Universal Intelligence: The Plant Kingdom

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A section of Pando, a quaking aspen in Utah that is the world's largest tree by weight and landmass at around 6,000 tons, with an age that stretches back at least several thousand years.

Research on the subject of the Universal Intelligence of the plant kingdom goes back about one hundred fifty years to the era of Charles Darwin, and the amount of research is voluminous. For Rosicrucians who think about consciousness, the research gives a new view of the world around us. This is illustrated by an experiment in which researchers showed people a short film and then asked them to note what they had just seen in the short clip. One part of the clip had a horse in it, another part of the clip had two birds, and another had three people, and that was what people reported. But in all of them, primarily what was there were plants, trees and other flora. The research showed that people have what the scientists called "plant-blindness." We really don't notice plants. However, what present research shows is that plants are as sentient and intelligent as other living creatures.

Universal Intelligence lives in the plant kingdom. A basic Rosicrucian tenet is that there is one intelligence, one consciousness. In accounts of people who've had momentary experience of Cosmic Consciousness, one of the key features is awareness of an imminent intelligence that's in everything, surrounding everything, and which we're part of. So that Universal Intelligence is really what this is about. What we see in the animal kingdom and in humans, manifests in very similar ways in plant life. So, one Universal Intelligence is not new to us. All living things manifest this Intelligence and you can see it in the smallest gnat. The tiny little creature that's ducking around us—it's trying to live, trying to find food, trying to reproduce, and trying to avoid irritation. It's doing nothing unique in its objectives. It may not watch Netflix, but it acts similarly to other forms of life.

We find that whether we consider a protozoan or a larger animal, the behavior we see with living things, we similarly see in plants—self-preservation, seeking nutrients for food, reproduction, and avoiding irritation—trying to be in comfort, not discomfort. Most of us learned about plant reproduction in school, so there's no need to go into detail here. We know there's pollen and there are seeds, etc. Most of science, up until the present time, looks at plants as being almost inert, in the sense of being passive actors—not active agents. Scientists observe how plant reproduction takes place. Bees visit and carry away pollen, a seemingly passive role for the plants.

From a scientific point of view the key features that researchers look for in categorizing intelligence is the ability to take in information from one's environment, the ability to process and integrate that information, then deciding how to act on the information and lastly, and this is really where scientists lately have been somewhat forced to yield regarding the intelligence of plants—the ability to solve problems. Besides the preceding, there is a separate scientific debate as to whether plants are conscious. Many get stuck on that point, however it is enough to remember that plants are active problem solvers.

One of the most interesting comments about this subject is an observation that plant life is, ironically, the closest thing to alien life on our planet. Plants don't have eyes and ears and legs and move around in the ways we're used to seeing in other life forms. Nonetheless, plants are sentient creatures responding to their environment, and they share the world with us.

Let's look at some plant characteristics. They are sessile, which means that they don't move around; they are rooted in a fixed location. It's very interesting when you think about them. Scientists who are interested in this field recognize that plants have to solve all the problems that other animals face: being able to survive in their environments, getting food, etc. But they can't get up and move to address their needs. Pretty much every other living creature moves to get what it needs, if it's not immediately present in its own environment. Plants are rooted, so they clearly have to be very creative in getting

A resilient desert shrub called a fire bush or calligonum, that is native to sandy deserts across North Africa, the Arabian Peninsula, and parts of Asia. In order to reach water, its roots can grow 30 feet deep.

what they need. While people don't see plants as conventionally moving creatures, plants do move through growth. That's the behavior they employ to access resources not immediately present. Related to this, plants act on a much slower timescale than our own. Plants move so slowly compared to humans that we think that nothing is happening. However, we can see these behaviors clearly through time-lapsed photography. In an ironic twist on this fact, there was a *Star Trek* episode where a type of alien creature came to Earth that functioned on a much faster scale of time, and they looked at humans as being inanimate. They began to do with people what they wanted. They saw people as inert and inanimate so they had them for lunch and other things like that.

What's also interesting is that plants, in addition to having functions that are akin to human senses, actually have additional senses. You could say that plants have the five senses we're accustomed to, plus additional ones. Another point is that plants have sophisticated means of self-defense to protect themselves as all living creatures do. They also communicate with other plants through various means. They have memory. They exhibit purposeful decision-making: They crunch incoming data and, in effect, say I'm going to do this, not that. They can distinguish self from non-self. As we know, plants reproduce through a variety of means: wind, insects, animals, etc. for distributing their seeds and pollen.

A look at plant bodies reveals that plants are very different, which has made it so confusing for traditional scientists to get their arms around plants. Plants don't have lungs, they don't have kidneys, they don't have livers, they don't have organs like animals do. Even tiny bacteria have different organs. There is the nucleus, the mitochondria, and other elements. Plants

The milk thistle is named so for the milky white sap that oozes from its leaves when crushed. It is still widely researched and used as a natural liver detoxifier, due to the compound silymarin.

don't have organs as we know them; they don't have a brain. Many scientists have great difficulty in recognizing intelligence when something doesn't have a brain. But if you simply look at a key defining characteristic of intelligence—problem solving—we see plants meet this test, even without an obvious brain.

Plants are modular. Instead of having internal organs, plants have everything in each part of the plant because they must withstand being eaten. If something ate half of an animal, or human, they'd be dead. Plants must tolerate that. They can't move. They can't run away. So, in the instance of being eaten, if they had a brain or specific organs, if they were localized, they would not survive. There is a lot of research showing that the root tips are really where a key amount of processing goes on in plants—it is mediated or stimulated or takes place in the root tips and a little area right behind the root tips. So, the processing area of plants likely exists below the ground.

Sight

Now we're going to go through human senses. Let's begin with sight. One of the basic premises of sight is response to light. Plants can perceive and process light. Evidence of this is that shoots always grow towards the source of light. And they'll do a lot of things in order to succeed at that. On the other hand, roots always grow away from the source of light so they're aware of light as well. They have what we perceive as sight. They respond to that part of the electromagnetic spectrum that we call light and do so in more sophisticated ways than even humans do. They differentiate between different parts of the light spectrum, not so much for aesthetic purposes, but they'll respond differently to sensing more infrared light on the spectrum. If they're trying to seek light, they obviously don't want to be where it's more likely to be shady, in terms of the canopy. So, they're going to seek out more direct light. They can perceive the difference based on the light spectrum. There are other things they do that are really fascinating. Clinging plants such as vines can sense an object in their environment and can even discern an appropriate object to wrap around.

Smell

The sense of smell is a recognition of chemical molecules in the air. Like humans and other animals, plants can pick up what we would say is a scent in the air. In fact, this is a key part of how plants communicate and defend themselves. Plants emit chemical signals and respond to chemical signals emitted by other plants. For example, plants issue different chemicals depending on the nature of the threat. If it's a bacterial threat, there will be a different chemical emitted by some plants than if it's a herbivore threat. For example, if a caterpillar is eating a plant's leaves, a specific chemical is emitted. Sometimes a chemical is emitted to notify the rest of the plant and sometimes it's to notify plants around as well. So, plants emit chemicals and other plants can sense and process those molecules, which again is what we do with smell in order to respond.

Now for some bad news: For those of you who like neat lawns—that nice smell of fresh cut grass - that's grass going "Oww!" Screaming, plants are emitting multiple chemicals saying their body is being attacked, as well as working to mitigate the injury inflicted by the lawnmower or grazing deer.

A wooly bear caterpillar munches on a budding daisy. African daisies have petals that close at night and on cloudy days—a behavior called "nyctinasty," thought to protect their pollen from moisture.

Despite their fame, Venus flytraps exist naturally in the wild in only a small area of the Carolinas. They grow in nutrient-poor, acidic bogs, which is why they evolved to supplement their diet by catching insects.

Touch

Plants actually respond to physical contact with other objects. A video on YouTube (https://youtu.be/dTljaIVseTc) shows a plant reaching out in its environment and as soon as it touches a nearby pole, it immediately begins to attach to that pole and wrap itself around it. Some may be familiar with the plant called the *mimosa pudica*; it's a plant that collapses when you touch it. There are also the carnivorous plants like the Venus flytrap which respond when touched by insects. There are also the clinging vines. They can discern what is a good surface to wrap around. Others will look for trees. They don't wrap around the tree; instead they attach themselves to the tree. So, plants respond to an object's surface.

Taste

Plants can recognize different herbivores. Based on the herbivore's saliva, plants will emit different chemicals. For example, plants have been shown to recognize one type of caterpillar versus another or other kind of insect. They release specific chemicals to ward off the caterpillar.

Venus flytraps and probably most types of carnivorous plants can discern when something is not food. They'll close up and basically stay closed for about twelve hours if it's not digestible. If they find something that is digestible, they'll stay closed for about five to twelve days. So, basically plants demonstrate they have a way to taste or respond to chemicals that they encounter in their environment for securing nutrients or food.

Hearing

Plants can also hear. Many people talk to their plants based on the assumption they can hear or respond to the physical vibrations that the voice creates, that is, the sound or pressure waves of the movement of air. Well, they're correct. For example, in laboratory experiments, scientists can take certain types of plants that are known to respond to caterpillars with a chemical defense, and, if they simply play the amplified sound of a caterpillar eating a leaf, the plants will issue a chemical response as if it was actually being eaten by a caterpillar. Plants recognize the sound of the eating and they will put out chemicals that ward caterpillars off. Similarly, plants will respond to the sound

of water flowing through an underground pipe, wrapping themselves around the pipe, below ground—as if seeking to get access to water.

Scientists are investigating plants that make a type of clicking sound at the root level. They believe there is some type of communication taking place through clicking sounds that are interpreted by other plants. All of these examples provide evidence that plants have the capacity to hear and interpret sound. With hearing added, we see that plants share the five commonly recognized senses possessed by humans and many other animals.

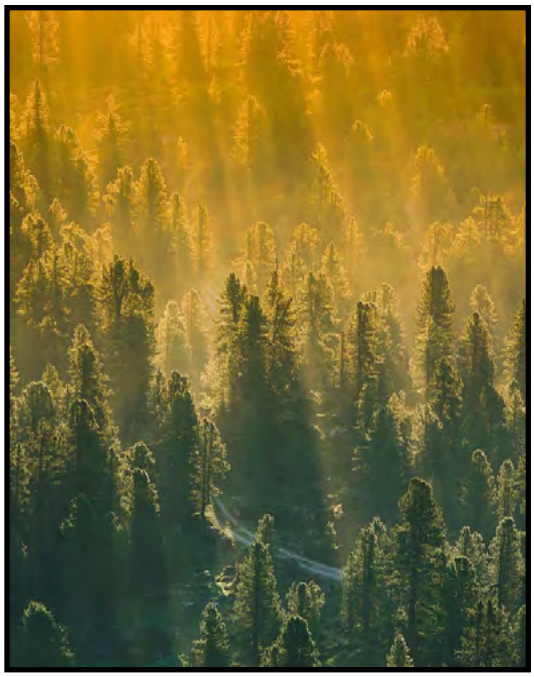
Other Senses

Beyond these five senses, plants have several other senses, including a sense of gravity. Shoots will always grow upwards and roots will always go down. There's an intelligence in plants that will make sure that the stem grows up and the roots down no matter how you position or plant the seed. So, they can sense gravity. Plants also have other senses which allow them to sense humidity, water, and oxygen.

Like humans, plants use their senses to assess their environment, particularly to identify nutrients or food. Since plants can't move, they seek out nutrients in the ground they're in. When they identify nutrients in the soil, they shoot out roots to get access to it. For carnivorous plants like the Venus flytrap that typically exist in more acidic soil where appropriate nutrients aren't as present, they get their nutrients from the animals they eat.

Like with all living things, self-preservation is a biological instinct. So, let's look at plant self-defense. As noted earlier, plants put out chemicals to deter herbivores. The acacia tree is an example. When acacia trees are being grazed by antelopes, they emit tannins. Tannins are the bitter stuff in teas. Acacia trees will put out tannins to make themselves unappetizing. There is a scientific report showing that, in at least one instance in a

The roots of the banyan trees at Angkor Wat are now an integral part of the temple structures, paradoxically holding some parts of the ruins together while also compromising the ruins' structural integrity.



Coniferous trees like the pines seen here are among the oldest types of trees on Earth, with some species having existed for hundreds of millions of years.

South African game reserve, the trees put out enough tannins to kill multiple animals in a herd of antelope.

Plants also emit chemicals to attract help. When certain corn plants are being eaten by caterpillars, they'll emit a chemical that attracts wasps that eat caterpillars. They're not the only example. Just imagine: the caterpillars come along and the plants put out a call and help comes just like in *Star Wars*, but it's to kill a bug. More broadly, plants very often communicate with one another when being attacked by a pest by issuing chemical signals to one another, a behavior often seen among forest animals who employ certain calls when a predator appears.

Plants also communicate at the root level. There's an enormous underground communication network between plants. In a forest, there are literally miles of underground connections between the trees. Scientists have called this the WWW—the Wood Wide Web. There are also fungal connections linking trees. Below the surface of the soil there are enormous fungal colonies. They connect plants at the root level and there are exchanges of information and resources, such as water and nutrients. Research has also shown that in the sharing of resources, plants will favor their own kin, although not exclusively.

One example is that larger trees will provide nutrients to smaller trees that are in the shade. If you look at the forest canopy, light is heavily blocked off. Trees in a shaded area don't get much sunlight. Yet a small plant needs solar energy to grow. In an example of resource sharing, some trees will provide through the root level, nutrients to smaller trees, until they get large enough to break through and get access to more light on their own. Another example can be seen with trees that stay green year-round. Evergreens will share nutrients with trees that lose their leaves. As leaves are the primary place of photosynthesis, without them, there isn't an opportunity for photosynthesis. So, evergreens have been shown to share resources with trees until the seasons change.

Let's further explore memory in plants. There are a couple of ways that we've already seen this. If a plant has been subjected to a particular pest in the past, for example an insect herbivore or a bacteria, they will more quickly produce appropriate defensive chemicals than a naïve plant that has never been exposed to that same pest. Somehow plants retain memory that they've encountered the threat before and respond more readily.

Just like our own bodies have antibodies that respond more readily because they've been primed by some past experience and will more immediately go in and attack what's putting our bodies in danger.

The Venus flytrap has memory and a seeming ability to measure time. There are three little hair-like elements on the top and bottom sections of the pod of a Venus flytrap. These are not the many tendril-like appendages on the outside perimeter of the pod that hold the animal trapped when closed. If an insect touches one of the hair-like elements inside the pod and then another within twenty seconds, the pod springs shut. So, the plant remembers that it's been touched once and if touched again within a 20-second time period, it closes on its prey.

The *mimosa pudica* plant that we discussed earlier is another plant that closes up. Scientists researched ways to see if the plants could be habituated not to respond. Scientists dropped a plant from a height of six inches onto a piece of foam and the plant closed its leaves in response. However, after four to five repeat droppings, the plant no longer responded by closing its leaves. The plant appeared to recognize that it was not in danger. A month later, when again dropped six inches onto the foam, there still was no response. However, if the plant was instead shaken, it would close its leaves. For at least a month, the plant retained the memory regarding the foam.

Plants can also recognize self versus non-self; they typically avoid wrapping around their own stalks. Also, they won't compete with their own roots and they don't compete the same way or try to block off their own offspring at the root level. So, there's a kind of recognition of a child-plant of the species.

Plants also make choices. For example, roots looking for nitrogen in the soil. A plant has to use energy to grow roots or stalks. Their resources are limited, so they use their energy just like we do—prudently. So, when a plant encounters

The reaction of the Mimosa Pudica *is called "thigmonasty," and it may help protect the plant from herbivores by making it look less appetizing.*

nitrogen in the soil, researchers have found that the plant is able to decide whether a patch of nitrogen, which might be very rich, is a better place to grow and invest by growing out more roots there, versus another patch. But what's interesting is that when one patch is not as dense but is increasing in density, the plant will grow out roots toward the area that's increasing in density, even though at the immediate point it is less dense than another patch. It's making a decision about how it's going to use its resources. Another example is that a plant will direct itself around obstacles. If a plant is growing roots down and encounters a stone or obstacle in its way, the plant will make a right or left turn rather than just remaining stuck there. It also seems that plants are able to discern an object before they actually come into physical contact, although researchers are not sure how they do it. But the plant will begin to turn to avoid the object. So,

they're making intelligent problem-solving choices.

In another experiment demonstrating plant choice, two plants were placed several inches apart. One had a weak type of stalk and the other was a tomato plant with a stronger stalk. In between the plants was a little seedling. The seedling was a parasitical plant. It latches on to other plants and gets resources from them. Using time-lapsed photography, the parasitical plant was seen growing toward the more favorable source, which was the tomato plant. Overall, the evidence shows that plants make choices and have the ability to solve problems.

There was a widely publicized book in the 1970s called *The Secret Life of Plants*. One of the book's subjects, Cleve Backster, was an expert in the use of the polygraph machine or lie detector. One feature of a polygraph machine is that it measures electrical conductivity based on the presence of moisture. In an unrelated experiment utilizing plants, he concluded that plants seemed to respond to thoughts directed at them. Based on his findings, he continued down this line of research. Later other scientists failed to replicate the experiments, so his hypotheses were considered to be debunked and lost attention. A TV program called MythBusters took up Backster's experiments with plants. In a video that appears on YouTube (https://www.youtube.com/watch?v=FhsbM9LxPAk), the program hosts set out to debunk Backster's work. They were surprised by some of the results. Backster did many more experiments with plants, pointing toward plants being much more sensitive to the consciousness of other entities around them than we humans generally are cognizant of ourselves.

If you find the subject of the intelligence manifesting in plants intriguing, there are lots of books on this subject. Ultimately, for the mystical student, the emerging scientific insights lead us back to our recognition of the Oneness of the Cosmic Consciousness in all things.

The Sonoran desert provides unique challenges to its plants, with temperatures capable of ranging 50 degrees in a single day, and parts of it getting only 3 inches of rain per year.