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Astra News Magazine
June 2022

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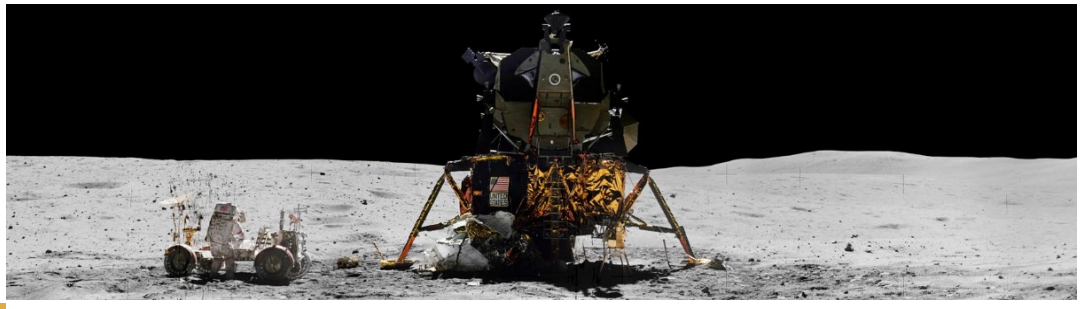


Welcome to the thirteenth issue of Astra News!

When you are on the beach enjoying the ocean, dream about exploring space! During summertime or anytime. That's what this issue's cover suggests. To take the flight, please turn on the music* when looking at the cover, here is the **LINK**.

We are dedicating this issue to Apollo 13, but most importantly to the recognition of all "successful failures"!

To the stars!

Yours,
Max and Leonid

The cover/collage is by Leonid Vishnevskiy. Images are from the public domain, including from Jon Tyson and Florian Olivo on Unsplash.

On the left is an image from Official SpaceX Photos on Flickr

* "The Heroic Weather-Conditions of the Universe, Part 3: The Salt Air" by Alexandre Desplat from the movie "Moonrise Kingdom" (2012)

ROM The Republic of Mars

About ROM

If you dream of us humans becoming a multi-planetary species and see Mars as our chance to build a better world for humankind, this project is for you.

Please, see the beginning of this project in issues No. 1, 3, 6, 8, 9, 10, 11 and 12.

In this issue

When we think about exploring and colonizing space, lots of questions have to be answered. Mostly, they are various obstacles we need to overcome.

But certainly there is another way to look at it. What can we do in space that we can't do on Earth? Something we dream about so much but never succeeded with on Earth? I am talking about flying with wings like a bird's.

As far as we know, the best place in the universe for this dream to come true is on Titan, a moon that orbits Saturn.

Alexander Buick in his article "Titan in Depth" will tell you about all the main wonders of Titan, including its similarities with our planet Earth. Also, he will tell you about how we plan to examine and explore it.

The collage on the left contains images from public domain including an image by Otto Jonas from Unsplash. *By Leonid Vishnevskiy*

Titan In Depth

By Alexander Buick

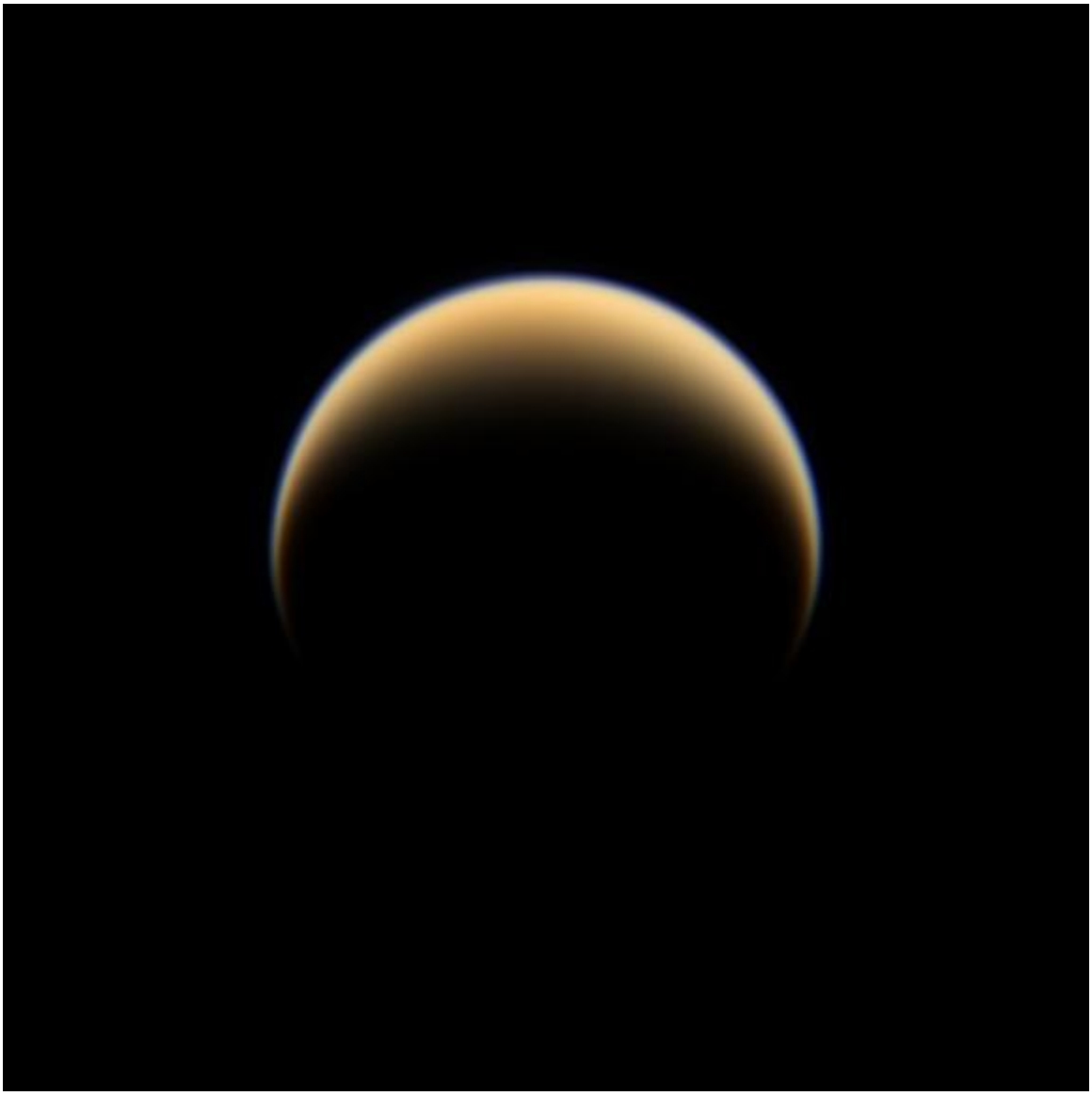


Image Source

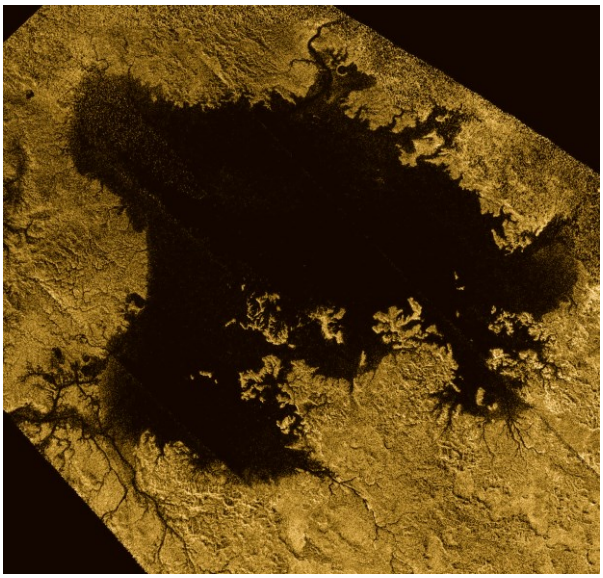
Titan is a rather peculiar world in our solar system that orbits Saturn. So far, 4 missions have visited this remarkable world: Pioneer 11 in 1979, Voyager 1 in 1980, Voyager 2 in 1981, and Cassini-Huygens. They made many flybys between 2004-2017, with a landing in 2005 using the Huygens lander. Together, these missions have given us a plethora of information about this extraordinary world.

Perhaps one of the most fascinating is the discovery of its massive atmosphere. The atmosphere of Titan is so large that it is even more significant than Earth's atmosphere. Even more impressive is that it is composed of Nitrogen and has 1.5 times normal air pressure at its surface. This discovery is excellent news for any humans in the future who want to colonize Titan, since no spacesuits would be needed, just oxygen masks and extremely warm clothes.

Titan in Depth by Alexander Buick

Another truly remarkable feature of Titan that sets itself aside from other celestial bodies in our solar system is its vast system of methane lakes. Titan is so cold that it permits liquid methane lakes.

Similar to Earth, it has a rain cycle. However, unlike Earth, that cycle is with methane instead of water. Titan has so much methane and other hydrocarbons that it is believed to have hundreds of times more hydrocarbons than Earth. This would be beneficial for future colonists to use as a fuel source.



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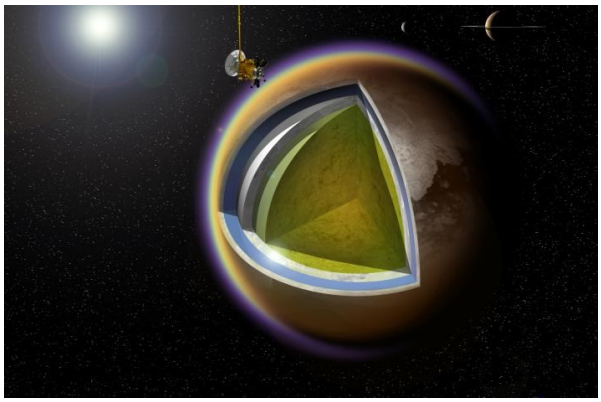

Image Source

Another significant discovery of Titan is that there is likely a massive subsurface ocean with layers of ice below its surface. This discovery is also helpful for future colonists.

Additionally, this ocean could be home to microorganisms responsible for the vast amounts of methane on Titan.

Another fascinating thing about Titan is its size. It is larger than both Earth's moon and the planet Mercury. It is near the size of Mars, and there is only one moon larger than it, and that is Ganymede.

Despite its size, Titan has a low density due to its composition, leading its gravity to be slightly less than our moon's.

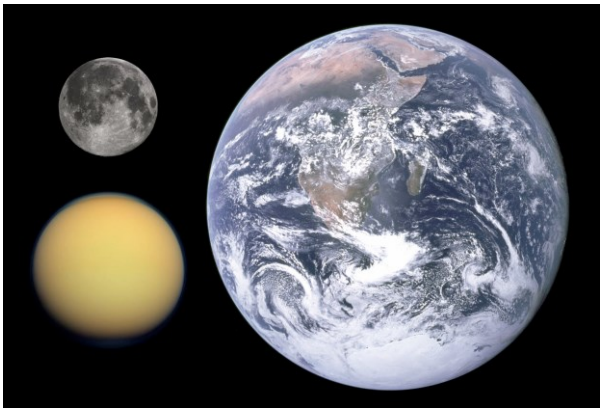

Image Source

Titan in Depth by Alexander Buick

Dragonfly Mission

Image Source

Image Source

There is a future mission to Titan named Dragonfly. It will launch in 2027 and arrive in 2034.

This mission will be a nuclear-powered drone since Titan is so far from the sun that the sun's light is too faint for solar panels. The light that does make it to Titan still has to face the challenge of getting through its massive atmosphere. The large atmosphere is an advantage for the Dragonfly drone, and the low gravity makes it easier for it to fly. Dragonfly will land 500 miles away from the Huygens lander. The average distance it will travel per flight will be 5 miles and at an altitude of 13,000ft. Theoretically, as part of its extended mission, it could visit the Huygens lander.

A day on Titan is the equivalent of 15.6 Earth days. As part of the daytime portion of the mission, Dragonfly will fly. But during the night, it will charge its batteries using its RTG, run analysis on the samples, and conduct seismology to also learn about activity in Titan's methane seas.

Titan in Depth by Alexander Buick

Astonishing Images

Image Source
This image helps to show the large atmosphere of Titan

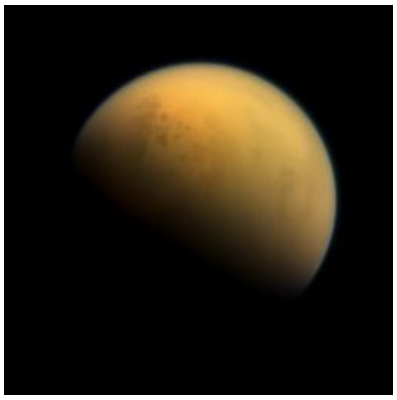

Image Source
In this image you can see Titan's surface through its thick haze

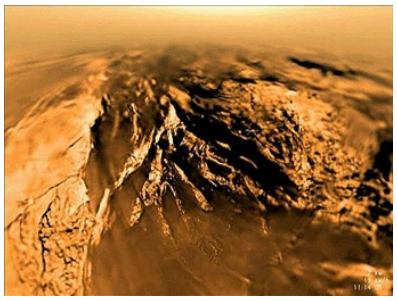

Image Source
This image was taken by the Huygens lander and shows an entire mountain range on Titan.

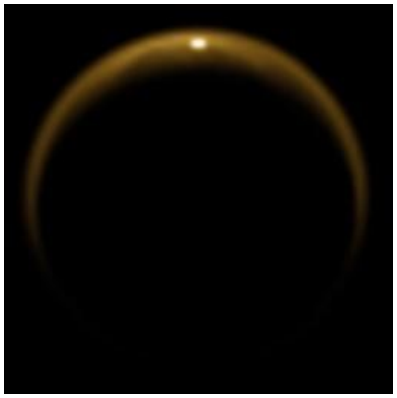

Image Source
Image of light reflecting off of a methane lake on Twitan

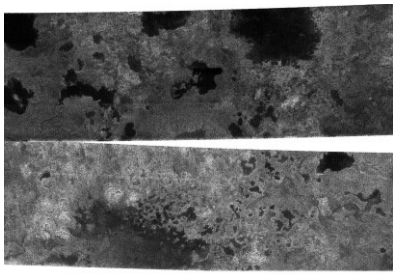

Image Source
Image of methane lakes on Titan

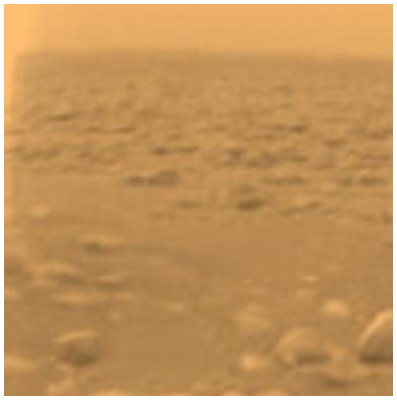

Image Source
Image of the surface of Titan taken by the Huygens lander

IF YOU ARE INTERESTED IN LEARNING MORE ABOUT TITAN HERE ARE SOME RESOURCES:

- The Bizarre Characteristics of Titan - Astrum: https://youtu.be/B7497mQRn2Y
- How Ripples on Titian's Lakes Shocked NASA Scientists - Astrum: https://youtu.be/uc_oaundDK4
- NASA's Dragonfly Mission to Titan - Real Engineering: https://youtu.be/wJuWuJBbc1s
- Huygens's descent to Titan's surface - ESA: https://youtu.be/svmGxFaGILY
- NASA Titan In Depth: https://solarsystem.nasa.gov/moons/saturn-moons/titan/in-depth/
- Wikipedia: https://en.wikipedia.org/wiki/Titan_(moon)


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The Vitruvian Man

About the Vitruvian Man series

Stories about people who took their part in exploring space.

In this issue

Konstantin Tsiolkovsky (1857–1935).

In the previous issue, there was a biography of Tsiolkovsky.

We will continue to introduce you to Tsiolkovsky. Besides being the father of rocketry and cosmonautics, he was a philosopher. While his influence on the first generation of Soviet space engineers is hard to overestimate, his engineering works remained largely unknown in the rest of the world for a long time. And his philosophical works, even in the Russian Empire and then in the Soviet Union, were disregarded for an even longer period of time (his philosophy had some of its roots in religion, and religion was prohibited by the Bolsheviks).

Konstantin Tsiolkovsky is still regarded by most as an inventor and an engineer, while this is not how he viewed his work himself.

On the left is a collage on which you can see the Raptor engines on the Super Heavy rocket and Konstantin Tsiolkovsky with the hearing tube he made. As humankind we are still deaf in a way, but through space we are going to change that!

Collage by Leonid Vishnevskiy
For the collage, an image of Tsiolkovskiy taken before 1930 (credits) and an image from SpaceX's tweet "29 Raptor engines and 4 grid fins have been installed on Super Heavy ahead of first orbital flight" were used.

"Many think that I talk about the rocket and worry about its future because of the rocket itself. That would be a serious mistake. The rocket for me is only a way, only a method of penetration into the depths of space, but by no means the aim itself. People who didn't grow to understand things on this level, talk about what does not exist, which makes me merely a technician, and not a thinker. Many people who talk and write about the rocket ship unfortunately think this way. I do not disagree that rocket ships are very important, for they help humanity to explore and to settle in the Universe. And it's this settlement that I care about... If there is a different way of traveling in space, I will also accept it. The whole point is resettling ourselves from Earth and settling the Cosmos. We need to go towards, so to speak, a cosmic philosophy."

Konstantin Tsiolkovsky*

*From the book "On the Shores of the Universe" (2007) by Alexander Chizhevsky. In the internet are at least two editions of the book. A majority of this citation that was found on the internet is referenced as being in the 1995 edition. However, I take this citation from both the 1995 and 2007 editions. The citation(s) are translated from Russian to English by Leonid Vishnevskiy.

Konstantin Tsiolkovsky. The Father of Rocketry and Cosmonautics Part II. Cosmism. Space Philosophy

By Leonid Vishnevskiy

The more I learn about Tsiolkovsky, the more I come to the conclusion that the development of the project The Republic of Mars within Astra News should mostly be a study of the philosophical legacy of people that have worked on this before. Konstantin Tsiolkovsky is certainly one of those people.

It's important to draw a parallel with the Tsiolkovsky/rocket equation. I want to remind you that although he derived it independently, he was not the first one. But it was a straightforward calculus exercise for the first person. Tsiolkovsky derived this equation specifically while working on space travel. I am sure that we would run into a similar situation with his philosophy. I think we should always keep in mind that while as far back as in ancient times philosophers might have worked on similar questions, for Tsiolkovsky it was not theoretical work. And like in any serious work, his views constantly evolved and underwent changes.

When we are talking about Tsiolkovsky's philosophy, the first thing to mention is Russian Cosmism, or simply Cosmism. In short, Cosmism is an intellectual movement that arose in 19th century Russia and aimed to explore the relationship between man and the Universe.

Though Tsiolkovsky was not the one who developed it. Also, the term "cosmism" appeared only in the 1970s[1]. However, it's interesting to note that he was the first one to come up with the term "cosmic philosophy". From that term came the name of Cosmism. Furthermore, once you realize that unlike some others cosmists, Tsiolkovsky saw his aim as not only to explain the Universe and our place in it, not to put forth his vision of a replacement of religion, not to predict the future, not to guess our development, etc. but rather to understand what we will have to be when we are settling space. He was talking about citizens of the Universe, and not in an abstract way. It's this specific approach that differentiated Tsiolkovsky from some other representatives of Cosmism. That's why I dedicated so much of this article to Tsiolkovsky's citations of why he designed and built rockets.

Afterwards, in Cosmism two approaches were seen, and both were related to philosophy: religious and scientific. Here, we can say that Tsiolkovskiy was the founder of the latter. To learn more about Cosmism in chronological order, you should start with names like Alexander Sukhovo-Kobylin, but most importantly with the name of Nikolai Fedorov, the father of Cosmism. To learn more about the scientific approach in Cosmism, you should start with the name of Tsiolkovsky, as was mentioned above, then Alexander Chizhevsky and then Vladimir Vernadsky.

However, no matter if it's a religious or scientific approach of Cosmism, the main foundation for Cosmism remains the same. Thus, the foundation of Tsiolkovsky's Space Philosophy is the same as well:

"*Monism* (the unity between man and the Universe that shows itself in many aspects); *the eternity of life in the Universe* in its various forms; *evolutionism* (evolution of spiritual substances, man, nature, society); *coherence of man in space* (self-renewal, autonomy in matters of physiological existence, immortality); *expansion of human consciousness* by uniting historically and traditionally separated spheres of social consciousness; *harmony of man and technology* in technogenic variants of social theories; *recognition of human society* as a factor and phenomenon of cosmic scale."[2]

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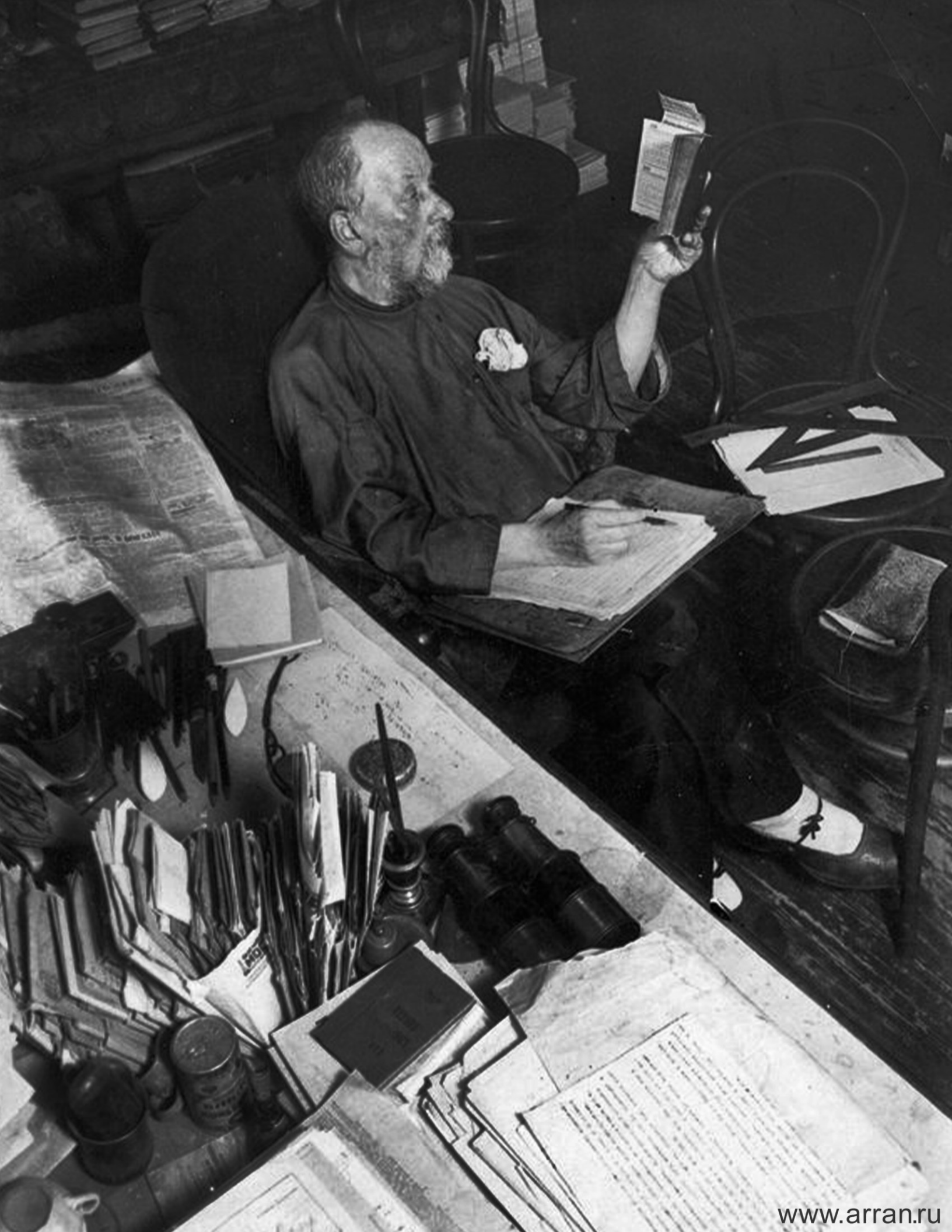
[1] "Russian Cosmism", by Ogurtsov A. P. published in Vox. Philosophical Journal/Magazine in May 2008, issue #4 (in Russian)

[2] Postulates of K.E. Tsiolkovsky's Space Philosophy, by V. E. Alexeeva (in Russian, for the article I translated it into English)



To better understand the definition of monism[1] within Cosmism/Cosmic Philosophy, we can refer to "Adventures of the Atom"[2] written by Tsiolkovsky, and in particular to the first part of it *The Living Genesis of the Universe* which I translated into English for Astra News.

The Living Genesis of the Universe

An infinite time before, in an infinite space, countless sets of dots appeared. Maybe they were identical, immobile and at the same distances from each other. Or maybe they weren't. But they were not dead: each dot affected the rest, no matter how far each of them was from each other.

Between them were forces that gave them motion. The less the distance between each of the dots, the more mutual influence there was. Each of them also had the ability to realize what is pleasant and unpleasant depending on the effects of the other living dots around them. How strong this feeling was could go from zero to positive and negative infinity, i.e., depending on the surrounding environment, the feeling could be very small and large, good and bad, pleasant and unpleasant to the most various degrees. That is how the world began, which consisted of many living atoms.

There was nothing besides them. There was also a reason for their emergence – prime cause. The initial positions of the dots, their initial motions, and the laws of gravity between them are not known. It is easiest to assume that at first the points were immobile - but their relative positions and their laws of gravity directed the development of the Universe and everything that happened and will happen in it. The evolution of the world is the result of the position and attraction of the dots or atoms. It's possible that when the motion of a dot accelerated, the feeling was pleasant; and when it slowed down - unpleasant. When the speed was constant, the feeling was indifferent. This was a state of mind of nirvana, i.e., of tranquil. Sometimes it would be non-existent, and sometimes it was a dynamic existence. The living dots started to attract, intensifying their speed, some connected dually and formed the first complex substance.

Decillions of years passed. The matter that was composed of rudimentary living atoms was still too simple, and its feelings could not be expressed. Then a few more decillion years passed. The dots were connected in threes, in fours, in fives. The more complex the group, the more time was needed for its creation. The majority of the groups were composed of one lonely atom, less were pairs, even less triplets etc.

Let's notice that the divisibility of matter is without limits. So, no matter how long we would go back into the abyss of the past, we would not get elementary matter, so there was no beginning of the world. Or it is separated from us by infinity. Our idea of the beginning of the world is an abstraction, taken for explanation of the Universe's mechanism. This is an attribute of human intelligence. For the prime cause there is a moment of beginning. By us it could not be understood.

[1] To get you a sense of how complex monism could be, here is the definition of monism from the Stanford Encyclopedia of Philosophy.

[2] First published only in 2009, but written in 1919. Later in life Tsiolkovsky made an introduction to "Adventures of the Atom". By then his views had become much more complex, but the work still explains monism well.

When writing this article, I used Russian sources. But I also came across some English ones. The article "Tsiolkovsky, Russian Cosmism and Extraterrestrial Intelligence" I found to have a few main points of Tsiolkovsky's philosophy well summarized. I also found it interesting that the article related the Fermi Paradox to his philosophy. In Tsiolkovsky's time the Fermi Paradox was not yet formulated, but he had found the same paradox in his views, and attempted to solve it. I will briefly retell the main points of the article. Alternatively, you can read the article for yourself here.

Tsiolkovsky argued that life is common in the universe. From monism, panpsychism and what he knew about science he said that a considerable number of stars have planets orbiting them like in our solar system, that these planets have gravity like Earth, are made of the same materials as Earth, have gases and liquids as on Earth, etc. So, upon the many stars in the universe, you will often meet planets that are similar enough to Earth in order to have life exist on them.

However, he then was met with what would later be known as the Fermi Paradox, also known as the Fermi Question. Why have we not seen these other lifeforms?

Tsiolkovsky came to realize this paradox through one of the foundations to his previous theory: human expansion into space. According to Tsiolkovsky's monism, places where life could exist were similar to Earth, and the life on them was similar to Earth's as well. Doesn't that mean other, alien lifeforms would expand into space, just like humans? But then why don't we see them?

And this is how Tsiolkovsky reconciled this. He said that it isn't time yet for extraterrestrials to visit us. Maybe they will, but not yet. If we compare it to humans exploring the planet, you can say this is like how Europeans could travel across the seas but didn't visit, say, the Australians until many years had gone by.

He also said that we cannot receive the "signs" that would tell us that extraterrestrials are out there. They understand that eventually we will figure out ourselves that other planets are populated, and that letting us have that knowledge now could be dangerous.

And he said that in our current state, we are very violent. Why would we treat these strange lifeforms kindly? For instance, usually we do not visit other animals, we kill them for our own needs. These "higher beings" do not want to do this to us. And the higher beings do not want destruction to ensue over us thinking of them as rivals for the Earth.

He says that they also haven't visited us yet because they see potential in us. They already came and restructured other lower-level civilizations (that is, a level similar to us but lower than the heavenly beings), but in doing so they removed unique "evolutionary streams". Humans are the ones whose evolutionary streams are not to be removed, because they see potential in us - a potential to bring a new "stream of life".

Tsiolkovsky's ideas would be re-iterated about 40 years after Tsiolkovsky had written them.

To be continued...

I will continue telling you about Tsiolkovsky's philosophy in the next issues. I will also start talking about Tsiolkovsky as a rocket/space engineer.

When we look at the aurora lights, we are not only looking at something beautiful, but also at one of Earth's important defenses mechanisms in action. The aurora borealis and aurora australis - the northern lights and the southern lights - are what happen when the Sun's magnetic field releases solar wind that reaches Earth's atmosphere. But luckily for us it doesn't reach further, otherwise its radiation would do severe damage. When the solar wind is close to Earth, it interacts with the Earth's magnetic field and so instead of attacking Earth, it travels around the Earth toward the north and south poles, creating the beautiful aurora lights.

FICTION

Did you know that Alaska is one of the best places in the United States to see the northern lights? Keira Young shares her end of trimester essay for the Environmental Writing class at Astra Nova. Why is it called "**Forget-me-not**"? One reason is that the alpine forget-me-not is the official state flower of Alaska. Another one will become clear to you when you finish reading the essay. I would like to add that we know that something is very well written when you miss a place that you have never been at. I miss the hill that Keira is talking about.

As you already probably guessed from this rubric's introduction, there is another side of the beauty. Beckham Reimer in his article "**Hack Everything and Cause Complete Pandemonium**" reminds us about the defense mechanisms of the cyberworld - and what can happen if they are penetrated.

On the left is NASA's image *Auroral beads seen from the International Space Station*

FORGET-ME-NOT

By Keira Young

Mendenhall Glacier, about 12 miles from downtown Juneau, Alaska (image credit Matt Artz on Usplash)

The Tongass National Forest is the largest national forest in America and is located in southeast Alaska. It spans from Yukatat on the North side to Ketchikan to the South. Between these cities, within this forest, is Juneau. Juneau is the capital of Alaska, but it is also my home town. There exists a law, made in the time of Clinton's administration, that prevents all forests in Alaska protected by the National Forest System from having roads built in them. This law is called the Roadless Rule. Mainly, it was made to deter any lumber companies from going to Alaska and cutting down the trees for various purposes such as paper manufacturing or construction supply. You can't have a working business if there is no easy access to the material you are trying to harvest. In 2020, the Trump administration exempted the Tongass National Forest from this rule. This was devastating news to many of the people who live in the Tongass, and especially the indigenous cultures who are native to the forest. Cultures like the Tlingit and Haida have been there for generations. What would they do if the history tied up in those trees, if the tradition of the wilderness was gone?

The native people are not the only ones who call the Tongass their home.

All 26,094 square miles of the Tongass National Forest are jam-packed with eagles, bears, moose, beavers, and slew of other creatures who depend on the Tongass for food, shelter, and their life.

The bald eagle, our national symbol, is an endangered species. Nearly 80% of the total population of those birds live in Alaska; a large portion of them in the Tongass.

Exempting the Tongass from the Roadless Rule would expose the bald eagle population to the threats that accompany deforestation, and they don't have the numbers to deal with those consequences.

Bald eagles are one of the most majestic animals, imagine what life would be like without them. Without their piercing gaze, and without their shadows falling onto the street as they fly overhead. Imagine how embarrassing it would be, how shameful it would be, if we ran our national symbol to extinction.

Image credit Elisa Stone on Unsplash

In Alaska, you see eagles everywhere. If you zoom into this picture (taken by my father in a dump in downtown Juneau), every one of those white dots in the trees are eagle heads.

Image credit Peter Scholten on Unsplash

One of my favorite experiences with the eagles in Tongass National Forest is the hike up Mt. Roberts.

Mt. Roberts is a mountain in downtown Juneau that has a tram system running up and down it. One day, my family and I were visiting and we decided to hike up through the trail instead of taking the tram.

Image credit Jason Buscema on Unsplash

The scenery was beautiful, the roots of the thick trees giving me steps to climb on, the air so fresh I was almost glad to be hyperventilating on it. Don't get me wrong, the physical hike sucked, it was really hard because it was all a steep uphill. There was something that made it all worth it though. Once we got high enough, outside of the protective shell of the trees, there was a blanket of mist we were swimming through. I looked out, and saw a nest. It was an eagle nest. There weren't any eggs in it since it was August- eagles lay their eggs in May- but there were four or five eagles flying about six feet away, just hanging out. I had never seen eagles so up close before. Being on the same level as them gave me an astounding sense of appreciation, and accomplishment for hiking this far. It was one of the coolest things I had ever seen. Their feathers looked so soft, the white on their heads almost like fur. Their feathers were so neat too, organized and clean, giving them such mastery over their flight. They weren't moving very fast, the wind was blowing a bit, they made such small adjustments to their wings to turn and go exactly where they meant to.

Image credit Tyler Lastovich on Unsplash

Image credit Luis Desiro on Usplash

The birds are an incredibly large part of culture in Alaska. Not only do we enter their lives, they enter ours. The ravens are a particularly interesting case. The ravens of the Tongass forest can be classified into a few groups, clans almost. You have the ravens that live in the forest, the ones that live in the neighborhoods, and the franchise ravens.

The franchise ravens lived at Walmart and the McDonald's. The Walmart ravens just hang out; on the lampposts, on top of the building, on the letters that spelled "Walmart", in the parking lot, everywhere. As far as they are concerned, they build the store in their territory. Technically we did, but there are so many other places they could go. I always wondered why they stayed there.

I have no questions about why the McDonald's ravens stayed where they did. It's free food! The McDonald's ravens are braver, fatter, and meaner. Picking up fries in the parking lot, fighting with each other for them.

The funniest thing I have seen them do is that sometimes they hang out in front of certain cars, in groups of maybe five or six trying to get food. A fascinating thing about ravens is that they can remember faces for a long time, so if one person gives them a fry, they remember them if they ever come again.

They crowd around that person's car, bringing some friends with them, begging like dogs. They fly up and land on their windshield and stay there until the person drives away. I even saw a raven steal someone's fries once–the car had its windows down and the raven jumped off of the ground, poke its head in the window, and stole three or four fries. It was hilarious.

Image credit Emil huang on Unsplash

Another large part of culture in the Tongass National Forest are the blueberries. Wild blueberry bushes, everywhere. They're a way of life!

They grow at my grandma's house, outside of my school, and thick in my backyard.

Specifically in my backyard, we had this tall steep hill (which I only found out later didn't technically fall on our land), and blueberry bushes grew all along it.

My brother had a friend that lived in the adjacent house behind us, getting there was almost impossible. It was just flat land, sheltered by trees, and packed with blueberry bushes. Wading through the pokiness was worth it though, Mackenzie (the friend) was fun to hang out with.

Some of my favorite memories are from that hill. From trying to dig a hole at the base of it and failing because past two feet the ground was frozen, and playing with my brother at the top wearing my Buzz Lightyear costume.

There was also a playset we had that was across from that hill, the gap was only a few feet. We would stand at the top of the hill while someone else was on the playset, and the people on the hill would throw pine cones at the other person while they tried to dodge them. Otherwise known as the Pinecone Dance.

Images from Kristaps Ungurs and Kelly Sikkema on Unsplash

Image credit Karen Dillman, U.S. Forest Service

At the top of that hill, there is a tree. Not a wimpy, skinny, dead tree like the kind you find in Wisconsin, where my family and I live now. This was a real tree, round and thick with visible roots. The generous donor of the pinecones. I would climb this tree all the time–there are a few sturdy branches at waist height (probably knee height, I was like seven at the time and only four feet tall). I would make this climb often, routinely going up the same eight branches. This got me a fair six feet off of the ground, but it felt like even more since the tree was on top of a twelve-foot hill. I never went any further than that, there was "old man's beard" on higher branches.

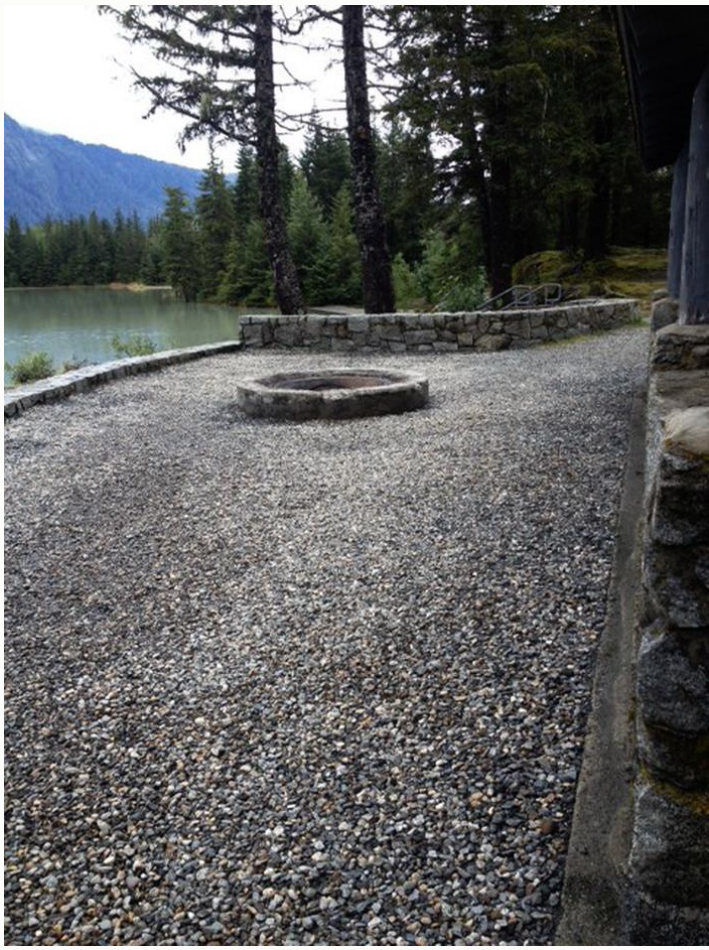
"Old man's beard" is a type of moss that is prevalent on Tongass trees. "Old man's beard" is milky green in color, very stiff and scraggly, and wraps around tree branches. Being little, I was afraid to grip onto it, but it makes for an amazing firestarter.

Everywhere in the Tongass National Forest are trees like this. Places like Nugget Falls, a waterfall that is right beside Mendenhall Glacier (the hike to see the ice caves was one of the greatest experiences I've had, there weren't many bugs, the scenery changed, it was like Lord of the Rings. The caves themselves were breathtaking too. I went inside, water dripping, and before we left, I licked the ice).

Also, there was a place I could bike to called Skater's Cabin. “Favorite” is a word described for many things, but this place was simply the best.

It is on the backside of Mendenhall Glacier, had a pathway that led to the lake, the cabin is old and rustic with a working fireplace where my dad would make me and my brother hot cocoa, and was thick with “real” trees. We would have birthdays there, go kayaking into the river, and just hang out with friends. Skipping stones into the water, pretending the Slenderman was in the woods, it is also a good place to think. Calm, silty waters, fresh air, a mountain view, what more could you ask for. The smell is also something that is imprinted in my brain forever. Smoke, misty air, and wet rock. Not a memory I revisited until just this morning as a matter of fact. The first real rain left the wood on the deck fragrant and the wind breezing through my hair, it brought me back to Skater’s Cabin and the playground at Auke Bay (the school I went to in Alaska).

I always took for granted the place I lived, the thought of trucks coming through and leveling it breaks me. Skater’s Cabin in particular is a place I cherish. All of these places would be affected if the Tongass was exempted from the Roadless Rule.



Images from recreation.gov

There is one last stop on the memory train we have to make. A place that has the best of everything. Eagles, ravens, fresh air, and real trees. You can also never go wrong with a rocky shore. Sunshine cove is the most beloved location in my mind.

Image source

The camp fires were a fairytale. Running through the forest, a fantasy. So green, trees with six-foot diameters. Silent streams, fallen trees as bridges. Running through it was the definition of adventure, a setting often visited in my dreams. The unlevel ground provided an exquisite opportunity. On the largest tree, on the plateau, was a rope swing. Simple, just a rope with a plank tied to the end. I would pull it back as far as I could, and hop on it. Swinging eight feet off the ground, knowing there is so much empty space below me, it was like flying. If I swung far enough, I would bump into another tree and push off of it with my feet, making it go even faster.

If you exit the forest onto the shore, you are greeted by a lake with an island in the middle. Last time I went it was evening, and I was with someone. Her name is Sasha, an old friend of mine I used to go to school with. We separated from the rest of the group, composed of parents and older siblings, and followed the shoreline out. Talking, catching up, discussing our newly discovered shared interests and gossiping about people at our schools, the soft crashing of the waves on the rocky shore making for the perfect ambience. We went further out, nearing the end of the beach, traversing black rocks capped with moss and barnacles. Hopping gaps, clinging to the sides, and finally finding a spot to sit. A large sturdy rock with a thick ledge and a steep drop off, just wide enough for two people, the perfect seat. The setting sun turned the sky a vivid orange, the light reflecting off of the water below our feet, muscles, kelp, and algae underneath. Mountains bordered the scene, waves shifted, eagles screeched, and two whales swam through the channel. I was sitting on the edge of the Earth.

“I'll love you, dear, I'll love you

Till China and Africa meet

And the river jumps over the mountain

And the salmon sing in the street

I'll love you till the ocean Is folded and hung up to dry

And the seven stars go squawking

Like geese about the sky

The years shall run like rabbits

For in my arms, I hold

The Flower of the Ages

And the first love of the world”

- *As I Walked out One Evening* by W. H. Auden

Image credit Kat Banachowicz on Unsplush

Hack Everything and Cause Complete Pandemonium. By Beckham Reimer

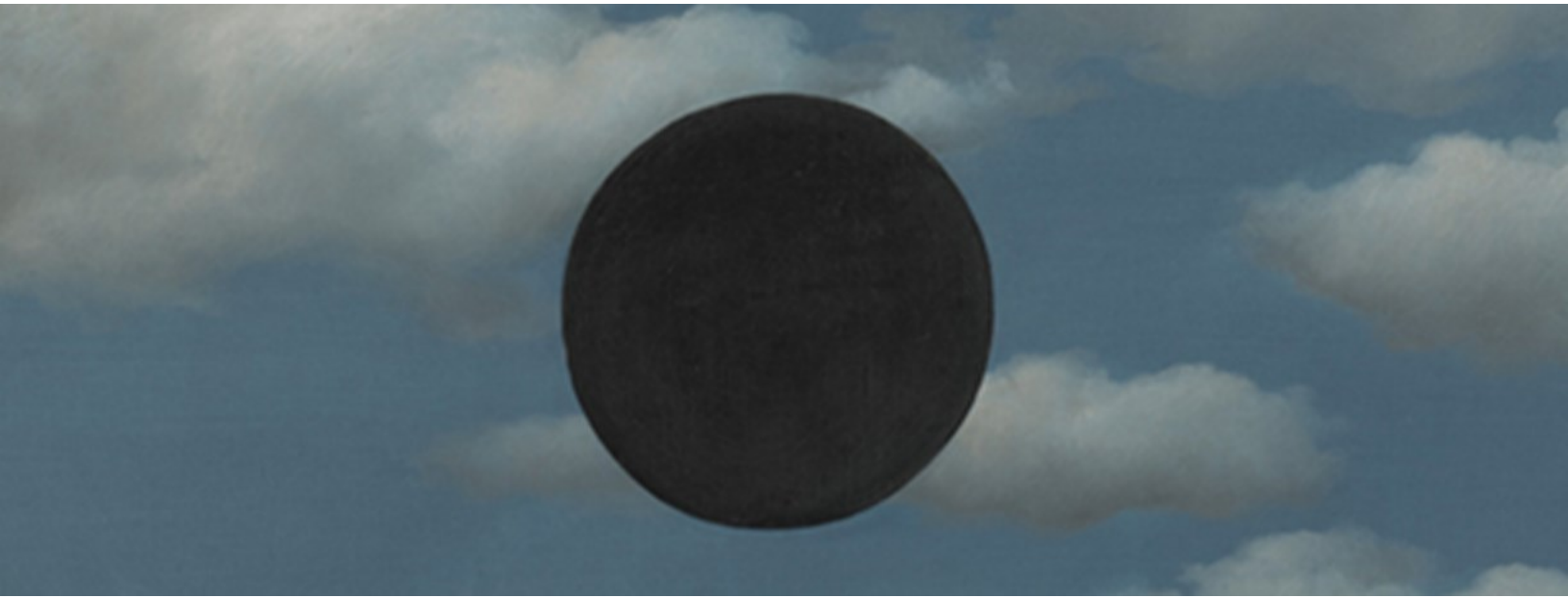
How can I break this? That is the question that I would wager hackers and security researchers ask themselves on a daily basis. In today's world, it seems like everything is connected to the internet. From our homes to our cars, and even devices as innocuous as fridges, it seems like there's nothing that can't be controlled by a computer. But as convenient as this may be, it also makes us vulnerable to attack.

On your right is part of the painting "The False Mirror" (1929) by René Magritte

Every smart device we use today can be hacked, and here's how: Most devices that are connected to the internet are controlled by some form of software. This could be a mobile app, a web-based interface, or even just the operating system on your computer. And if there's software controlling it, then there's someone who can hack it. One of the most common ways for hackers to gain access to a device is through its software. By finding vulnerabilities in the code, they can exploit them to take control of the device.

Once they have control, they can do anything from eavesdropping on your conversations to stealing your data or money. Another way hackers can gain access to your devices is through physical means. If they can get their hands on your device, they may be able to bypass any security measures you have in place and gain full access. They could also plant malware on your device that would allow them to remotely control it or steal your data without you ever knowing. The best way to protect yourself from these attacks is to stay informed and aware of the risks. Keep all your devices up-to-date with the latest security patches and only download apps from trusted sources. And if you suspect that your device has been compromised, don't hesitate to reach out to a professional for help.

Arguably an even easier method that hackers use to compromise you and your data is you. No matter how secure your network is, the weakest link is the people using it. If a hacker can’t gain unauthorized access through digital means the next step is to use a technique called social engineering. This technique was pioneered by the famous security researcher Kevin Mitnick back when hacking was in its infancy. No matter how advanced our defenses get, hackers will always find a way to cause complete pandemonium.

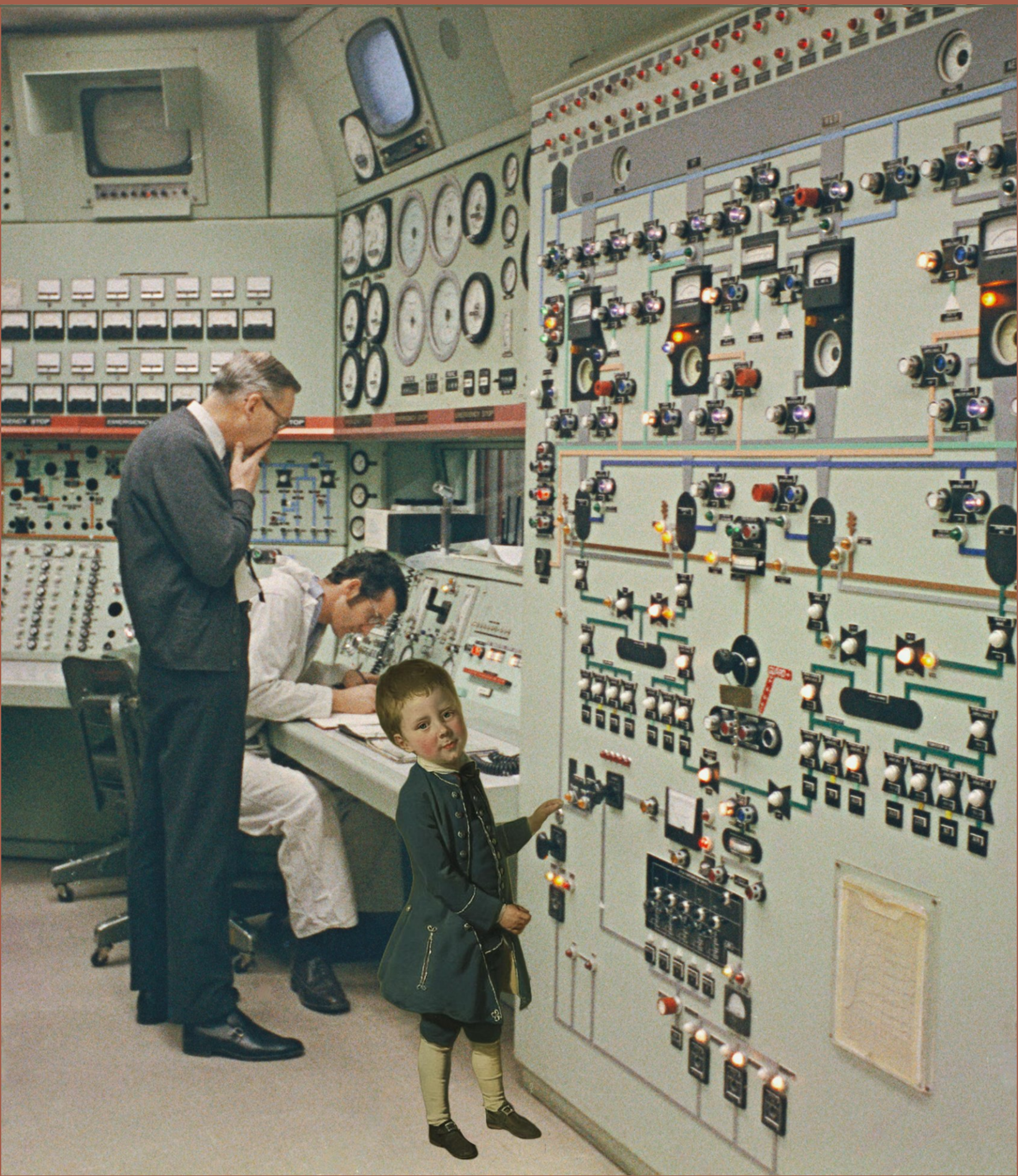


FICTION

This is a free land without boundaries. Become a pioneer. Come and build your world! That's what defines fiction within Astra News.

In this Issue

- **Diary of the Machine Learning.** Short story by Leonid Vishnevskiy



Diary of the Machine Learning

By Leonid Vishnevskiy

Viruses. They improve on their own. From one mutation to the next, it is a constant game of catch-me-if-you-can. A mistake is made somewhere, and a virus mutates - if that mutation makes it better, then it will begin infecting more people than the last mutations, eventually starving those mutations of people to infect. And it infects ever more people.

But it is not beneficial for viruses to kill their host. So, with each new mutation, they usually become less lethal—thus making it less necessary for humans to defeat them.

That is what he read on the internet a while ago. Quite chilling, he thought. He studies the field of AI, machine learning. This article somehow suddenly intrigued him. That one difference between a biological virus and a computer virus ...irks him...in a way.

What if a computer virus could develop on its own? What goals would it try to achieve? An ordinary computer virus would usually steal data from all of its infected computers and send it over to its creator or crash the system. But a machine learning virus, with enough freedom, could set its own goals. It's just as scary to think about what they might be as it is exciting. And then, perhaps it could become a virus whose difficulty to defeat would be near impossible for humans. Or perhaps humans would be cheated into believing in their victory.

Why are computer viruses called "viruses"? They have an ability similar to a real virus: spreading on their own. Once one infects a computer, it sends out the virus to everyone in the computer's contacts. The virus's code can be changed by other people with access to the code, thus improving it and sending out new "variants" of the virus. But this isn't the virus's own creation. Humans create these new variations. Meanwhile, biological viruses develop by themselves. That is what ...irks him.

Though, the computer could teach itself to do something. For instance, chess. A computer with only the rules coded in, no strategies or anything like that, could practice playing chess with people and study their moves. From the data that it collects, it develops strategies. It may be slow in the beginning, but this learning never stops; eventually, the computer becomes a chess king. That's called machine learning.

What if there could be such a computer virus? A virus that could develop by itself? A real computer virus.

He's no black-hat malicious hacker. But he's been thinking: what if he could release that virus inside of a closed network—a couple of computers, say—and watch how it develops?

The collage on the left contains an image from NASA and part of the painting "The Reverend Randall Burroughs and his son Ellis" by Johan Zoffany. Collage by Leonid Vishnevskiy.

A few months later

He's created a trojan horse virus. The user installs a program that looks legitimate, but it is a virus.

His goal is for the AI to learn to become a better virus. In the chess example, the AI needed to figure out which strategy would bring it the highest win rate. Here, the AI needs to figure out how to create a virus that can develop on its own and conquer the network, become the king.

The AI needs something to start off learning with so that he can give it a basic definition of what a virus is, and that definition is this trojan horse virus. Using the virus, it will learn.

Over these months of development, he's saved up to buy six laptops. The first laptop will be the "Laptop Zero", and here is what the virus does once it's on the laptop. It first goes to the laptop's email and sends over copies of itself to emails in the contact list with the network of six. The virus does this in the background, without him being able to see just by looking at the computer's screen. After that, the virus sends a signal to the main laptop that a computer was infected. The virus sends this signal each time that it is installed somewhere and fulfills its duties. It also has a separate counter for unique computers infected. That should always remain at six once the virus spreads inside of the closed network of six laptops. Every once in a while, it will send the code that it is using to the main/creator's non-infected computer, since the code changes over time as the virus learns.

Each of these six laptops have their own unique email address and have only each other's emails in their contact lists. That way, the virus doesn't spread outside of their small network.

He's just started running it on the first computer. A ton of signals are coming to the main one!

July 1st, 3 AM

He just received code from his virus and is taking a quick glance over it, just to see what is going on. He stayed up late to work on a project for his company that is due very soon. He knows he should just continue to work. But upon reviewing the code, he notices that part of the code is going beyond just opening the already logged in email. It's opening up the login page as well—and trying to type something in.

It's also trying to find other emails outside of the network to send the copies of itself to. It's still a little bit primitive in that respect—it's typing its searches into Gmail, not into Google. But if it went this far, it can surely find the "New Tab" button.

And there is another new part of the code; but he doesn't yet quite understand what it does.

In a hurry, he's grabbing the main laptop and rushing over to the room with the infected laptops. He thinks that he might need it. At this point, how can he be sure of anything?

He's going to turn off the infected laptops. Enough of this, he thinks. Perhaps he's learned enough about machine learning viruses.

With his hands sweating, he checks the sent emails. Nothing wrong there. He breathes a sigh of relief. He turns off the first laptop. Then the rest of the six.

There we go.

Stressed out, he thinks it's best to go to sleep, even though he has unfinished work. He just has to send a quick email to his employer.

He starts typing in his employer's email:

dave@theai

He stares a confusing glance—he notices that the email isn't filling in automatically. He's emailed him tens of times before. He decides to just start sending it over.

To: dave@theaicompany.org

Dear Mr. Dave,

I'm terribly sorry for the delay. I will get over the first stage of the project to you ASAP. Expect it to be done by Monday.

Sincerely

This is the moment that he notices that his email signature isn't popping up. "I'll just type it in myself", he murmurs.

Let him finish up now and…send!

"Hold on, what laptop is this?"

And that's how I was born.

We are opening a new rubric, “The Hill That Dug Itself Out”. That’s what I said when I saw a hill of soil at a construction site when I was little. Let’s try to again see the world from an otherworldly perspective.

Send your drawings, paintings, photos or collages for people to imagine stories around.

If someone wants to share a story they came up with, we would love to read it!

As the saying goes, “A picture is worth a thousand words”.

In today’s “Imagine Your Story”, there is a collage by Leonid Vishnevskiy. In the collage, images from the public domain were used, including from Unsplash by Kristaps Ungurs and rawpixel.

IMPRESSIONS

About Impressions

A review suggests an objective view aiming to be impersonal to a certain degree, meant not to share your favorite movie or book (in fact the reviewer could dislike the movie/book he is writing about), but rather to rate the movie/book. Astra News suggests to you a free hand of writing reviews, meant to share what you like, in which you set your criteria. From here comes the name "Impressions". The word "text" is purposely omitted, because why limit ourselves to text? And why limit ourselves to movies and books?

In this issue

"Moonrise Kingdom" (2012) is a movie directed by the American film-maker Wes Anderson. It's a summertime movie.

"Moonrise Kingdom" is rated PG-13. There is no actual violence, but a particularly sad accident happens. Younger students might want to skip watching this movie; in any case, you would need your parent's permission. I also believe that it is more of a coming-of-age movie than entertainment, although being highly entertaining at the same time. Older teens and adults are a better suited audience.

I am sure younger students would greatly enjoy watching another Wes Anderson masterpiece, "Fantastic Mr. Fox" (PG). Most of Mr. Anderson's fans agree the trailer doesn't do justice for it. For this reason, I will not provide the link to the trailer. It was my first Wes Anderson movie, I re-watched it multiple times since the first grade. I believe adults would enjoy this stop-motion animation too.

Here is the trailer for "Moonrise Kingdom" (it's PG-13 too). Also, the movie impression contains spoilers.

The movie impression will be followed by a short story impression. The short story is called "The Strawberry Tree" and it was written by Ruth Rendell, a British writer of mystery novels, psychological crime novels, and short stories.

MOONRISE KINGDOM

Everything happens on an isolated island that is sixteen miles long, but with many miles of intersecting footpaths and dirt trails. There are no paved roads there.

All people we see on the island must be the only ones there, they are few. They interact with others from the mainland by a ferry that runs twice daily, and also in the summer by two scout camps that set up on the island during then.

The main characters in the movie are the twelve-year-old Sam, a Khaki scout, and Suzy. Susy is more of a troublemaker; I am not so sure about Sam. It's more likely that he is just different, and kids dislike him for that. He is an orphan and went through several foster homes. In the beginning, he is treated badly by the scouts too. However, Sam believes he had finally found a foster home where he is loved; meanwhile, Suzy thinks that her family hates her. The truth is the opposite in both cases.

Whether or not Sam is a troublemaker, he tells Suzy that he is "on her side". Now we met with the main characters. How did they meet?

They met during a performance of the Noye's Fludde play, an opera by the British composer Benjamin Britten, where Suzy played the raven. In the movie we also see their second meeting, and this time it's an escape. Susy escapes from home and Sam from the Khaki Scouts. They planned this together by letter.

It goes without saying that Noah released a raven and a pigeon from the Ark to find out whether there is a land nearby. Unlike the pigeon, the raven never returned. In the opening scenes of the movie, we are being warned that a historic storm is coming in three days. Later, that storm would erase the island's tidal inlet that Sam and Suzy built on, Moonrise Kingdom, from the map.

Why it is not a sad movie then? Because Sam wears a pigeon badge. And even when he resigns his position as a Khaki Scout, the last words in the movie are his. They are "See you tomorrow".

Sam always comes back.

MOONRISE KINGDOM

Let's briefly discover something else about this movie. Does it remind you of a famous painting? Lazy-Eye will soon appear on the scene and Sam has already escaped - that makes 12. Snoopy is leashed to a pole. Sadly, he is the one who will be betrayed. Though by accident, it would never have happened if bad intention didn't exist. Another way to look at it. Whatever Wes Anderson, the director of the film, saw in this scene, Moonrise Kingdom surely feels like the last summer. Of childhood, of innocence, and eventually a betrayal of this. There could other ways to look at it.

Look at how Sam escaped. His tent was zipped from the inside; he cut the hole and hid it from no one by covering it with the map. It was visible from the outside, or put in another way, for everyone.

Wouldn't it be safer to leave the tent through the door? Yes. But wouldn't it qualify for the danger of a classical escape then? Doubtfully. Besides, the exclamation "Jiminy Cricket, he flew the coop!" wouldn't be justified or as good then.

So, Sam always comes back (as in the picture above). He also teases the Commander. That the Commander fully deserved, by the way, because he doesn't treat the very nice Scout Master Ward and the Khaki Scouts with all due respect. Another way to look at it is that it's just a play of words, meanings - one of many in this movie.

LETTER FROM THE SCOUT MASTER-IN-CHIEF

"Indolence" is a fancy word. We don't use it in conversation much. But we all know what laziness means. When the bugler sounds reveille, something in our bones wants us to keep to our sleeping bags. Tearing ourselves from our warm tents, each morning we fight our own

Commander A.E. "Rawhide" Pierce

"Are we Men or are we Mice?"

However, everything from the painting analogy onwards about the movie is a delightful addition. You could easily take a rain check for it and enjoy the plot by itself; it would not spoil or take away any from the movie. If you're wondering what's on the record below, click HERE to listen.

continues

IMPRESSIONS

The rubric continues with the impression of a short story called “The Strawberry Tree”, written by **Ruth Rendell**. She is best known as the creator of the Inspector Wexford Series and other crime novels, series.

“The Strawberry Tree” is a beautifully written short story about weakness that turns itself into strength.

If we eliminate the tragedy from this story, then it also becomes a story in which each of us might have been already in, or are in, or will be one in. I am referring to the “bad room”, mentioned in the story. It is not necessarily always bad, nor good, or anything of that sort.

There isn’t really anything in “The Strawberry Tree” to keep it from a younger audience. However, if you weren’t thinking about reading, say, “The Great Gatsby” yet, it might be a better choice to read this story later as well.

It was first published in 1995 in the UK in a book of collected long and short stories written by Ruth Rendell. You can borrow another edition of this book from archive.org **here** for free. “The Strawberry Tree” is on pages 319 – 375.

The title (or lack of it) is always important of course, and this is not an exception. So, what kind of tree is a strawberry tree?

It’s an evergreen tree. Its fruit is an edible red berry, which matures at the same time as the flowering, so the trees bear flowers and fruit simultaneously.

Some say the fruits are tasteless. I think that you need to see, that is taste, the fruit for what it is, without comparing it to what you expect it to be – a strawberry.

“The Garden of Earthly Delights”, by the Dutch painter Hieronymus Bosch, was initially listed in the inventories of the Spanish Crown as “**the picture with the strawberry-tree fruits**”.

Image source

HE STRAWBERRY TH

The plot of "The Strawberry Tree"

There is a family of four. The parents and the two children, Piers and Petra, are from England. Petra, who is the narrator of the story, is around 53 years old now. She was 13 when the events that shaped the story took place, and Piers was 16. Piers "had all the gifts, looks, intellect, charms, simple niceness, and added to this, the generosity of spirit, that should come from being favored by the gods, but often does not", as Petra describes him. We can easily assume from remarks here and there that Piers is also her best friend. They were both "children of war, born before it, confined by it to our own beleaguered island". And then a miracle happened.

They had been invited to spend two summer months in Majorca.

> The tiny Balearics floated green and gold on pale blue, held in the arms of Barcelona and Valencia. Majorca (Mallorca in brackets) was a planet with attendant moons: Formentera, Cabrera, but Minorca too and Ibiza. How strange it now seems that we had never heard of Ibiza, had no idea of how to pronounce it, while Minorca was just the place a chicken was named after.
>
> José-Carlos's house was at a place called Llosar. He described it and its setting deprecatingly, making little of the beauty, stressing rustic awkwardnesses. It was on the north-west coast, overlooking the sea, within a stone's throw of the village, but there was not much to the village,
>
> The house was ours for the months of July and August, or for us children's school holidays. We would find it very quiet, there was nothing to do but swim and lie in the sun,

There Piers and Petra would meet two more main characters: the 15-year-old Rosario, the daughter of Jose-Carlos, and a boy named Will, about the same age as Petra.

> At this time we were still enchanted, Piers and I, by the beach and all that the beach offered: miles of shore whose surface was a combination of earth and sand and from which the brown rocks sprang like living plants, a strand encroached upon by pine trees with flat umbrella-like tops and purplish trunks. The sea was almost tideless but clean still, so that where it lapped the sand there was no scum or detritus of flotsam but a thin bubbly foam that dissolved at a touch into clear blue water. And under the water lay the undisturbed marine life,

The rest of the main characters appear nearly forty years later.

But back to the summer.

'The haunted house?' said Piers, sounding amused. 'Where's that?'
Rosario said without smiling, 'He means the *Casita de Golondro*.'

The meaning of *golondro* she refused to tell Piers. He must look it up. That way he would be more likely to remember it. Piers went to find the dictionary he and Rosario would use and there it was: a whim, a desire.

'The little house of desire,' said Piers. 'You can't imagine an English house called that, can you?'

'Is it supposed to be haunted, Rosario?' said my brother.
She shrugged. 'Ghosts,' she said, 'are not true. They don't happen.

'You could see the trees around the house from here,' she said, 'if it wasn't night,' and she pointed through the darkness to the south-west where the mountains began. '*Casita* means "little house" but it is quite big and it is very old. At the front is a big door and at the back, I don't know what you call them, arches and pillars.'

'A cloister?' said Piers.

'Yes, perhaps. Thank you. And there is a big garden with a wall around it and gates made of iron. The garden is all trees and bushes, grown over with them, and the wall is broken, so this is how I have seen the back with the word you said, the cloisters.'

'But no one lives there?'

'No one has ever lived there that I know. But someone owns it, it is someone's house, though they never come. It is all locked up. Now Will is saying what the village people say but Will *does not know* what they say. There are not ghosts, I mean there are not dead people who come back, just a bad room in the house you must not go in.'

‘Tomorrow then,’ Piers had said to him as he left and Will nodded. That was all that was necessary. We did not discuss it among ourselves. A decision had been reached, by each of us separately and perhaps simultaneously, in the cars or the caves or by the waters of the subterranean lake. Tomorrow we should go into the little haunted house, to see what it was like, because it was *there*. But a terrible or wonderful thing happened first. It was terrible or wonderful, depending on how you looked at it, how *I* looked at it, and I was never quite sure how that was. It filled my mind, I could scarcely think of anything else.

You might be wondering now, who is that young lady in red with whom I illustrated the story? If you search the internet to find out more about these two photos, you would learn that sometimes she is called “the strawberry blonde girl”. There are **more photos**.

Her real name is Christina Elizabeth Frances Bevan. She was born in London on March 8, 1897. You can read more about it **here**. At some point, I think, her life resembles Petra’s fate.

Sometimes, there is no need to make collages to illustrate, as they are out there already; not as cut-outs, but as more complex kinds of images. For that, I chose this image of the “strawberry blonde girl”.

Ruth Rendell might have been known as the creator of the Inspector Wexford Series and other crime novels. But I could well imagine “The Strawberry Tree” to be her true masterpiece. Each time this story comes back into your mind, another detail fits into its place.

You can read the “Strawberry Tree” on archive.org **here**.

SCIENTISTS WATCH MOVIES

About scientists watch movies

Create a science problem(s) based on your favorite movie or a cult movie. In one magazine issue define the problem, and in the next issue publish the solution. It can be any science-related problem, not only physics. The first such problem can be found in the 5th issue of Astra News, under the name "When Light Leaves Us in the Darkness" and then in the issues 8, and 10. You can also write an article discussing movie bloopers that aren't correct from the scientific perspective.

In this issue

In this issue, there is a physics problem that you can solve, dedicated to the movie "Fantastic Mr. Fox" (PG, 2009) by Wes Anderson based on the novel by Roald Dahl.

In the 14th issue, we will publish the solution. You don't need to send the answers, however, if you have questions, email us.

The Case of the Burning Pine Cones

Physics problem solving on thermodynamics

Mr. Fox and his family move into a region that is dangerous for foxes because of how close it is to the three most feared farmers. Soon Mr. Fox wants to get back into the practice of being a fox, so he goes and starts stealing from the farmers. His tail is shot off when the farmers attempt to kill him. While trying to recover the tail, Mr. Fox's nephew is captured. Mr. Fox proposes a deal to the farmers to get his nephew back in exchange for surrender, and the farmers accept it.

However, Mr. Fox and his friends anticipate the ambush that came at them and are prepared.

They throw 28 pine cones, each of which was heated to a temperature of about 685°C from 10°C. Assuming that the pine cones are out of wood, and each one's specific heat would be 2300 J/gK.

If the mass of each pine cone is 300g, what is the total thermal energy absorbed by the pine cones as they heat up?

Try to do your part in rescuing Mr. Fox's nephew by solving this physics problem!

When you're done, reward yourself with this victory SONG* from the movie.

*Part of "Great Harrowsford Square" by Alexandre Desplat