THE ARK 47 LIBRAE

BORIS STERN

The Ark 47 Librae

leta CAPITAL

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The book belongs to the genre of hard science fiction. It concerns the colonization of a habitable—but initially dead—exoplanet, sixty light years from Earth. With this, the author has attempted to stay within the framework of known physics, with many thousands of years of flight time and tens of thousands of years involved in running a program for the "revitalization" of the planet. The colonization of the planet begins successfully enough, but then the story of the new world begins to unfold in an unforeseen manner...

INTRODUCTION

Boris Stern is a well-known Russian astrophysicist, Dr. Sci. in Physics and Mathematics and a leading researcher at the Institute for Nuclear Research (INR) of the Russian Academy of Sciences. His new hard science fiction book immerses the reader in the story of the colonization of a distant planet located sixty light-years from Earth, and all this in the absence of any scientific compromises, because there is literally no place for teleportation, hyperspace jumps or superluminal speed. It is impossible to surpass the speed of light given that at near-light speed you will be fried by cosmic radiation. The project to prepare for departure takes as long as one hundred and fifty years, and the flight itself is another ten thousand. Not a bad planning horizon, is it?

We at Leta Capital VC realized a long time ago that we can implement any ambitious project, and in fact it is not as complicated as it initially seems, if we give it enough time and resources. And what is most important is that the project team is highly motivated, and they believe that their project will make the world a better place. I am inspired by the belief in the triumph of reason and the creative power of science for the benefit of humanity. The book you are holding in your hands is about such concepts as humanism, the flight of thought and the search for something more. For this, the author can be forgiven for violating the laws of the genre when no love story, scenes of betrayal, canonical villains and heroes can be found in the book. Instead, the writer appears as a scientist and visionary, whose scale of ideas and, more importantly, values are so lacking in today's world preoccupied with crises and wars.

And isn't his plan to find and populate a new world not for the sake of valuable resources, like locusts, but so that more intelligent beings can enjoy the beauty of the universe? Doesn't a scientist, who is ready to put all his talent, all his life into a project, the result of which he will never see, deserve admiration? What the author writes about is probably the

only thing in this world that is truly worth living for. I do not know if genius and villainy are really incompatible. However, people like Boris Stern make me believe again that the words “scientist” and “noble” are almost synonymous.

Immerse yourself in the world of this book. Despite the detailed description of complex physical phenomena, it is written in simple language. The author does not forget about lyrical digressions with detailed descriptions of nature. There are also amazing details in the work emphasized with gentle realism. What are worth only the fragments in which scientists openly fool around, while letting the reader into the life of a scientific team that has forgotten about the assumed seriousness! The smallest details of the narrative give a full understanding of the realism of the project at the current level of scientific development, making it finally clear that this book is a kind of inspiration for scientists and visionaries from all over the world. Plot twists and, of course, the ending will not leave anyone indifferent. Along with the author, experience all the ups and downs of a universal scale project lasting ten thousand years, it really is worth it.

Enjoy!

Alex Chachava
Founder & Managing Partner at LETA Capital
www.leta.vc

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“And that is about the same thing! The devil forced me to take up such a beaten topic!”
“If you write badly, you will be beaten.”
“But if you write decently, you’ll have an eternal theme.”

From a conversation overheard on a plane

PART ONE

While the salty sea gently laps the warm sand...

The places in our narrative cover vast expanses of time and space. They are without doubt worthy of and deserve several paragraphs. The place where the salty sea gently laps the warm sand for the entire day and only occasionally irons out the surface of the wide beach with heavy waves is one such example. Beyond the beach a strip of sand dunes quietly sits, while further on granite slabs take over, in some spots crossed over by moraine ridges. Once long ago, in time immemorial, a wide glacier flowed over this area, apparently flowing from the blue mountain range that dominated the view of the landscape visible from the dunes. It had probably happened a hundred or two hundred million years ago as the continents were shifting, but now there is a warm and stable climate here. Judging by the snow caps, the mountains are very high. In such a climate, at a latitude of forty degrees north, eternal snow lies at an altitude of over four and a half kilometers. Some of the jagged ridges of these mountains would certainly be of interest to intermediate climbers. However, the fact is, there are no climbers here.

At one point, the dunes part and allow the river to flow into the sea. The mouth of the river is marked by an unforgettable rock sticking out of the sand about a kilometer from the confluence (to the left when viewed from the sea). The rock looks like a hundred-meter-high dog's fang with its vertical side facing the sea. It is obviously not limestone but either gray granite or basalt. What stands out the most is that as far as the eye can see, there are no other such rocks anywhere.

Most of the year, the trade winds prevail here, predictably like clockwork carrying with them the weather. In the mornings the air is so transparent that the blue colored mountains become multi-colored, full of

pinks and grays, and the snow caps turn golden in the sunlight and change to blue in the shade. At noon, cumulus clouds appear and grow, swirling higher and higher above the belt of granite ridges between the endless sea and the towering mountains. They are then blown away by the damp breeze that soars up over the granite and is heated by the midday sun.

The rain-swollen-clouds suddenly let loose a heavy downpour and a double rainbow rises over the land. Despite the pouring rain the sun still shines over the shore, and the sea licks the warm sand. Suddenly, from the blue-black sky beyond the rainbow, lightning begins to strike and thunder starts to peal. A rainbow and lightning, both at the same time, about ten strikes per second, each time breaking and branching, accompanied by the eerie unceasing rumble of pealing thunder.

All of it then stops as soon as the granite cools down from the cold shower. A golden evening comes and with it a holiday of water, crystal clear and warm. The water that has fallen from the sky, having accumulated in low areas, depressions and gulleys, receives the warmth of the granite and runs along winding routes to the river valley that cuts through smooth rocks. This would be a paradise for teenagers, jumping into huge granite baths filled with clear water, climbing under warm waterfalls, swimming down streams along smooth winding chutes. However, there are no teenagers here. In the distance beyond, the mountains are golden, sporting newly refreshed snow caps.

The clear transparent river flowing through the pebbly valley is cold as it originates from the remnants of a former glacier and small glaciers hidden in the upper reaches of the mountains above the valleys. There should be trout here, but there is not, and there's a lot more that is not: there are no mosquitoes, no trees and no grass, despite the warmth and abundance of fresh water.

Not a single blade of grass! No lousy ciliates! There is nothing at all that even with a stretch of the imagination could be attributed to or classified as wildlife.

Why? What happened here? Was it environmental poisoning, or perhaps radiation or a supernova explosion? Maybe it was a case of

self-destruction or an apocalypse? No, none of these of course! The matter is that the question "What happened here?" has been applied incorrectly.

The real question is: "What didn't happen here?" The answer to that is that there has never been an event whose probability we have no idea about. The answer: life never happened here.

We still do not know how it arose on Earth.

As biologists concerned with the origin of life like to say: "The probability of life arising under the right conditions is equal to the product of two quantities: zero and infinity."

Even today we still don't have a clearer estimate. Zero to infinity... The only thing we know is that the result of any calculations is not exactly zero, and that is only for the sole reason that we have one example before our eyes. There are optimists who say that the probability is close to one in infinity being as life appeared on Earth very quickly, during the first half a billion years. However, the pessimists have objections: they say that if life had not appeared when the environment of our planet was much more volatile and active volcanically, chemically and electrically, it would never have appeared on our planet at all. After that the window of opportunity then closed. Therefore, from the point of view of pessimists, life on a planet can appear either quickly or never. However, nowhere in the world does there exist a judge to arbitrate and competently judge both scenarios.

It gets dark there very quickly and the nights are usually clear and starry. A person lying on their back on the still warm sand of the beach would be delighted with the unfamiliar constellations, among which is an almost perfect semicircle of five bright stars which catches the eye. It is true though that in order to calmly enjoy the spectacle of the unfamiliar sky, a person would have to use a breathing apparatus to deliver them oxygen. The atmospheric pressure there is only slightly higher than that on the earth but oxygen exists only as an insignificant fraction of a percent of the atmosphere. Almost all of the "air" is made up of nitrogen mixed with a little CO_2 and water vapor. Obviously without photosynthetic life, what possible oxygen could anyone mention?!

Even if someone was wearing an oxygen mask, a person who remembers the sky of the Earth very well, would see something familiar. Of course, there would be the same bifurcated Milky Way but that's not all. One would recognize the Pleiades although they appear a little smaller there, seeing a pair of very bright stars, one bluish and the other reddish in hue, in principle one could recognize Betelgeuse with Rigel only without Orion and Deneb would shine just as brightly but only without the Swan.

Two small moons would be seen and when they rise they would appear to be ascending towards each other, both rotating in the same direction as the planet itself, one of them at an altitude of 20 thousand kilometers overtaking the rotation of the planet and the other at a distance of 56 thousand kilometers circling counter to it.

No one can really say why life never appeared here. Where there some missing connections? Was it a shortage of quiet lagoons saturated with organic broth? Did the lightning not strike hard enough? Or was it simply that even in the presence of everything needed, the insignificantly small chance for the correct assembly of the combination of molecules (zero) never occurred even with the gigantic number of related interactions (infinity). It appears that the window of opportunity really did slam shut here a long time ago, and now for six billion years sterile clear dawns have risen above the coast and the barren sea guiltily licks the warm sand.

Sixty Human Years

There may be nothing more serene than a long summer day on the banks of a large river. Mark Selin lay on the hot sand of an island overgrown with plant life and willows. A smooth looking steep mountain stretched into the sky beyond the river, its ridge covered with forests from which limestone cliffs protruded here and there. Mark looked at the mirror-like surface of the river at a spot where the mountains slowly floated above the clouds. The day seemed to have begun in time immemorial and would drag on indefinitely until the evening coolness came. With it would come brutal hunger and he would have to swim back through the canal, pull the bike out of the bushes and go home. When he got there,

he would have to listen to the grumbling of his parents about a long absence and only then would he have his blessed dinner.

That would be later, while the sun was still high, he could think and dream for a long time, and there was much to dream about. Mark has just entered the International University of Advanced Studies which was a university that had earned the status of "legendary" in only fifteen years of existence.

Of course, he, being a creature of this wonderful outback, was incredibly lucky. He was lucky for the three teachers he had had in physics, mathematics and literature. He was lucky for having such wonderful parents, who slipped him good and fascinating books that made him think. Yes, and he himself, through the sweat of his hard work had nurtured his luck, which honestly deserved a rest in the day's serenity.

True it was one of the last days of rest and relaxation. Soon he would have a five-hour flight which would take him to a new life: one which Mark's imagination painted vague but disturbing pictures about, as he would be *at the forefront of world science*.

Perhaps he was also lucky with the times into which he had been born, such luck rarely occurs with the inhabitants of these backward places, and it was not only the locals... The world, having gone through a severe crisis, seemed to have woken up and rubbed its eyes. Talk show stars, the news heroes whom Mark's father called "fiery lackeys", "chain patriots" and "obscurantist courtiers", all disappeared from sight as if hiding in some secret cracks. Instead of them smart normal people began to appear in such numbers that he had to ask: "Where were they before? Where had they been hiding for decades?" The changes did not stop there, finally after a seventy-five-year hiatus; people actually returned to the moon and have already delivered equipment and supplies there for a Mars expedition that will be launched in six months.

An exciting life lies ahead, thought Mark. *How important it will be to succeed in this life and to become a real scientist!*

Looking at the reflection of the mountains in the clear water, he said to himself: "I must definitely come back here when the main events of

my life have already happened. Come back here in sixty years and give myself an accounting: whether what I am thinking about now has come true. Did I become a scientist? Did wisdom come with age? How great it would be if everything I planned worked out and how nice it would be to lie here with a great life behind me...

In our youth we often make all sorts of stupid promises and vows and almost always quickly forget them, but there are exceptions, some things get stuck in memory for life, perhaps due to some bright detail, like the reflection of the mountains for example. So as it were, sixty years later the now accomplished and wise Mark Selin, a man of moderately wide renown, got out of a rental car on the banks of that very river. After a continuous three hours of driving, the usual five-minutes of rehabilitation were necessary. When he got out and attempted to stand like a decent human in a vertical posture, his knees and back screamed out in pain. In order not to waste time, in a half-crooked state, Mark took the boat out of the trunk, connected the hose and turned on the compressor. Now he had time to walk around the car five times, shaking the stiffness and pain out of his legs and in turn gradually straightening out his back.

Every time Mark asked himself: Where does this idiotic pain come from? Are my joints or ligaments causing the pain? Is there some kind of rubbish that accumulates in them while I'm driving?

The fact was that Mark, with his ability to quickly understand any area of knowledge where he had previously been a complete layman, in half an hour could have easily and thoroughly figured what kind of idiotic pain it was and what kind of rubbish built up, but the question was more of an idle rhetorical one, just to keep his mind busy while recovering from the drive and not really worthy of investigation. And after five minutes Mark finally straightened all the way up, and said to himself: "Well, now I'm going somewhere!" He picked up the boat, carrying it with his shoulder, and went to the river.

Before returning here he had studied satellite images and already knew that his beloved island had long been washed away by floods. As an acceptable alternative, he chose a place on the left bank opposite the mountains, a spot from where the view should be almost the same as

it was then. It was necessary to row five kilometers upstream, but since Mark had no problems with his shoulder girdle, no *rubbish accumulated* there, he did it easily and rather quickly.

The weather was the same as it had been then, sixty years ago. Mark had followed the weather forecast and chose a time accordingly. He lay down and began to look at the river, where the mountains floated above the clouds in the same way but, so far, the past had refused to revive itself. Then, lying on the sand after an eight-hour flight with the corresponding jet lag and three hours of driving, Mark fell asleep. When he woke up, he felt the poignantly familiar smells of a hot day by the river: the willows, beautiful plants with long soft needles and round red berries, hot sand, silvery burdocks with a name unknown to Mark, and then the smell of the river itself. And the past gradually came to life.

"Well, how did it go with you becoming a scientist?" asked Mark Jr.

"It seems to be that I have become one. At least a lot of people think I am."

"Have you discovered anything important?"

"Yes I did in fact, but it's a bit of a sad discovery. I discovered the reflection of a star in the ocean of a distant planet, the reflection of the sun of that planet, sixty light years away. The sad thing is that there is no life there. There is a huge ocean which extends over two-thirds of the planet's circumference at low latitudes and one third of the planet is occupied by a continent. All of this I found thanks to the reflection of the star. There is land, there is sea, an atmosphere of nitrogen and a warm climate. Clouds float around there no worse than these and there must be rivers, almost like this one, but there is no oxygen. So there is no life."

"But maybe there is some other life out there that doesn't need oxygen and doesn't provide oxygen?"

"I had hoped so, as did many others, but biologists have dashed those hopes to smithereens. If life appears capable of evolution, it will certainly begin by using oxygen photosynthesis. Evolution must stumble upon such a valuable find but yet on that planet there are all the conditions

for photosynthesis: light, liquid water and carbon dioxide, which we also see. And as soon as photosynthesis begins, life blooms and creates an oxygen atmosphere. However, all of that does not happen right away, on Earth it took a couple of billion years, but that planet is already six billion years old. That's the law, I do not know in detail how it was proven but in general terms I understand that it is true, so if the inevitable trigger of life is not present, then there is no life."

"Are there other planets where life has been found?"

"No. There are three more planets with the right temperature and with what appear to be decent atmospheres with water vapor, except that the glare of the star is not yet visible on any of them. There is no oxygen anywhere, but this does not mean that there is no extraterrestrial life anywhere at all, just that so far only four suitable planets have been found. So as soon as I get back, I will start to process the data for two more. What we already know for sure is that even if all of the conditions are right, life does not necessarily arise."

"It's really sad. Life loses 1:4. How did you find the reflection? Has the planet been seen?"

"Seen in detail? Of course not! The planet is visible only as a luminous dot and is very faint and to see such weak points of light I had to spend a lot of time, work and money. Even in your time, they wanted to resume long-buried projects, *Darwin* and another one, abbreviated as TPF, you seem to have even read about it. Some of the projects were really renewed, united and improved and given the name *Darwin*. It took a long time, but they did it in the end. Do you remember what *Darwin* is?

"Three space telescopes, it seems..."

"Now there are seven, a whole flotilla. They are capable of accuracy within fractions of a micron, which is necessary to nullify the light from a star but at the same time see the planets around it. Light from six telescopes is added to and mixed in the central unit, the seventh. From a star, whose light is in an opposing telescope there is what is called an antiphase, that is, it is subtracted and the light from the planet is added. It may seem incredible, but the star which is billions of times brighter

than the planets truly vanishes and the planets appear to us as separate points. All together it is called a null interferometer."

"Can't you see the planet anyway?"

"No, of course not, this requires a whole armada of cyclopean telescopes and they have not been developed and will not be developed in the nearest coming centuries. Therefore, we see only one weak point, but we can measure their spectrum using infrared rays which are emitted by the surface of the planet. There are a lot of interesting things: the atmosphere lets something through, and absorbs something else but since physics is the same everywhere, we know that at such and such a wavelength there must be a dip in the frequency and the like. And we see all these dips and in such and such a place there should be a dip from oxygen, more precisely, from ozone. It is visible in the spectrum of the Earth but in the spectrum of that planet, named 47 Librae it's not. There is not the slightest hint! And in the spectra of four more known exoplanets, which are similar to the Earth in everything, it is also not visible."

"Did you take the spectra readings yourself? How did you see the reflection of a star?"

"No, not me. Spectra readings are exactly what the experiment was started for. Obtaining the spectrum is like skimming cream, it's what everyone wants. I took aim at what was hidden deeper and used it for temporal analysis in visible light. It is more difficult to observe the planet in visible light than in the infrared range, the star interferes even more strongly. If you just look at the light curve of the planet, you will not see anything there, only noise. I forgot, do you already know what the Fourier Transform is? It is powerful stuff. If we conduct a Fourier Transform for the light curve, then if there is even a weak periodicity hidden there, drowning in noise, it will come out in the form of a peak in the Fourier image, and if the noise is huge, and the periodic signal is negligible, it will still come out if you watch for a long time. Something showed up for me, a rather wide bump with a center at a period of twenty-seven hours. These are the clouds of the planet, twenty-seven hours is its day. Where there are more clouds, the planet is brighter. They rotate with the planet and give out a period of rotation, but clouds

are impermanent, they move. Therefore, the Fourier Transform shows a bump, not a narrow peak. After a year and a half of pure observation time, something interesting appeared: a weak but narrow peak on a period of twenty-seven point two hours, it could only have been caused by something firmly attached to the surface of the planet. This is by far not the end of the story but let's take a breather. Ask me anything if something is not clear."

"Why is the planet called that?"

"It's named that way because it is the 47th star in the Libra Constellation. There was such a contemporary of Newton named Flamsteed, he numbered two and a half thousand stars. The star is like the sun, although its mass and luminosity are a little less and its life expectancy a little more."

"Why planet b? So is there also an a?"

"Heavens no! For some reason, they decided to reserve the letter 'a' for a planet behind the star itself. People had some vague arguments for such a rule and this has been customary since the 1990s, when the first exoplanets began to be discovered. However, there is a planet c, it's cold like Mars. There are also d and e, those are gas giants. In general, the system looks a lot like ours, which is not so common.

"Sixty light years?" Does this mean you are now studying the light that was emitted when I was lying here before?"

"Yes, that's what it means... Listen further... When I discovered this peak, they decided to close the project. The *Darwin* had been in operation for more than twenty years. The fuel for the micro thrusters was running out, the solar panels were dying out, some of the electronics had already totally stopped functioning. We needed a two million kilometer space expedition by the service team. It didn't seem like that God awful much, some one and a half billion, cheaper than a flight to the moon in both directions. Then a global whining began: the economy is in recession, there are more pressing needs, life still has not been found, the goal of continuing the experiment is incomprehensible..."

"How can such a goal be incomprehensible? What, are they crazy?"

Both of them sat and thought, looking at the river through the eyes of the elder Mark. A three-deck tourist ship was sailing far off the right bank. Exactly the same ones sailed here in the time of Mark Jr. against the backdrop of the same mountains and under the same clouds. The same smells, the same peace. Nothing seems to have changed in sixty years. No matter how everything else had!

"Crazy, you say... No, rather, they just all went stale. It was you who lived during good times, when the goal was always clear and bright, but good times tend to pass, like youth. The flames are not enough for many generations. So the global whining about incomprehensible goals began. In short, if the project had been closed, I would have remained with my barely hatched peak at a period of 27.2 days, but we won because we spoke wherever possible, and explained and finally convinced everyone. As a result, volunteers organized a special fund to support the expedition, where people contributed a hundred or even twenty dollars. Of course, one and a half billion cannot be collected in this way, but the governments of the countries participating in the project were apparently ashamed and chipped in for a service expedition."

"The team has done an excellent job since then, *Darwin* has been working for fifteen years now, better than before and for four complete years out of those fifteen it has observed 47 Librae. My peak grew and became unkillable, in other words, statistically significant. It told us that we definitely see something on the surface of the rotating planet. But what? I plotted an average daily brightness curve but still couldn't see anything! It already seemed mystical! But then I accidentally saw a picture of the Earth from space and on it, the sun's glare in the ocean. And in the glare, almost a quarter of the brightness of the entire image of the Earth! And how did I not guess before?! I ran to the computer and in ten minutes changed the starting point of the rotation phase. This task made it within your power to determine where on the planet the highlight should be, and count the rotation of the planet from that point, which changes with the seasons. After half an hour I had an expressive curve with a *trough* of one third of the day and a plateau of two thirds. This means that two thirds of the circumference of the planet is covered by

the ocean, and one third by the mainland. The ocean and the mainland on the planet are sixty light years away, can you imagine?! However, this is all very approximate, the picture should depend on the latitude, after all the glare at different times of the year appears at different latitudes. We knew the parameters of the orbit, but we did not know the inclination of the planet's axis of rotation. And only by accumulating data for five years, two years before the expedition and three after, were we able to restore both the tilt of the axis and the approximate geography of the planet from twenty degrees south latitude to fifty degrees north. In the northern hemisphere there is one giant continent covering up to half the circumference of the planet. It narrows to the south, and another smaller continent appears in the southern hemisphere. However perhaps further south it becomes wider, we cannot see there. The reflection of the glare of the star provided us an example of the geography of the planet, like the beam of an ancient TV or more precisely a scanner beam. The rotation of the planet is like a horizontal scan and the seasonal movement of the glare along the latitude is like a vertical one."

"Awesome! And that's all I have to do?"

"You have to be, to be..."

"Did they name anything after you?" with timid hope asked Mark Jr.

"There was one anecdotal case, thank God, it did not take place. At a recent anniversary, a major science official suggested naming 47 Librae b, Selina. My hair stood on end. I did not expect such vulgarity and I was ready to collapse from shame. And all of the people supported it and applauded. Then, I half fought back and the story of renaming the planet quieted down."

"Why was it vulgar? After all, it sounds beautiful, like Selena."

"Yes, although you read good books, I remember that you had a serious problem with taste. God, what music were you listening to? Pop is bad! Oh well, it will soon pass. Let's talk about something else."

"What about Mars? After all, they should fly there soon!"

"With Mars, oddly enough, everything is in order. It's actually much better than with the Earth. There are already more than a thousand people living there, some of them were even born there and they are not planning on going anywhere. They predicted that life on Mars would be worse than a term in any earthly prison, but the fact is that a meaningful creative life in prison is better than the empty passing of time in the most beautiful paradise. They are creating a new world and are quickly expanding the walls of their "prison". They already have a nuclear power plant operating on Martian uranium, powerful earth-moving equipment and huge halls under ten-meter-thick roofs. The roofs are held up by pumped air pressure from below. You grew up during a good time, everything was advancing. Having lived the next sixty years, you'll understand this very well. Right now, there would not be the slightest chance of winding up the Martian epic. But the deed is done and the Martians almost have no dependence on us. There only remains rare flights with settlers and tools and to be honest, I envy them."

Mark Sr. also talked with Mark Jr. about all sorts of things that in fact lie outside the main stream of our story. Finally, the past did not so much dissolve as simply fell asleep in the memory of Mark Selin, but not without leaving a trace.

Wow, Mark thought, *he had just fulfilled his youthful vow, and it was great! He remembered so much! It was as if life had become longer. No, not really longer... How could he be more precise...?* Mark concentrated, looking at the surface of the river, where the mountains were still reflected above the clouds. *Here: it is wider and deeper! I just tensed up, came, felt and remembered, and life became a little wider and deeper. Too bad it's coming to an end...*

When he started heading down the river back to the car, Mark tried to shoulder the boat and realized that the sun had horribly burnt his shoulders and back.

What the hell was this? he thought. *After all, back then he did not burn at all! And it seemed this year he had already been in the sun quite enough... All sorts of protective creams exist for this. I wonder what they put into them. In theory, the heavier the element, the better it absorbs ultraviolet radiation. Lead? No, most likely harmful. Tungsten? It's a pity to spend money on such nonsense. Oh!*

They could probably use salt, cesium-iodine is a scintillator used in gamma-ray detectors... However, these were just idle arguments, designed to brighten up a hike that turned out to not be very pleasant with a boat that he could not hoist on his shoulder.

Here we have to leave Mark, although his life is far from over. He still has some things he needs to do. However, we are forced to say goodbye as our narrative jumps ahead forty years.

Mongolian Park

In what directions can the idle chatter of two cool professionals go to? Probably only God knows, but in general, much further than in their own business conversations. It all depends on the circumstances, their moods, their location and the stars above their heads.

In the mountains of Northern Mongolia, the summer nights are cold, but for a couple of hours after sunset, the earth retains some of the daytime heat and that is the time for the mating concerts of small living creatures.

On that late evening in the river valley, a combined chorus of frogs and grasshoppers could be heard in a cacophony of sound and an incredibly starry sky reigned over everything. It seemed that the stars were twinkling in time with the grasshoppers, or the grasshoppers along with frogs all in time with the flicker from the heavens.

Against this background, quietly, so as not to interfere with the frantic concert that was in progress, the conversation started: "...Yes, the universe is in its prime, you might say it's just an orgy of life."

"Well, a heyday is very relative. We sit here on a living island, among thousands of dead planetary systems, and rejoice."

"But what about Cygnus 68?" the younger interlocutor asked.

Note: Here the author is forced to apologize for the fact that he gives the direct speech of the characters without any adaptation and with all