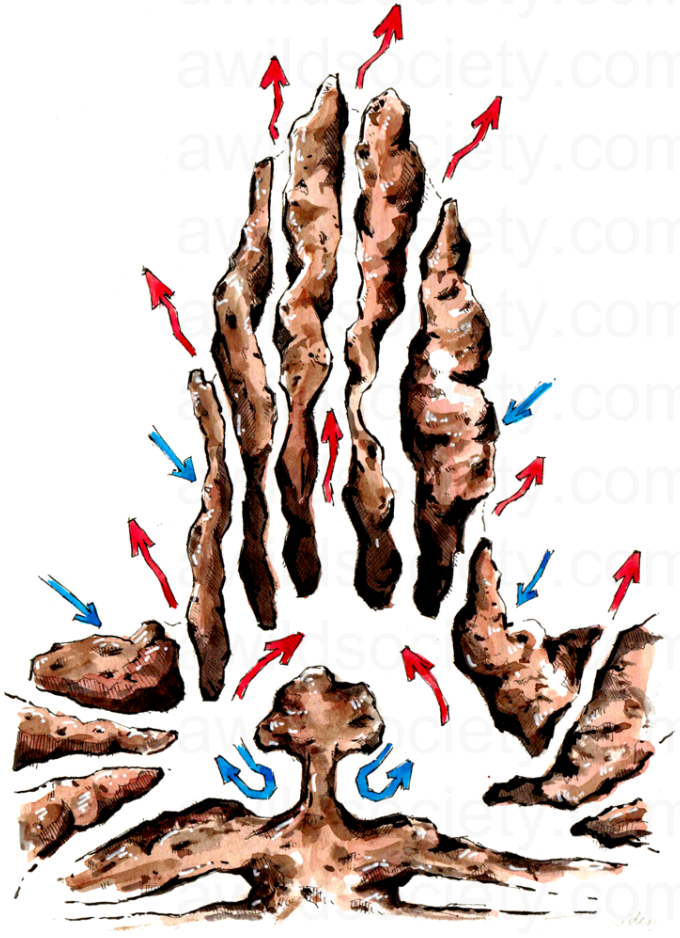
A special project in the capital of Zimbabwe required a large commercial building that didn't need the energy required for conventional air conditioning.



This was difficult because days in Zimbabwe's capital can be hot, and buildings can require a lot of power for cooling. The architect for this project looked to cathedral termites for a solution.

Cathedral termites are master architects and build impressive mounds that can reach over 15 feet, but what drew the architect of the project to these insects is what lays inside the termites' mounds.

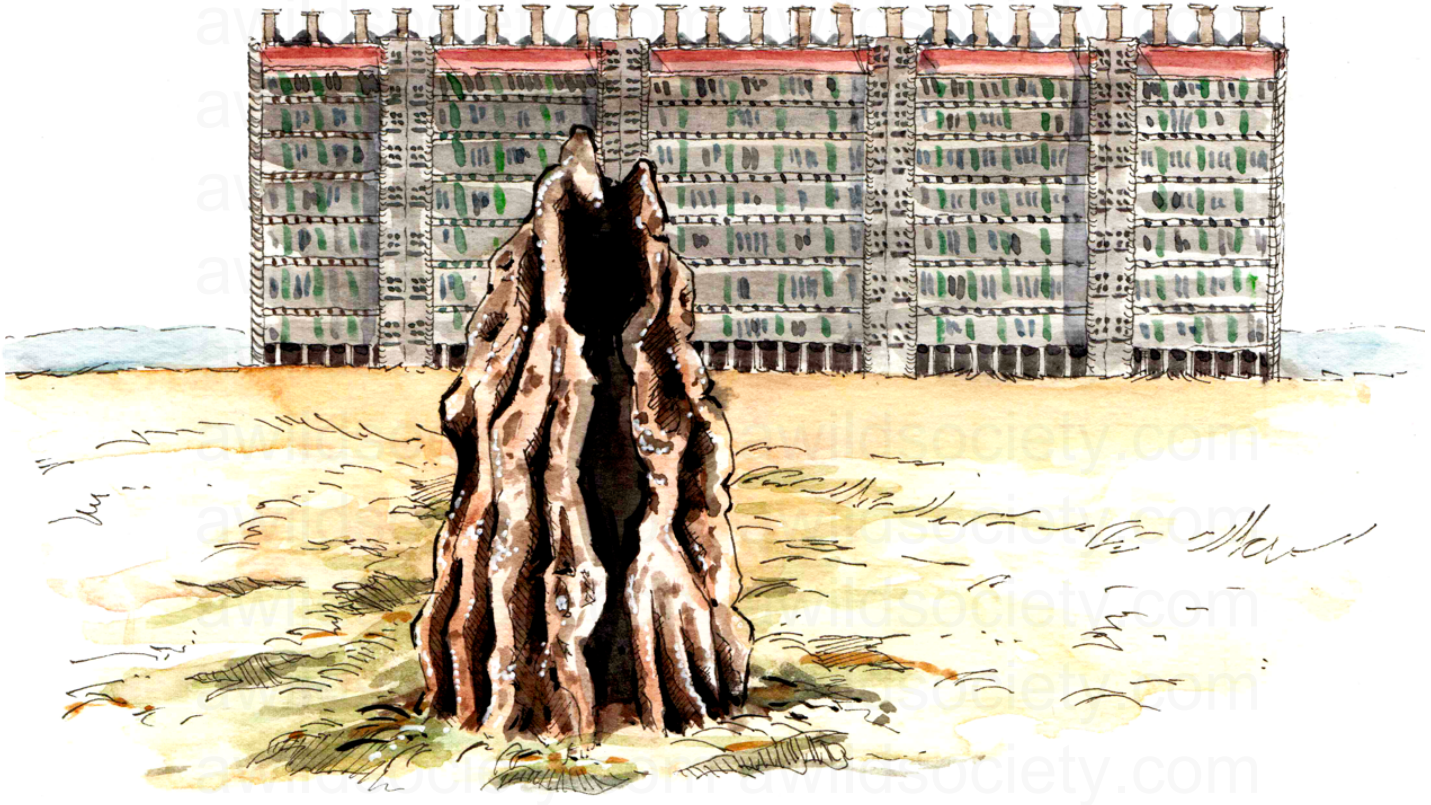
Inside the mound lies a complex structure of tunnels and holes, some leading to the outside of the burrow.



These tunnels are designed specifically by the termites to keep the mound cool during the day and at night! They allow the hot air to escape out the top and keep the cooler air in the mound.

Cathedral termites build their mounds to protect themselves from predators, flooding, and temperatures that can reach over 100 degrees Fahrenheit in their native environment.

Mimicking the cooling design of the cathedral termites' mounds, a building was constructed.

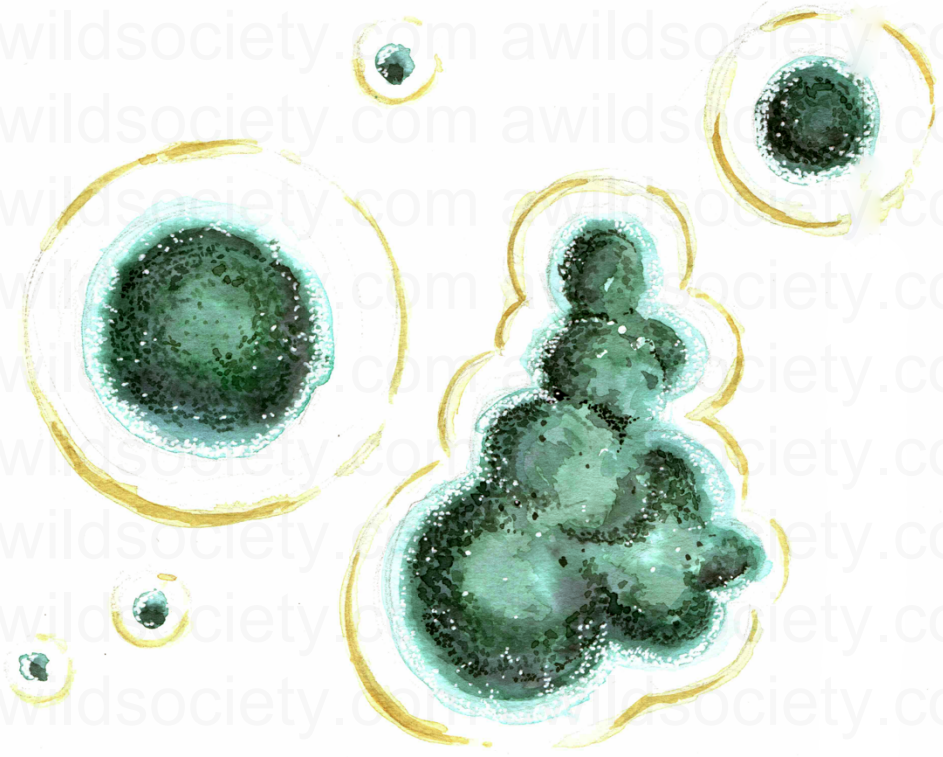


This building is made mostly of concrete with air flow channels to mimic the mounds that the termites build. As a result, the building uses significantly less energy than other buildings and ensures a comfortable temperature for those inside.

In addition to inspiring functional buildings, nature never ceases to lend inspiration to some of our most beautiful buildings.

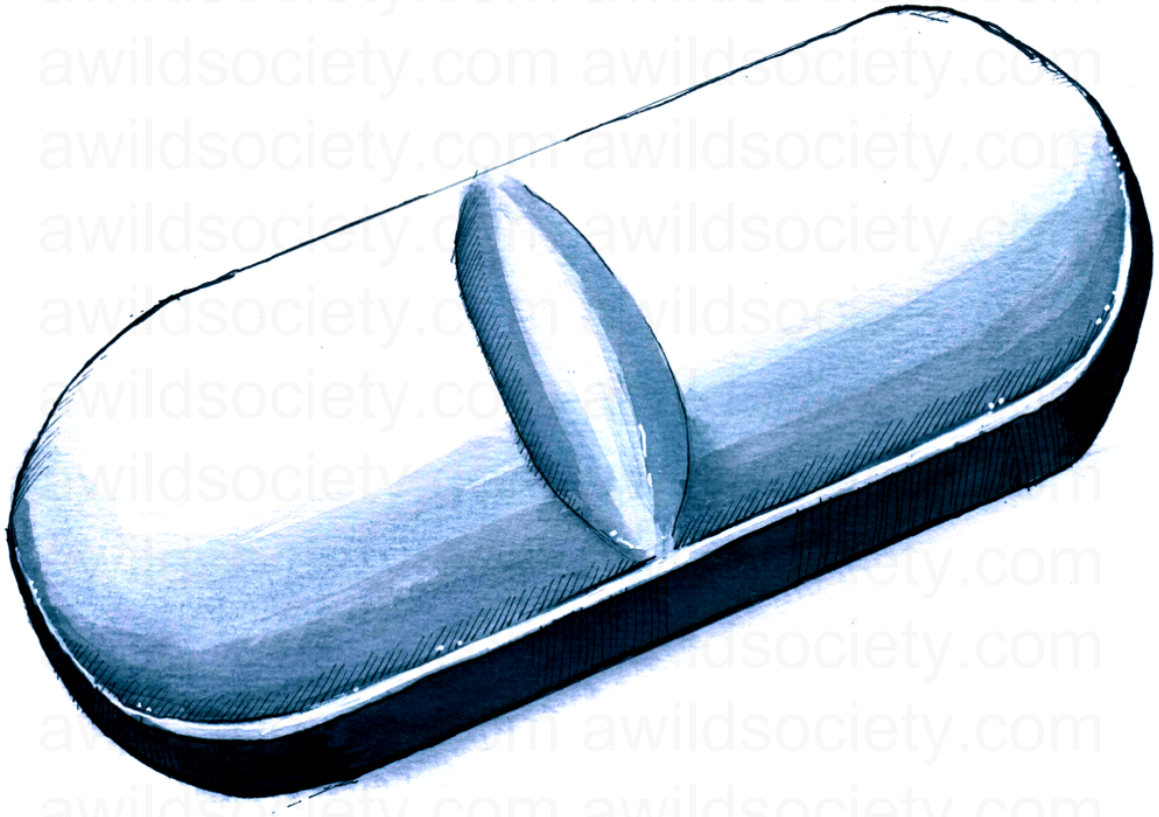
This building, which is located in London, was inspired partly by the Venus Flower Basket, a deep-sea sponge that builds a lattice out of silica.

Apart from beautiful and functional designs nature has so much to offer. Many medicines are modeled from or made in some way from things in nature.



Penicillin, one of the most commonly used antibiotics, comes from penicillium mold. Penicillium mold naturally produces penicillin to ward off other mold and bacteria that might threaten its food source.

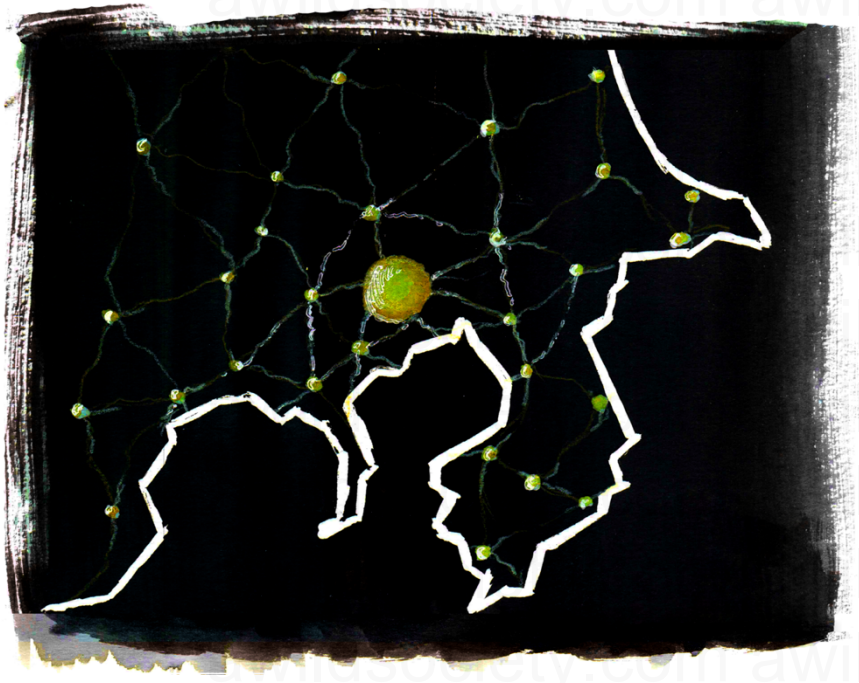
This compound that penicillium mold produces can then be processed to create a lifesaving medicine.



Medicines made from, or inspired by nature, have saved millions of lives.

Nature could also help us design the complex systems that allow our world to function.

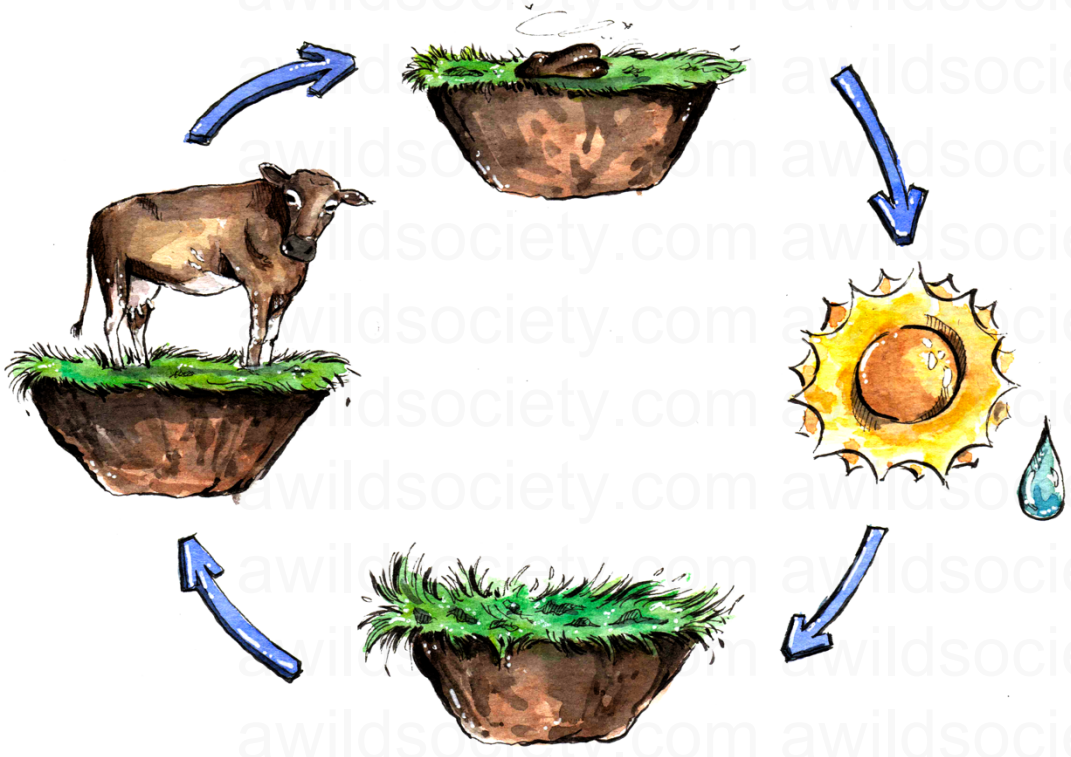
Slime mold is an unusual organism. It can be yellow, and it can look like flexible tree roots spreading out. To find food, slime mold spreads out in a direction. When it does find food it creates a flexible root-like extension to each food source it finds. The result is a central location from which the slime mold has expanded from with roots going out to each food source that it finds.



In an experiment where slime mold was placed on a map with food sources in place of cities, its roots spontaneously established efficient routes that resembled existing railways connecting those cities. In a little more than one day, the slime mold accomplished a task that took a team of people much longer to finish.

In the future, slime mold could be used to get a preliminary idea of the most efficient networks for connecting cities. This is one of many ways that nature could inform how we shape society's complex systems.

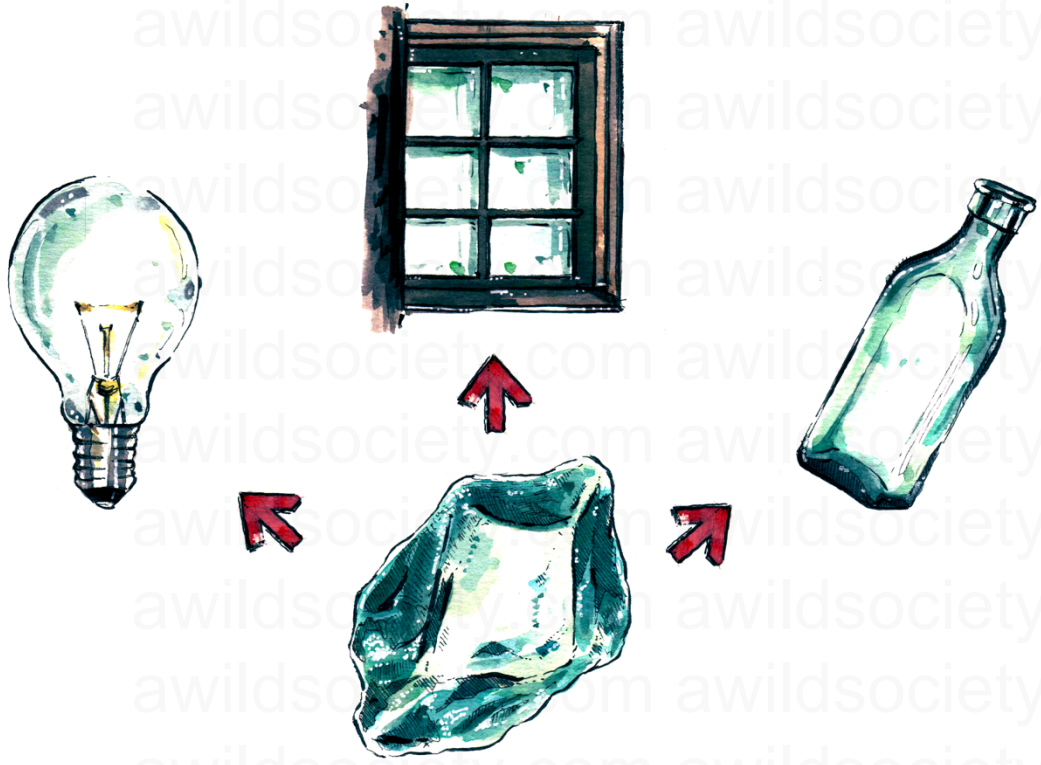
Additionally, nature has inspired an idea where human made products could be continuously recycled.



This would mean that there would be a cyclical lifespan to human made products similar to the life cycle of grass in nature.

Grass grows from the dirt using the sun and water, then it can be eaten by animals such as cows, and then those same animals fertilize the grass, which creates more dirt for the grass to grow, and so on. Every part in nature is constantly being recycled, with the only added energy being from the sun.

Currently, only a few things humans make even come close to nature's ability to continuously recycle.



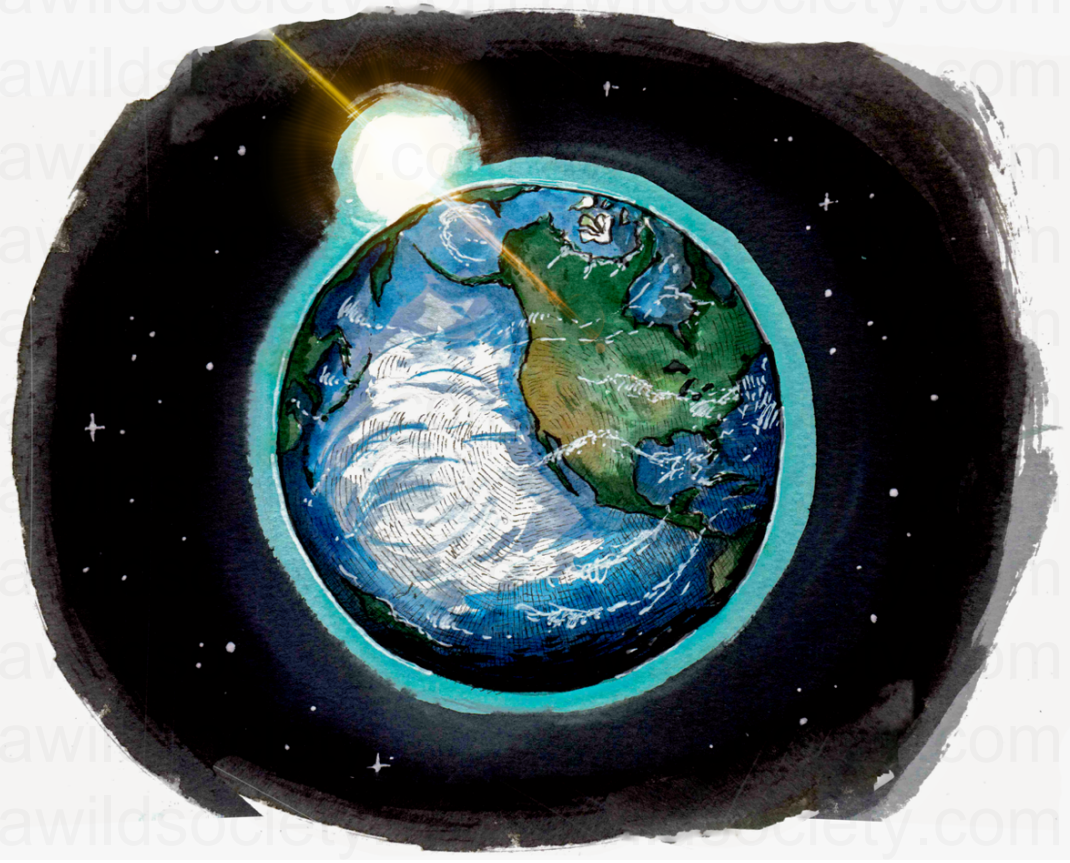
One of those things is glass, which can be continuously made into new things.

If humans could mimic the cycles in nature, we could significantly cut down on waste which would improve our lives and our impact on the world.

Over hundreds of thousands of years, humans' relationship with nature has evolved.

Every part of our lives has been impacted by nature, but we have also impacted nature through our activities. Using nature as inspiration to design our man-made world is a continuation of this relationship that is as old as society itself.

As people are increasingly insulated from the natural world, it's important that we try to maintain our relationship to nature.



There is so much to be learned and inspired by. To successfully navigate our future, society will greatly benefit from being able to look to nature for inspiration in creating art, inventing, designing systems, and innovating.

What will you be inspired by?