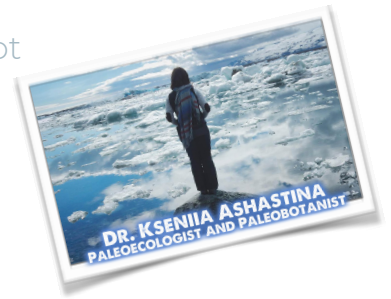


Kseniia Ashastina

Paleoecologist, and Paleobotanist



[Show theme music plays].

Daniel Scherl:

Welcome to the Memories of a Moonbird Podcast. Exploring life... one story at a time.

Hello friends, I'm Daniel Scherl. Are you ready to learn some amazing stuff? Well, buckle up because today on the show, she's a really cool scientist who was born in Russia, speaks three languages and loves good chocolate, ice cream, and tea. She currently works for the Max Planck Institute for the Science of Human History. There she studies archeological samples from the silk road that are thousands of years old in the hopes of discovering many long hidden aspects of ancient humanity.

If that's not cool enough... When she got her PhD, she made two expeditions to the Batagay crater in Siberia, a place that's been nicknamed "the doorway to the underworld." There, she studied something called the permafrost archive to reveal environmental changes that occurred in our world 120,000 years ago. So what's permafrost and why study these ancient samples? Well we're going to find out about all of that, and a whole lot more, as we talk about everything from life, love, and the Russian sense of humor, to cultured meat and how the science of ancient humans affects us, not just today, but in the future.

Please welcome Zooming in all the way from Germany, Paleoecologist, and Paleobotanist, Dr. Kseniia Ashastina.

Kseniia, welcome to the show!

Kseniia Ashastina:

Oh, thank you!

Daniel Scherl:

So hey, tell everybody... Where in Russia were you born?

Kseniia Ashastina (1m 30s):

I was born in Leningrad, which is now known as St. Petersburg.

Daniel Scherl (1m 34s):

And what was life like growing up in Russia?



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Kseniia Ashastina (1m 37s):

Hmm. So I was born in... Yes... Some years ago, and at that time [Both laugh], back in the USSR, and back then, so Perestroika and all of these things happened. So this is the time when a lot of things, a lot of things happened and a lot of people say it was a time when there was no law. The only rule was there are no rules.

Daniel Scherl (1m 47s):

So chaos basically.

Kseniia Ashastina (1m 47s):

Yeah. Some say it was chaos, and the others say it was a time of great opportunities.

Daniel Scherl (2m 7s):

What do you think?

Kseniia Ashastina (2m 7s):

Thanks God, I don't recall.

Daniel Scherl (2m 16s):

Well, I wanted to ask you about Russian stereotypes because in America, I think there's this longstanding, silly stereotype that, you know, Russians never smile, they all drink vodka, eat borscht, and stand in long lines for toilet paper. So what's it really like to grow up in Russia?

Kseniia Ashastina (2m 30s):

I think everyone had lines for toilet paper quite a couple of months ago, everywhere in the world. [Both laugh]. Thanks God, this time is over. The same as it's over in Russia as well. Of course, Russia is a huge country and every town, every city, every village is different, but I can just talk from my perspective. So I'm coming from big city. So St. Petersburg, I would say it's a European city, so everything is quite good there.

Daniel Scherl (2m 57s):

And very modern?

Kseniia Ashastina (3m 2s):

Yeah. It's quite modern, yeah. It changed a lot during the last 20 years. And you see it. We have a skyscraper now there and I think...



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Daniel Scherl (3m 7s):
Do you have McDonald's?

Kseniia Ashastina (3m 7s):
Yeah, we have McDonald's and this was huge line. When was that? I think it was 1991 or 1994?

Daniel Scherl (3m 20s):
I remember it made national news here. "The first McDonald's in Russia."
Yeah.

Kseniia Ashastina (3m 23s):
Oh yeah. I wasn't in the line. I was too small. I wasn't allowed to eat junk food back then.

Daniel Scherl (3m 27s):
Do you eat McDonald's now?

Kseniia Ashastina (3m 27s):
Sometimes.

Daniel Scherl (3m 27s):
Good, you gotta treat yourself.

Kseniia Ashastina (3m 27s):
Yeah, but they have a lot of junk food things here in Germany. So German junk food things.

Daniel Scherl (3m 33s):
What's your favorite German junk food?

Kseniia Ashastina (3m 38s):
Well I call... Bratwurst?

Daniel Scherl (3m 38s):
Bratwurst, yeah.

Kseniia Ashastina (3m 38s):
Like hot dog thing...

Daniel Scherl (3m 38s):



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Yeah, yeah.

Kseniia Ashastina (3m 38s):

...a junk food. Many Germans will not approve this. Please don't judge [both laugh]. I think I just tend to call junk food all fast food things.

Daniel Scherl (3m 53s):

So if I later on was to ask you, "Are you a vegetarian?" The answer would be no, right?

Kseniia Ashastina (3m 57s):

I'm from Russia, sorry, no. I'm from Northern Russia. That's not possible there. It literally is not possible because during the winter time it's really cold and you need to have a certain amount of fats and other micro elements and whatever in your body to sustain this cold. And historically we didn't have soy beans or some other things that could...

Daniel Scherl (4m 21s):

Tofu?

Kseniia Ashastina (4m 21s):

Yeah... no. These luxury things. Neh eh. So it would not compensate. The nature would not allow us to be vegetarians in the North, at least in the North. And then most of Siberia as well.

Daniel Scherl (4m 35s):

Well speaking of food, does your name, **Kseniia**, means something really cool, like "lover of chocolate?"

Kseniia Ashastina (4m 41s):

Unfortunately not. It comes from Greek language and it has two meanings. The first one is "traveler" and the second one is "hospitable person" or "hospitality."

Daniel Scherl (4m 54s):

And how true is that? Are you a hospitable person?

Kseniia Ashastina (4m 56s):

I always have a lot of ice in my freezer and a good variety of teas on the shelf. [Both laugh]

Daniel Scherl (5m 3s):



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So when you were growing up, what was little Kseniia like as a kid?

Kseniia Ashastina (5m 8s):

So I was a really lucky and happy person because I had everything I need. I had kasha every day. So that's porridge, Russian porridge. And then I was not seriously abused by pedophiles, which is also very good... [Both laugh]. And well, I had my LEGO. Do you know LEGO?

Daniel Scherl (5m 30s):

Oh yeah! LEGOs were one of my favorite toys growing up. And I actually carried this huge collection of it, like two huge boxes of LEGO throughout my entire adult life. And just recently, I actually donated the whole thing to a good friend of mine who has young kids so that the LEGO can continue to be enjoyed for years to come. So sadly, I have no more LEGO, but I really had no idea that Russia actually had LEGO. Maybe that's ignorant to me, but that's cool.

Kseniia Ashastina (5m 54s):

Well, I think they started to have it when I was small. I was, I was in the first wave of LEGO things, but we had some Soviet kind of LEGO before I think, but I had this official LEGO thing and I was extremely happy. There were five colors.

Daniel Scherl (6m 10s):

Did they have like a little Stalin LEGO figure?

Kseniia Ashastina (6m 10s):

[Laughs].

Daniel Scherl (6m 14s):

So what was your favorite thing to build?

Kseniia Ashastina (6m 16s):

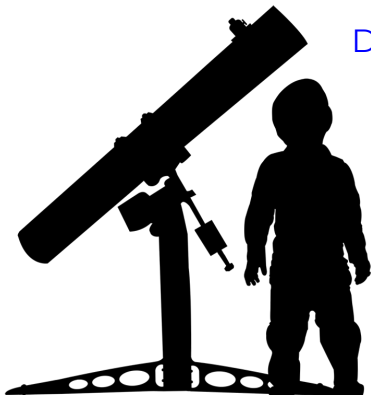
Well, I built houses, houses and towers. So we... I had only bricks and two windows, one door.

Daniel Scherl (6m 23s):

So just like living in Russia.

Kseniia Ashastina (6m 23s):

Exactly. With a roof [both laugh]. That's very good. [Both laugh more]. Yeah. And of course I had a lot of toys. Most of them



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were from my mom, so they were quite interesting. And a lot of books.

Daniel Scherl (6m 35s):

You like to read?

Kseniia Ashastina (6m 35s):

Yeah. We, I think now we had a TV back then, but there were not that many things for children on air back then.

Daniel Scherl (6m 48s):

Well what was Russian TV actually like then?

Kseniia Ashastina (6m 51s):

My experience is very limited because I got very scared when I turned on TV and there was some, probably American... [they both giggle] ...movie about some criminals shooting in the streets and then the policemen were trying to catch them. And I remember I was four and it scared me that much because I thought this is exactly what's happening right there behind my door. And I have a feeling that was the only thing that was always on TV, some scary criminal things. But when I was in primary school, I started watching TV after school, and there were a lot of different cartoons and the "Friends." That was the time of the "Friends."

Daniel Scherl (7m 30s):

Yes.

Kseniia Ashastina (7m 30s):

I grew up as a fan, didn't understand a thing but laughed with them every day.

Daniel Scherl (7m 40s):

Ah, that's cool. When did you become interested in science?

Kseniia Ashastina (7m 43s):

Hm. I cannot say one point of time. I knew there were about three episodes that subconsciously pushed me in this way. And the first one was the first year of primary school and the teacher, it was maybe the second lesson of primary school, the teacher asked us a question: "So there are two snowmen standing out in the sun. One is wearing a fur coat, and the second one, just standing there as he is. Which one would melt first?" And thanks God, I didn't say it out loud, but my answer was wrong. So I thought,



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“Well, Kseniia... You're really stupid. You should, you should stop playing LEGO and do some real things.”

Daniel Scherl (8m 36s):

[Laughs]. Is the answer the one with the fur coat?

Kseniia Ashastina (8m 38s):

No, that's the right one. No, no, no, no, no, no, no. Wait a second. Wait a second. The fur coat one would stay longer.

Daniel Scherl (8m 45s):

Oh, I'm wrong. See? I'm stupid too.

Kseniia Ashastina (8m 47s):

Well... and I didn't get that you said the wrong answer, so who is the stupid one here? [Both laugh]. Oops.

Daniel Scherl (8m 55s):

Maybe *I* should stop playing with LEGO and go do something with my life...

Kseniia Ashastina (8m 57s):

[Teasingly] Well, you got rid of your LEGO and I still have mine! [Both laugh].

Daniel Scherl (9m 4s):

Do you still actually have yours?

Kseniia Ashastina (9m 5s):

Yes. But not here. It's back in St. Petersburg.

Daniel Scherl (9m 9s):

Ahhh. That's hilarious. So anyway, so you're at a young age and the snowmen gets you interested in science, and then what?

Kseniia Ashastina (9m 15s):

It was the first episode. The second episode was with my grandpa. I was talking to my grandpa and he's really great guy, but that's a whole topic for another podcast. And yeah, I was asking him, what places has he been to, and he said that he's been to the North Pole.

Daniel Scherl (9m 34s):

Wow.



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Kseniia Ashastina (9m 34s):

On a submarine.

Daniel Scherl (9m 34s):

WOW.

Kseniia Ashastina (9m 34s):

And I was like, "Oh, grandpa, stop fooling around! The North Pole in a submarine? How's that possible? That's a continent." And then he looked at me and said, "Well, Kseniia... it's not." And that was the time when I realized... So he told me, explained that there is no continent or Island there, so it's basically ocean and ice, and I was eight years old and thought, "Well, now it's *really* the time to pack away my LEGO and keep reading." [Both laugh]. That's not good... not good.

Daniel Scherl (10m 13s):

And what was the third and final episode?

Kseniia Ashastina (10m 15s):

Yeah, the final one, it was already, I think 2000, early 2000 or late 1990s, there were more and more news on the TV about the scientific breakthrough discoveries. And most of them were coming from the British scientists. And well, what do you think about scientists? What do scientists usually do? What topics that you research on?

Daniel Scherl (10m 43s):

This is not a fair question to ask me because I grew up with a family that was very, very into science and I grew up watching David Attenborough's "Life on Earth," and Carl Sagan's COSMOS. So when I think of science, I think of multidisciplinary, you know, geology, astronomy, astrophysics, you know, go down the list, everything from research to... From chemistry to geology, you know? So I, I kinda think of science very... as a wide spectrum.

Kseniia Ashastina (11m 11s):

Yeah. But also very serious guys doing some great research.

Daniel Scherl (11m 16s):

That's funny. I think of scientists actually as some of the funniest people around because they're usually very intellectual and very well educated and they have a kind of greater understanding of the world. And I feel like they're usually very,



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very funny people.

Kseniia Ashastina (11m 31s):

Yeah, that's exactly what I *didn't* know. So I assumed that scientists are very serious guys in glasses.

Daniel Scherl (11m 31s):

And stuffy.

Kseniia Ashastina (11m 31s):

Yeah, yeah. Nerds, kind of? And then the British scientists reported on such a huge variety on topics and I thought, "Whoa, what's that?" So one of my favorite that British scientists discovered that the longer the time cow stay standing, the more likely it is to lay down and have a rest. [Both laugh]. And I thought, "What?! You can do research on these things?" Yeah. So this is actually the time when I realized that, well, you can explore everything! It doesn't need to be a nerdy thing. You can actually go outside and just explore everything, what happened to the earth or probably will happen to this planet and maybe even beyond. So I thought, 'Well, I want to do this.'

Daniel Scherl (12m 24s):

And how old were you when you had that thought?

Kseniia Ashastina (12m 28s):

That was 12, I think, but I didn't think of it serious. I thought of it like, 'Whoa, that's such a great thing to be British scientist. I want to be one of them.' It's like a dream work.

Daniel Scherl (12m 42s):

Do you still dream of working in England someday?

Kseniia Ashastina (12m 44s):

Visiting England for sure. Working? Well, I don't know how it turns out. If I have a possibility, for sure.

Daniel Scherl (12m 52s):

We're going to talk more in detail later about your career specifically and what you do, but I'm just curious, like where do you see yourself in 20 years? Or where would you like to be, I should say, if you could have a magic wish?

Kseniia Ashastina (13m 4s):



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Well, if I have a magic wish, I would like to win a lottery and then establish a research Institute that I would not have to work, but I would give money to the people who want to work and discover some great things. I mean, I would work as well, but I will not be worried about the money, where to get the grant for one of my research topics and where to go. So I think I would like to settle in one country maybe.

Daniel Scherl (13m 29s):
Okay.

Kseniia Ashastina (13m 35s):
Yeah, that's what I would like to do. If I had a lot of money, but that's very unlikely to happen.

Daniel Scherl (13m 35s):
Did you travel growing up?

Kseniia Ashastina (13m 42s):
Well, I traveled around St. Petersburg, so we have... Okay... St. Petersburg is the city that has been capital of Russia for about 200 years. So Peter the Great started this... flash mob or whatever you can call it [both laugh]. There's been a lot of czars, queens, and how do you call female czars?

Daniel Scherl (14m 7s):
Czarina.

Kseniia Ashastina (14m 7s):
Okay, czars and czarinas. And of course, each of them wanted to have their own residence greater than the residence of the other guy. And so there are a lot of palaces and nice parks around St. Petersburg and every weekend, my mom and I were traveling to one of them and having a nice walk. Then I started really early because of my mom. She was very interested, and she is still very interested, in landscape design.

Daniel Scherl (14m 38s):
So as a kid though, did you, you know, did you guys make trips to Moscow and other cities or no?

Kseniia Ashastina (14m 44s):
Oh, not that far away, but we did a lot of...

Daniel Scherl (14m 46s):



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Well, how far is Moscow from St. Petersburg?

Kseniia Ashastina (14m 48s):

Eight hundred kilometers. Okay, we need to convert it.

Daniel Scherl (14m 48s):

[Daniel types] Kilometers to miles... 434 miles. Okay, well it looks like it would be a beautiful drive.

Kseniia Ashastina (14m 59s):

Yeah, I'm sure it is, but we didn't have a car and no one in my family has a car. Still? Still. Yeah, yeah.

Daniel Scherl (15m 6s):

Do you have a car in Germany?

Kseniia Ashastina (15m 6s):

No, we bike in Germany. We don't need a car in Germany. Germany's small! [Laughs].

Daniel Scherl (15m 12s):

Where was the first place outside of Russia that you traveled?

Kseniia Ashastina (15m 15s):

Yeah, that was Finland. And this is just three hours away from St. Petersburg.

Daniel Scherl (15m 15s):

Oh, cool.

Kseniia Ashastina (15m 15s):

Three hours car drive. And we have a lot of bus tours go into Finland.

Daniel Scherl (15m 25s):

That's cool. Well, let's talk about current events. How has the COVID-19 pandemic affected both your personal life and your career?

Kseniia Ashastina (15m 32s):

Well, my personal life was not that affected. Maybe it was challenged a bit because we, with my boyfriend, were locked up in one flat together for the whole time [giggles], but everything went out quite great because we have a lot of board games.

We didn't have internet at the beginning of COVID, but thanks



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God, we got it later on. Yeah. So a lot of board games, a lot of book readings and yeah, that was quite good. And my work was not affected actually that much because as a scientist, you can do a lot online, a lot of research and writing papers or processing pictures for publications, this things. I also have a microscope at home so I can work with my samples here as well. So nothing actually happened. Nothing actually changed a lot for me.

Daniel Scherl (16m 29s):

So you had to still go to the lab to get your samples and then bring them home, right?

Kseniia Ashastina (16m 33s):

I did it the day before everything was locked down.

Daniel Scherl (16m 33s):

Ah, smart.

Kseniia Ashastina (16m 33s):

Yeah. I thought something's going to happen. So I asked my boss and then the manager of the lab, is it okay for the, if I take my microscope home? They gave the approval and there was not a problem at all.

Daniel Scherl (16m 49s):

How powerful is your microscope?

Kseniia Ashastina (16m 49s):

Well, it's extremely powerful.

Daniel Scherl (16m 49s):

Is it a monocular or binocular?

Kseniia Ashastina (16m 49s):

Binocular.

Daniel Scherl (16m 54s):

Nice! What drew you to physical geography, ecology and polar and marine research?

Kseniia Ashastina (17m 1s):

My passion for traveling, I would say. When I picked the faculty where I would like to go and what to study, I realized that if you go for physical geography, you have to spend every summer,



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somewhere out in the field and it would be paid by the university. And well... That sounds like right! [Both laugh]. That sounds perfect. So yeah, every summer, since I was a student, I spent somewhere in different places, mostly in Russia. And that's how I traveled quite a bit of Russia and saw a lot of different places and I think physical geography is the thing that you should see to understand better. I mean, you can read about these things or even watch a movie, but when you actually stand there on the, I don't know, volcano, and you see it and you think, 'Whoa!' That's the thing.

Daniel Scherl (17m 55s):

Yeah. I mean that, I think that's life too. You can look at a hundred different pictures and videos of the Eiffel tower, but when you stand there and it's right in front of you and this massive thing is going up to the sky and the lights are blinking and the wind is blowing. It's a very different experience to see it firsthand. Yeah.

Kseniia Ashastina (18m 11s):

And it's always different, right? When there's something on the TV, this is a perspective of one person going there and taking, I don't know, this shot... and showing you this movie and telling you these particular things about the place. But when you are there personally, you can experience something totally different, which would be just different. It doesn't mean that it's worse or better. It's different. And it's your pure experience, which is really nice I think.

Daniel Scherl (18m 39s):

Yeah. Well, let's talk about permafrost a little bit. So according to the internet, permafrost is ground that is continually frozen for two or more years.

Kseniia Ashastina (18m 48s):

Exactly.

Daniel Scherl (18m 48s):

What drew you to exploring this and why are scientists so interested in permafrost?

Kseniia Ashastina (18m 55s):

Well, permafrost sounds cool and very far away, but actually it's quite close to us. Maybe not to you, but for a person growing up in St. Petersburg, that's not that far away. About 25% of Northern hemisphere lays within the permafrost zone. And about 64% of Russia is in permafrost zone. So it's a huge



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amount of territory that is somehow affected by this. And if we're talking about the United States, then the Alaska is the permafrost zone area. And also you have permafrost in high mountains. So Rocky mountains, I suppose, and this things. Actually, so the great lakes, you said you're from Ohio...

Daniel Scherl (19m 33s):

Mmm hmm.

Kseniia Ashastina (19m 33s):

...and the great lakes are the result of one of the glaciations...

Daniel Scherl (19m 43s):

Yeah.

Kseniia Ashastina (19m 43s):

...so of the ice sheet retreats. So it's also kind of connected to permafrost. So permafrost was, it developed on the places which were not covered by ice sheets during the glaciations.

Daniel Scherl (19m 60s):

Okay.

Kseniia Ashastina (19m 60s):

So this is ice within the soil, within the ground. And yeah, somehow I started to study polar and marine research.

Daniel Scherl (20m 10s):

Well, what drew you to want to study it?

Kseniia Ashastina (20m 13s):

Again... there were a lot of expeditions they were offering [laughs].

Daniel Scherl (20m 17s):

So basically you just wanted to get out of town and thought, "Hey, I love science. I'm going to go travel and explore this stuff."

Kseniia Ashastina (20m 23s):

Well on one hand, yes. I'm from a big city. I didn't like to spend my time in the cities, so I would love to use all opportunities to get out. And on the other hand side, this is very interesting questions. And these are yeah, fascinating things you can learn about and you can study. And at the end, if everything goes



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great, then you end up having a paid hobby for the rest of your life. [Daniel laughs]. And that was my dream!

Daniel Scherl (20m 56s):

Well, let's dig into the science a bit... pun intended... And talk about your expeditions to the Batagay Crater when you got your PhD. I have a quote from you about that experience. You said: "There are tons of mosquitoes. They're trying to bite you. There's cracking ice and creaking trees. It's dangerous. You'd need to be crazy to enjoy it, but in a good way. Let's talk about this so that the listeners can hear what a scientific expedition can actually be like. So, my impression is, you leave Germany, and as you told me off-line, over the next couple of days, you take several flights, even a propeller plane until you finally arrive in Northern Siberia. And then you drive to some pull off on the road where you then have to hike almost two miles through the Taiga forest, all with your gear and all just to get to this crater. So I'm curious, what was the total time that it took to get from Germany to the crater? And what was it like when you got there for the first time?

Kseniia Ashastina (21m 52s):

Well, if we omit the time that we spend overnight at some places and the last minute expedition shopping and getting some agreements and so on... I would say took me about 16 hours to get from my flat in Germany to the crater itself. It was actually the first permafrost outcrop I have ever seen. And you know, my first thought when I saw this amazing, almost vertical 70 meter permafrost wall? So my first thought was, "WOW! It looks like it's a huge pile of frozen Nutella." [Daniel laughs out loud]. Do you know Nutella? The spread?

Daniel Scherl (22m 32s):

Of course! Yeah. And so for the listeners, so they know, 70 meters in America is about 230 feet. So a 230 foot big blob of Nutella. That's hilarious.

Kseniia Ashastina (22m 42s):

Yeah, but it smelled different, unfortunately.

Daniel Scherl (22m 42s):

How did it smell?

Kseniia Ashastina (22m 48s):

Well, it smelled as an old rotten huge pile of... um... "organics."
Let's put it that way.

Daniel Scherl (22m 56s):



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Okay. People can use their imagination. That's... now how big is the crater in, in width? Cause I know you said it's about 200 feet deep?

Kseniia Ashastina (23m 5s):

So the data I have, it's about one kilometer long and about already, also one kilometer wide.

Daniel Scherl (23m 13s):

Okay. So little over half a mile.

Kseniia Ashastina (23m 13s):

Mmm hmm. Oh, it's a nice walk.

Daniel Scherl (23m 13s):

That's huge

Kseniia Ashastina (23m 13s):

Yeah, it is.

Daniel Scherl (23m 13s):

That's huge. I mean, that's, that's several city blocks. That's a big crater. So what were the temperatures like that time of year when you were there?

Kseniia Ashastina (23m 24s):

Oh, both times that I visited the outcrop, it was summertime, so the temperature was quite warm and it was sunny. It was almost 80... 86 Fahrenheit.

Daniel Scherl (23m 36s):

So it's not typical Siberia that people think of with freezing cold and bitter snow and all of that?

Kseniia Ashastina (23m 41s):

Well typical Siberia is really freezing cold, but in winter time and then summertime it's quite pleasant there. You can really spend your vacation there if you want.

Daniel Scherl (23m 48s):

That's something I think people wouldn't know. I think people would think... I think when we think of Siberia in America, we just always think of, you know, being in the freezing cold weather, you know?



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Kseniia Ashastina (23m 56s):

It's probably true from October til May, maybe?

Daniel Scherl (23m 56s):

That's a long winter.

Kseniia Ashastina (23m 56s):

Yeah. It's a long winter, but it's a long winter for Europeans or people who are, or Americans, people who are not used to this winter / spring, or a local spring and autumn. I've been there once in November, which is autumn time for them. And it was, oh, I don't know in Fahrenheit, but it was -38.

Daniel Scherl (24m 23s):

That's about minus, well, technically it's -36.4 Fahrenheit. I'm so good at math, I know these things just off the top of my head. I'm totally not using Google's converter in the background.

Kseniia Ashastina (24m 29s):

Cool.

Daniel Scherl (24m 29s):

I am... shhhh. Secret. Is this big crater a dangerous place?

Kseniia Ashastina (24m 38s):

I wouldn't call it dangerous nowadays. It probably was several thousand years ago. And, but you're right. One should take precautions when working or even having a date there.

Daniel Scherl (24m 48s):

People go on dates there?

Kseniia Ashastina (24m 48s):

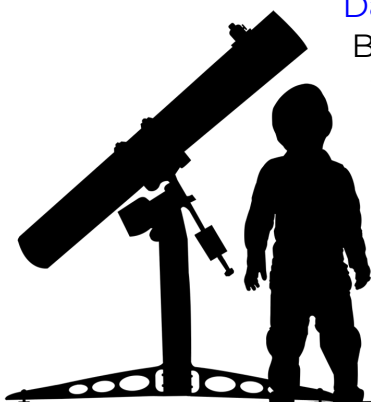
Maybe. No, I don't think I would go for a date there, but who knows?

Daniel Scherl (24m 57s):

But when you say have a date there, you mean like just going out for a hike and...

Kseniia Ashastina (24m 59s):

No, like men and girl going for a romantic date there.



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Daniel Scherl (25m 3s):

So I'm in Siberia and I like this girl and I say, "Would you like to go sit at the edge of this massive crater and smell something like rotten flesh and shit?"

Kseniia Ashastina (25m 12s):

And enjoy the sunset. Yeah. [Both laugh out loud]. Well... you take what's there!

Daniel Scherl (25m 16s):

"Our first kiss was over petrified woolly mammoth poop." So you're there at this crater because permafrost is obviously very important to scientists. Can you summarize why it's so important?

Kseniia Ashastina (25m 29s):

Yeah. As we already discussed, permafrost underlays quite an area in Northern hemisphere and in Russia in particular. And because of its properties, so being below zero temperatures for hundreds of thousands of years, it's a great medium for preserving a huge amount of diverse data on the past. And scientists from a wide range of disciplines can come together to collect parts of this mysterious puzzle and build up an almost complete picture of the past. So, past climatic parameters, vegetation, animal world, soil parameters or, and so on. And so many different things. And advantage is that some permafrost is syngenetic. It means that the accumulation of sediments and their freezing took place roughly at the same time. So the material is perfectly preserved in host and sediments. And it also means that we can identify the succession of layers and their relative chronology. Okay... Let's speak about more common things to get an idea what I'm talking about at all.

Daniel Scherl (26m 45s):

Okay. So a modern day example.

Kseniia Ashastina (26m 47s):

Modern day example, of course, comes from food and that would be a cake with a fancy frosting in a super cake shop or whatever you call it.

Daniel Scherl (26m 57s):

So multiple layers of cake with multiple layers of frosting and butter cream.

Kseniia Ashastina (27m 0s):

Yeah, exactly.



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Daniel Scherl (27m 0s):

Okay.

Kseniia Ashastina (27m 0s):

So the first layer of cake on the bottom was the first one to come. Then it's overlaid by a frosting, then comes another layer of cake, another frosting. And then on top of this calorie bomb is some maybe whipped cream or even more frosting, something like this. So when you cut this cake, you see its stratigraphy, the succession of layers of cake and also its relative chronology. So the oldest layer of cake is on the bottom and the youngest is on the top.

Daniel Scherl (27m 35s):

Then that's the same with the earth, right?

Kseniia Ashastina (27m 37s):

Yeah. It's the same with permafrost. Exactly what you see in the permafrost wall, after some good training of course. But I guess it doesn't taste that good. [Daniel laughs]. And if we put the cake into the freezer, then it will be conserved there for quite some time. And this is exactly what happened to the material within permafrost.

Daniel Scherl (27m 57s):

I understand that about permafrost, but why specifically is the Batagay crater significant?

Kseniia Ashastina (27m 57s):

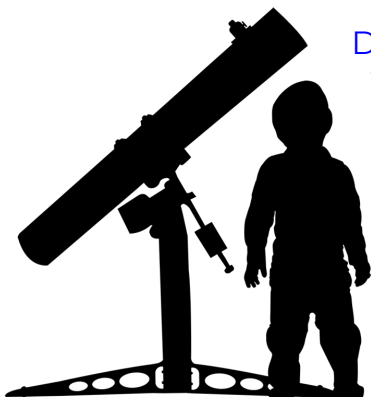
Yeah. All natural phenomenas are special. And it's interesting for scientists because of its location, its age, and the material trapped or caught within. So first of all, the majority of permafrost outcrops are exposed along riverbanks or Arctic ocean. And due to wave activity, the shores and the banks with the permafrost are eroding and exposing permafrost outcrops. And the outcrops along the rivers and oceans, they preserve data on environments that prospered under marine climate because they were in a proximity of the ocean.

Daniel Scherl (28m 43s):

That's interesting.

Kseniia Ashastina (28m 43s):

And the Batagay is a pure continental climate keyed. So the sequence was accumulated under the continental climate



Kseniia Ashastina

Paleoecologist, and Paleobotanist

conditions.

Daniel Scherl (28m 53s):

Assuming that human beings used to live more inland than at riverbeds or ocean fronts, is it then more likely that you're going to have more information about our ancestors at Batagay?

Kseniia Ashastina (29m 3s):

That's a good question, but if you look in the paleo record, I would say that human beings tend to have settlements near the water bodies. Could be lakes or rivers. And actually the Northernmost archeological sites are found some 600 kilometers to the North from Batagay.

Daniel Scherl (29m 3s):

Interesting.

Kseniia Ashastina (29m 3s):

Or maybe 400 kilometers to the North from Batagay on the river bank.

Daniel Scherl (29m 32s):

Are scientists finding more information from Batagay because

it hasn't been eroded away by water over the years and stuff, and it's just been sitting there frozen for very long time?

Kseniia Ashastina (29m 42s):

Kind of. I wouldn't say that we have more data from the Batagay. I would say we have more curiosity or at least the research group I'm working in, or used to work in, we're particularly interested in Batagay because it's special. It's also the oldest recorded permafrost sequence in Eurasia. So it potentially has a lot of old material. So it contains a huge amount of data that disappears and we didn't have a chance to explore it yet. That's why it's very, very special for scientists. But not only for scientists, it's also very special for the locals as well.

Daniel Scherl (30m 14s):

Why is that?

Kseniia Ashastina (30m 21s):

So there are many shamans that live in the area. And so a lot of landscape features are secret places inhabited by different spirits. And evil spirits live in the underworld. So the land that is thawed is taken away by evils. And it's, of course, very



Kseniia Ashastina

Paleoecologist, and Paleobotanist

frustrating for the locals. And you've heard about the ivory hunters? And this is a big business there. So the men are collecting mammoth tusks and rhinoceros horns to sell them afterwards. And a lot of local people think that collecting bones could bring bad luck for you and your family. And actually there are some cases that support their fears. But I don't want you and listeners to have an impression that people who live there are barbarians, or they're not educated or something like this. No, they respect the place they live and they observe the environment more accurately or more precisely than most of us city kids do.

Daniel Scherl (31m 32s):

So you're saying that the locals are more respectful of the environment than people living in cities?

Kseniia Ashastina (31m 38s):

I think people living outside, or in the woods, or somewhere on the permafrost area, they see the changes and they observe the changes that directly affect their life. That's why I think they're more cautious with what...

Daniel Scherl (31m 54s):

Is it awareness? Like they're more aware of the changes than people in cities, you think?

Kseniia Ashastina (31m 54s):

Yeah, I'm sure they are. Yes.

Daniel Scherl (31m 54s):

Well, time for some fun science trivia. You and I spoke offline about the fact that the area around Batagay is a "pole of cold." For the listeners out there, it is a term that refers to a place on the planet with the lowest recorded air temperatures. Antarctica has the coldest pole of cold in the entire world. But the area by Batagay is also a pole of cold, which means it is one of the coldest places on the earth, correct?

Kseniia Ashastina (32m 25s):

Yeah, true! So you mentioned Antarctica and there, the pole of cold, the Southern pole of cold, the recorded temperature was -128.6 Fahrenheit. Whew! That's cold. Quite chilly, right? [Both giggle].

Daniel Scherl (32m 40s):



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Yes! Very chilly!

Kseniia Ashastina (32m 40s):

But there are no people living there or I mean, there are some research stations, but they're not living there permanently.

Daniel Scherl (32m 52s):

I mean, I like the cold, but that's ridiculous.

Kseniia Ashastina (32m 54s):

Yeah, that's too much. I also think it's... [laughs]. And the pole of cold of the Northern hemisphere is located about 60 kilometers away from the Batagay crater in Verkhoyansk town, which is a populated area where the air temperature goes down to -90 Fahrenheit.

Daniel Scherl (33m 14s):

That's still cold.

Kseniia Ashastina (33m 14s):

Yeah. To be fair, there is another settlement, Oymyakon. Also, not that far away from there, where people enjoy a winter air temperatures of -89.9 Fahrenheit.

Daniel Scherl (33m 37s):

No thanks! [Both laugh]. Well, in some of your videos, Kseniia sent me some videos from her expedition and I'm going to put some of these on my website. So listeners, you can go to memoriesofamoonbird.com right now and click on my podcasts, then episodes, and choose Kseniia's episode. And there, you're going to see some of these insane videos for yourself. You'll see videos of the crater, and you're also going to see videos about these insane mosquitoes, which I want to talk about. So tell the listeners about these crazy mosquitoes, 'cos I saw the video and I was just like... no thanks.

Kseniia Ashastina (34m 3s):

Well, this particular video is taken in another place in Siberia, but still it's kind of always the same. Actually, I can withstand mosquitoes quite well. After three minutes of a cloud of mosquitoes chasing me, I accept them as a white noise. So they're always there, 30 days long, and at some point I started to think that they're my personal...

Daniel Scherl (34m 26s):



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Wait, when you say they're always there 30 days long, what do you mean? Like they're there all year round or they only last for 30 days?

Kseniia Ashastina (34m 32s):

They're there all the time that I'm staying. So when I'm out in the expedition...

Daniel Scherl (34m 37s):

Oh, so you were there for 30 days. They were there the whole time?

Kseniia Ashastina (34m 39s):

Yeah. Well my longest expedition was about 60 days in a row, but 30 days that was in Northern Siberia where there were a lot of mosquitoes and unfortunately, 30 days there were no mosquitoes, but other beasts...

Daniel Scherl (34m 46s):

Hmmm. Well, like what other beasts?

Kseniia Ashastina (34m 46s):

No, wait a second. I want to talk about mosquitoes a bit more!

Daniel Scherl (34m 58s):

Okay! [Both laugh]. Please go ahead!

Kseniia Ashastina (35m 1s):

So at some point I started to think that they're my personal orchestra. Okay. And sometimes it's not that well tuned. [Both laugh]. And black flies. They're awful.

Daniel Scherl (35m 12s):

They are. They get in your eyes and your ears and...

Kseniia Ashastina (35m 15s):

Yeah. And this silent beast eat your skin, actually. So they're so tiny, yeah, they can get through the net and they feast all and day long on you. So imagine you're in a tent, some meters away, permafrost cracks, trees creak, chunks of ice smashing on the bottom of the crater as if you're at huge parkings lot where some crazy people shut doors of their cars all the time, and you're bitten by silent black flies.

Daniel Scherl (35m 48s):

So you're telling me that you're sitting in a tent, or you're trying to sleep in a tent, and there's this noise of the Batagay crater



Kseniia Ashastina

Paleoecologist, and Paleobotanist

melting and these chunks of earth falling 200 feet to the ground [Daniel makes smashing sounds], right? There's mosquitoes buzzing outside and you're being bitten by black flies inside the tent?

Kseniia Ashastina (36m 6s):

When they're black flies, there are no mosquitoes. So I prefer mosquitoes over black flies. At least I can hear them.

Daniel Scherl (36m 12s):

Okay. But then you're sitting inside this tent with all this noise and you're being eaten by black flies. How do you sleep?

Kseniia Ashastina (36m 20s):

[Sighs]. Tight as a rock. Because you worked the whole day before that. Well actually during the summertime you have a polar day there. So it's sunny all the time.

Daniel Scherl (36m 28s):

Oh really? It's not dark at night?

Kseniia Ashastina (36m 28s):

No, no, no. It's not dark at night. It's, uh... The light is a bit... dimmed? Is that the right word to use?

Daniel Scherl (36m 28s):

Dimmed, yeah.

Kseniia Ashastina (36m 28s):

But still, it's always sunny. So the sun is always over the horizon and that's why you work a lot of time. I would say maybe 16 hours a day or something because, I mean, you have light.

Daniel Scherl (36m 50s):

And you just pass out 'cos you're so tired?

Kseniia Ashastina (36m 50s):

Yeah. And then you're just knock out. [Daniel laughs].

Daniel Scherl (36m 50s):

And you wake up missing some of your flesh.

Kseniia Ashastina (36m 57s):



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Yeah. Unfortunately, sometimes yes.

Daniel Scherl (36m 60s):

Well now that sounds like fun. And by fun, I mean horrible. So there you go, listeners, if you want to be a scientist and go out into the field, you can look forward to things like being eaten alive by black flies and not getting any sleep in a tent. And I'm sure a million other fun things, or as we call them... "Character building experiences."

Kseniia Ashastina (37m 19s):

Well, if it's a problem, but it's not a problem for me to sleep when there is sun.

Daniel Scherl (37m 22s):

But do you wake up, seriously, like all bitten up and having little flea bites all over you?

Kseniia Ashastina (37m 28s):

Sometimes, yes. Sometimes you don't sleep at all. I would say they were two nights when we couldn't sleep at all. But usually

you're in the tent with someone else. So it's a good thing to choose a sweet person to be in a tent with... So they get all the bites. [Both laugh]. Don't tell my colleagues...

Daniel Scherl (37m 47s):

Yeah. Or just rub them down, secretly spray them with some, some sweet spray or some jam.

Kseniia Ashastina (37m 53s):

No, actually, we would try to get rid of all the insects in the tent. First of all, we try not to let them in. And then before falling asleep would try to get rid of them.

Daniel Scherl (38m 3s):

Can't you use some bug spray, you know, inside the tent? So they don't... Or outside on the flaps or whatever, so they don't come in?

Kseniia Ashastina (38m 8s):

Well, if you're not allergic to the spray, yes you can. And actually that's what we kind of do.

Daniel Scherl (38m 13s):



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Well, all kidding and sarcasm aside, I am beyond impressed and completely respect scientists and anyone else who goes out and does this kind of work. I'm curious, especially in the name of trying to improve humanity, you know, do most scientific expeditions have some level of discomfort or things you have to deal with alongside them?

Kseniia Ashastina (38m 32s):

I think so. It depends what you call discomfort. For some people staying in a tent for more than two days is already discomfort. For others, I don't know, drinking river water is a bit uncomfortable. For example, we ate nearly two weeks, just fish for breakfast, lunch, and dinner because we were fishing there. It's so delicious. I mean, you should be prepared for these things, yeah? We didn't have fresh, nah fresh coffee we did. We didn't have fresh bread every morning or croissants or something fancy, but...

Daniel Scherl (39m 7s):

Do you take, do you take food with you? Like, do you take canned goods and things like that as part of the expedition, or are you just all local?

Kseniia Ashastina (39m 13s):

We buy local things, but usually they're pasta or usually rice and some canned vegetables, canned meat. I mean, it depends where you are. In our Siberian expeditions, we always did some fishing because it's actually the best thing you can do. You're always camp near the river or lake and then you go fishing there. And it's always fresh. It's extremely delicious. And it's very healthy. But actually, Siberian fishing is so boring. You just put your fishing rod in and within five seconds you get a fish.

Daniel Scherl (39m 49s):

I don't know if I'd call that boring. That's very efficient. I like it

Kseniia Ashastina (39m 51s):

Efficient. Yeah. Yeah. Another word for this. [Laughs].

Daniel Scherl (39m 54s):

So how did Batagay actually become a crater? Is it true that we think it was because of deforestation in the region?

Kseniia Ashastina (40m 0s):

Well, you know everything! You can tell people...

Daniel Scherl (40m 0s):



Kseniia Ashastina

Paleoecologist, and Paleobotanist

I did my research!

Kseniia Ashastina (40m 0s):

Yeah! You're great! So yeah, there is a, this is a very likely scenario that the area was deforested and therefore a crucial vegetation cover with a thick layer of moss was damaged. So vegetation is a sort of protective cover for permafrost. If you remember our two snowmen, one standing in the fur coat and others without out in the sun.

Daniel Scherl (40m 21s):

Yeah.

Kseniia Ashastina (40m 33s):

So this is the same story here. Actually permafrost without vegetation cover is like a snowman without a fur coat, it will fall faster. So back in the fifties and sixties, the vegetation integrity was damaged and an ice-rich permafrost was exposed to the sunlight. So it formed a gully directed from Northeast to Southwest. And that grew in depth and length until the nineties and then rapid thawing transformed the gully into the ray-shaped giant that keeps on expanding even today.

Daniel Scherl (41m 13s):

And how fast is it expanding? And do you think it will stop at some point?

Kseniia Ashastina (41m 17s):

I wish we could have solid answers to these questions. The content of ice within permafrost is not homogeneous. That's why the thawing or expanding rate can vary from one side of the outcrop to another, but according to rough estimations, made by my colleagues from Alfred Wegener Institute in Germany and Institute of Cryolithozone in Russia, the erosional rate is from 12 to 13 meter per year, which is 40 to 97 feet per year with an average of 15 meters. So 59 feet per year.

Daniel Scherl (41m 58s):

Wow.

Kseniia Ashastina (41m 58s):

But we should take into account that thawing is taking place only during summer months. So when it's warm, above zero temperatures establish, so it's roughly four and a half months per year.



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Daniel Scherl (42m 15s):

Wow. So it's roughly 15 feet a month.

Kseniia Ashastina (42m 17s):

Yeah. It's huge. Right?

Daniel Scherl (42m 17s):

That is huge.

Kseniia Ashastina (42m 17s):

It's impressive.

Daniel Scherl (42m 20s):

And if you were to divide 30 days by 15, you're talking about two feet every day.

Kseniia Ashastina (42m 20s):

So you actually can see this expanding.

Daniel Scherl (42m 20s):

Yeah, you can see it everyday. So then this brings into the question of course, of global warming. If the earth continues to warm and this thing starts thawing longer and longer, if it's not just four months, let's say it's now starts throwing six months or eight months out of year, it's going to expand even further and deeper and faster because of longer thaw times. So it's another reason that global warming could be a concern. Well, one of my questions is as this thing defrosts and the permafrost melts, are scientists at all concerned that we could be exposing ourselves to like hundred thousand year old bacteria or in some cases, viruses that we're not prepared to handle?

Kseniia Ashastina (43m 5s):

Um, can I be a bit nerdy now?

Daniel Scherl (43m 5s):

Of course! Please.

Kseniia Ashastina (43m 5s):

And say the permafrost doesn't melt, it thaws. So ice within permafrost, it melts, and permafrost itself, it thaws. Because it's sediment and ice, it's a mixture. So it's for example, your snowball, if you have a snowball, if you're a lucky one to have snow in winter and you have a snowball in your hand...



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Daniel Scherl (43m 26s):

It melts.

Kseniia Ashastina (43m 26s):

It melts. But if you have a chicken from the freezer...

Daniel Scherl (43m 32s):

It thaws.

Kseniia Ashastina (43m 32s):

Exactly. And this is the thing with permafrost.

Daniel Scherl (43m 39s):

Okay. I appreciate the distinction and I shall take that with me the rest of my life. So are scientists concerned... [they laugh]. No, that's, that's actually really good to know. That's really good distinction.

Kseniia Ashastina (43m 47s):

Exactly. It's very important. It's very important for them.

Daniel Scherl (43m 47s):

Yeah. So getting back though, are scientists concerned that if too much permafrost thaws, that we could expose ourselves to hundred thousand year old bacteria or viruses that we're not prepared to handle?

Kseniia Ashastina (44m 0s):

Well, scientists that I work with are not greatly concerned about it, but it's just because we do not investigate this matter, this questions. But indeed you're right. There are some outbreaks of diseases in Siberia, for example, smallpox or anthrax. And usually reindeers are infected and sometimes also humans, but the population density is so low that the outbreaks remain local. So yes, it could be dangerous, but I wasn't concerned about it when I was working there.

Daniel Scherl (44m 36s):

Of course, a really great movie for Hollywood would be that a scientist goes to the Batagay, creator gets exposed to some ancient form of smallpox, comes back to Germany and then infects the entire planet with a pandemic. Oh wait, sorry. That's not a movie... that's COVID. [Both laugh].



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Kseniia Ashastina (44m 52s):

That's reality... Whoa, whoa, whoa... but it didn't start in Russia!

Daniel Scherl (44m 52s):

That's true.

Kseniia Ashastina (44m 52s):

That's a really good point that we have, we should have infectionists and people working with all these diseases. Even if we think they're already gone, they're in the past. Whoa, please. We need these people. Pay them.

Daniel Scherl (45m 9s):

Yeah. I agree.

Kseniia Ashastina (45m 9s):

Give them job.

Daniel Scherl (45m 9s):

overall, if you had to choose one thing, what is the most important thing for you about permafrost?

Kseniia Ashastina (45m 16s):

It's very hard to name one thing I would say permafrost itself is a unique medium that conserves so many answers to the questions that probably were not yet asked.

Daniel Scherl (45m 28s):

Could I summarize that and say that for you, the most important thing is that permafrost is an archive of the past.

Kseniia Ashastina (45m 28s):

Yeah. I would say you're super right, but it's important not just for me, but for the whole human kind.

Daniel Scherl (45m 42s):

Ooh. Yeah. I love it. That's great.

Kseniia Ashastina (45m 45s):

It, it really is.

Daniel Scherl (45m 48s):

So after all the expeditions, including the ones that you've



Kseniia Ashastina

Paleoecologist, and Paleobotanist

done and any research that still continues to this day, what have scientists discovered about Batagay so far? Anything significant?

Kseniia Ashastina (45m 58s):

Ha! A lot of significant things. So scientific groups already established a preliminary stratigraphy of the outcrop. They reconstructed vegetation that covered the area during the Eemian interglacial. It's about 120,000 years ago and a vegetation during the onset of the last glacial maximum about 26,000 / 28,000 years ago. They also found and explored the carcasses of places and animals. So bisons, horses and so on. They also worked with paleo soil properties, and even ancient DNA analysis was run on some of these sediments.

Daniel Scherl (46m 29s):

Wow.

Kseniia Ashastina (46m 41s):

And they also identified winter temperatures on the basis of ice-rich isotopes and dated some of the layers, and it appears to be the second oldest permafrost sequence in the world reported so far. So I would say we just made the first scratch. There's still a lot to do.

Daniel Scherl (47m 4s):

And I assume scientists are continuing to go there to this day.

Kseniia Ashastina (47m 4s):

Yeah. Yes.

Daniel Scherl (47m 4s):

So I know we covered how fast the crater is expanding. Do you think it's going to stop at some point?

Kseniia Ashastina (47m 13s):

Well, local geologists said that at some point the bedrock will be reached. So the rock will be reached, and so the thawing will stop. But of course everything will eventually end. But before that, a lot of damage will be done. Damage to local infrastructure, damage to the environment, damage to the local river system and damage to local's sacred places.

Daniel Scherl (47m 40s):

Is there any way to actually stop this thing from expanding



Kseniia Ashastina

Paleoecologist, and Paleobotanist

and thawing?

Kseniia Ashastina (47m 44s):

I'm not sure. There are some scientists who work on the infrastructure that blocks the erosion rates, for example, in temperate climate zones. But as far as I know, there were no projects or they were no big projects in permafrost zone.

Daniel Scherl (48m 2s):

How long do you think it will be until the thing is, till it reaches the bedrock?

Kseniia Ashastina (48m 5s):

Oh, it's very hard for me to estimate the time. I wouldn't, I wouldn't even try to estimate it.

Daniel Scherl (48m 5s):

Okay.

Kseniia Ashastina (48m 5s):

But I think we still have some time in getting the data that thaws out.

Daniel Scherl (48m 15s):

There's a part of me that, like, wants a big chunk of this crater to break off, and then suddenly there's an entire skeleton of a woolly mammoth just sitting there and scientists are like, [in funny voice] "Oh my God!"

Kseniia Ashastina (48m 21s):

[Also in funny voice] "Finally!" [both laugh hard].

Daniel Scherl (48m 21s):

So, so all that science was fascinating to learn about, and thank you for sharing it, but that was all your PhD. What are you doing today at the Max Planck Institute?

Kseniia Ashastina (48m 42s):

Ah hah! [They laugh].

Daniel Scherl (48m 42s):

Ah hah!

Kseniia Ashastina (48m 42s):

Ah hah! So I actually keep on doing what I did for my PhD. I



Kseniia Ashastina

Paleoecologist, and Paleobotanist

apply plant microfossil method to analyze contents of different kinds of samples.

Daniel Scherl (48m 53s):

Now say that in plain English so listeners can understand what that means.

Kseniia Ashastina (48m 56s):

Yeah... So fossils are any preserved impressions or traces of once living organisms. So there are macro and micro remains and macro refers to big things. And the things that are visible with naked eye. And micro refers to small things. And we need a microscope to see them. So plant macro-fossils or macro remains, are for example, seeds, fruits, leaves, twigs and so on. And although they're called macro-fossils, I use microscope to see the surface structure of them and identify the things. And after identifying all plants from the sample, I can say what vegetation it used to be. Or if we're talking about archeological samples, what plant species are found there. So generally I work in the field of fundamental science. So trying to answer the questions, like where does this plant come from? Where did it originate? When was it cultivated? What woolly mammoths were feeding on? How did vegetation look like 100,000 years ago? But some of the answers might be applied to the up to date issues. For example, how will the vegetation respond to the changing climate, or who can take over seed dispersal of fruit trees after humans destroy habitat of all rare and endangered frugivores. So the animals that feed on fruits. Is your job exciting to you? Yeah. I find it very fascinating. I think it's also, as we talked about, it's a paid hobby. What's the goal of your studies, what are you hoping to find? It depends on the research questions and it also depends on the samples with which I work. If I work with archeological samples and then our interest would be to find out what people were eating, which kind of plants they were eating, and at what period of time they added new plants to their diet. And now I'm working in Max Planck Institute with the samples from the silk road. So this famous trading route from, from China to Europe actually, and we can trace how the plants were traded and...

Daniel Scherl (51m 26s):

But let's say you get that information and you discover these things, what does that do for science?

Kseniia Ashastina (51m 30s):

We don't, we don't know these things yet. We don't know all of the things yet. We don't know where the origin of for example, fruit trees are. We cannot pinpoint these areas yet.



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Daniel Scherl (51m 42s):

Well, no. What I'm asking in a, in a global perspective is, why is this important? Why do we need to find this out? What's the point of you?! [Both laugh].

Kseniia Ashastina (51m 50s):

What's the point of me?! I can, so, okay. If I'm talking about me working with permafrost, so what I did for my PhD, the point of that, if one, once you can recreate a mammoth, a woolly mammoth, and there are studies and there are research groups working on it, I'm going to be the one who tell what are the right plants to feed him.

Daniel Scherl (52m 15s):

Do you think they're actually going to recreate a woolly mammoth from DNA?

Kseniia Ashastina (52m 18s):

I hope they will not, but it's quite possible. Yeah.

Daniel Scherl (52m 18s):

Why do you hope not?

Kseniia Ashastina (52m 18s):

Yeah. It's a tricky, ethical question. Isn't it?

Daniel Scherl (52m 18s):

It is. I'd love to hear your answer. [Both laugh].

Kseniia Ashastina (52m 27s):

He'll be the only one here, very lonely. Then the climate is not really appropriate for it. And who will be the owner of him, which country?

Daniel Scherl (52m 40s):

And can they create several of them so they're not lonely? Probably, yes. I would think they belong in Siberia cause it's fucking cold there.

Kseniia Ashastina (52m 47s):

Yeah! But it's also a bit different now from what it used to be 11,000 years ago.

Daniel Scherl (52m 47s):

Yeah.



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Kseniia Ashastina (52m 47s):

Yeah.

Daniel Scherl (52m 47s):

That's true.

Kseniia Ashastina (52m 47s):

And then there would be crazy hunters who would eventually kill it, so...

Daniel Scherl (52m 59s):

Well, do you believe we should be working on human cloning and the ability to clone organs for transplants and things like that?

Kseniia Ashastina (53m 6s):

Cloning, probably, yes. I think it's very innovative right now for, personally, for me. I know there have been studies for decades already in cloning, but I don't think it's something bad. If you can save more lives with this technology without harming actual other living beings.

Daniel Scherl (53m 16s):

Well, I think that some of the concerns are going to be that evil cabals or governments are gonna make super soldiers. And you know, I mean Hitler's dream of the perfect aryan race could be achieved with genetic cloning, so it's kind of scary.

Kseniia Ashastina (53m 37s):

Yes, but I mean, there, there are so many ways that we can screw up our life... [Both laugh] ...genetic cloning is not the only one.

Daniel Scherl (53m 37s):

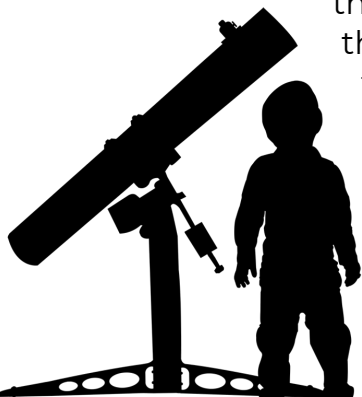
Yes.

Kseniia Ashastina (53m 37s):

I mean, I think there are way horrible things that are going on now in the military. Drones and the things they can do, actually. The, the things they can achieve right now. I think they're a bit more scary than, than cloning.

Daniel Scherl (54m 0s):

Than growing a heart in a lab?



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Kseniia Ashastina (54m 0s):

Yeah.

Daniel Scherl (54m 0s):

Well, one of the things that they're working on right now is called cultured meat, also known as VAT meat, where they take cells from an animal and then they actually grow the meat in a lab. You know, they grow the portion that we just want to eat without all the other stuff. And we don't have to slaughter animals. And I'm just curious, how do you feel about that as a scientist?

Kseniia Ashastina (54m 21s):

When I hear it, I'm scared. [Laughs].

Daniel Scherl (54m 21s):

Why is that?

Kseniia Ashastina (54m 21s):

Because I think it's unnatural on one hand, on the other hand, I think it might be a solution for the food security and for the other ongoing global issues that we have.

Daniel Scherl (54m 38s):

Factory farming and all those things?

Kseniia Ashastina (54m 38s):

Yeah, these are awful. But I think that's my first opinion on everything new. I'm kind of, first of all, cautious, and think... whoa, whoa, whoa, wait a second. Let me think about this. I'm not sure it's gonna work. And then if I take time, I think about it and now, yeah. Maybe? Why not?

Daniel Scherl (54m 59s):

So are you, is your first response a bit of skepticism?

Kseniia Ashastina (54m 59s):

Yes. Always.

Daniel Scherl (54m 59s):

Do you think that's a trait of you personally? Or is that a cultural, Russian thing?

Kseniia Ashastina (55m 9s):



Kseniia Ashastina

Paleoecologist, and Paleobotanist

I think it might be my personal trait.

Daniel Scherl (55m 9s):

Okay.

Kseniia Ashastina (55m 9s):

But taking everything with humor, like making jokes about all the shits going on... It's totally a Russian thing.

Daniel Scherl (55m 20s):

All the shits. I love it.

Kseniia Ashastina (55m 22s):

Well, there's no other way you can survive in that country.

Daniel Scherl (55m 26s):

There's no other way to survive a human life without humor, I don't think.

Kseniia Ashastina (55m 26s):

Mmm.

Daniel Scherl (55m 26s):

All right, so big question... Do you believe in love?

Kseniia Ashastina (55m 26s):

Oh, what does that mean?

Daniel Scherl (55m 26s):

Do you ever want to get married and have kids or are you just happy to be girlfriend, boyfriend forever?

Kseniia Ashastina (55m 39s):

Oh, I think that believe in love and have family, they're not the same things. I mean, you can be in love without having a wife and kids.

Daniel Scherl (55m 39s):

I agree.

Kseniia Ashastina (55m 39s):

I mean, if you have a partner, you're in love, that's totally okay.

Daniel Scherl (55m 53s):



Kseniia Ashastina

Paleoecologist, and Paleobotanist

What do you say to people who think that climate change isn't real?

Kseniia Ashastina (55m 53s):

Well, I think they should read more.

Daniel Scherl (55m 53s):

[Daniel laughs hard]. That's a great answer.

Kseniia Ashastina (56m 2s):

They should go out and see themselves what's going on.

Daniel Scherl (56m 4s):

How do you think we can create a more positive change in the world going forward?

Kseniia Ashastina (56m 9s):

We should be more concerned about what's going on, and not only what's going on between that kissing couple across the street, but actually what's going on everywhere, including our own head. And we should be more responsible for our actions.

Daniel Scherl (56m 21s):

I agree.

Kseniia Ashastina (56m 21s):

It's starting from the food waste, the type of car you drive, the way you're traveling, until the political decisions you make. We should be really aware of what we're doing and active in this.

Daniel Scherl (56m 38s):

Are you optimistic about the future overall? Do you think the human race is going to survive and have a bright future?

Kseniia Ashastina (56m 44s):

I would say it might be pretty bright after the nuclear winter.

Daniel Scherl (56m 44s):

[Daniel bursts out laughing].

Kseniia Ashastina (56m 44s):

We'll not find out! [Both laugh] I don't know... I, well, the people I see, most of the people, some of the people I see outside and



Kseniia Ashastina

Paleoecologist, and Paleobotanist

insides and everywhere... I'm really scared about the future.

Daniel Scherl (57m 7s):

If you're that scared about the future, why do you want to have kids and risk bringing them into a world that could end?

Kseniia Ashastina (57m 11s):

First of all, maybe that's in my nature. I... maybe should have kids.

Daniel Scherl (57m 17s):

Shouldn't hospitality be in your nature? [Laughs].

Kseniia Ashastina (57m 20s):

Yeah! So I'm very hospitable to my kids! I will welcome them! I mean, I have ice in my freezer. I should feed them somehow... Why to have kids? There's one friend of mine who decided not to have kids because of the awful situation in the world. I highly respect this. I think that's an amazing point. But somehow, I think we should always have hope. And that's not because I'm thinking I'm very special, but maybe the kids who will be born, they will change this attitude.

Daniel Scherl (57m 55s):

I agree.

Kseniia Ashastina (57m 55s):

I think there should be some kind of critical mess. So they should be more and more of people thinking differently and growing in different times. For example, I think people born in 2000, 2010, they're totally different from you and me.

Daniel Scherl (58m 5s):

Yeah.

Kseniia Ashastina (58m 5s):

So they have different perspectives. They value their time and their knowledge differently. I hope so. And so I really like what Greta Thunberg did, and all the kids, this Friday's for Future things. I think this is extremely important that children or underaged, who some adults think are not smart enough, or they should sit, drink Coke and watch, I don't know, Simpsons or whatever... Not offending Simpsons, but just watching television....



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Daniel Scherl (58m 45s):

But they actually are right. That's the point. I agree with you.

Kseniia Ashastina (58m 47s):

They will live in this world! I mean, we're oldies! We'll go extinct soon and they are exactly the people who will live there. We should make decisions for them or at least listen what they want.

Daniel Scherl (59m 1s):

So if you had your kind of dream life as a scientist, would you be in a lab nine months out of the year and then three months out of the year, every year, take a trip somewhere to do field research?

Kseniia Ashastina (59m 10s):

Well, I would prefer to be nine months in the field and three months in the lab. [Laughs]. No, I, I really enjoy being outside. I really love expeditions. So two and a half months, three months. No problem. I'm in. Whatever you say, I will just go there and do this. I really like being outside. I really like communicating with the locals because they're so amazing people. Well, living there and the pole of cold, this is insane. And they're so happy! And I asked "What, but this is so hard." And they say, "Well, no, we have our WhatsApp accounts. We can communicate with each other." That's totally. No, that's okay. You're just going faster on the streets. You just run. It's also kind of physical activity. That's also good. They're really amazing people. And when you look in their eyes, they're, you're like... drowning there. They're, they're so deep and they know so many things. And this is what I would like more and more scientists to appreciate. To talk to the locals, to ask them questions because they are actually people living out there. So they knew all the natural phenomena. Maybe they cannot address them the way the Western, let's call them this way, Western scientists, so they cannot use the same terminology maybe, but they observed the permafrost thawing for generations already. They know these things. They have the names and this is what I like in permafrost science, some terms are called after the local indigenous people's terms.

Daniel Scherl (1h 0m 48s):

Oh, cool.

Kseniia Ashastina (1h 0m 48s):

And this is so great because it's, it's gratitude and respect to the locals. And there are more and more projects where



Kseniia Ashastina

Paleoecologist, and Paleobotanist

people work, actually work with the locals.

Daniel Scherl (1h 1m 7s):

Do you feel it's safe as a woman to go traveling and doing these things? Do you ever, do you ever feel in danger or no?

Kseniia Ashastina (1h 1m 13s):

Yes, definitely. I felt in danger. That's why I think a self-defense course is very important to take. Before you go in on the field.

Daniel Scherl (1h 1m 23s):

Now, do you feel more in danger from bears and animals and nature, or people?

Kseniia Ashastina (1h 1m 26s):

I think that's the reason why I enjoy being in the nature, as that I feel maybe more secure there because I have no idea what I can expect from the human beings around me. Even in a big town, I don't feel really comfortable because they were well since a child who they were a lot of different cases and not nice cases. But luckily for me, everything ended up quite good, but still, I don't know. I feel very comfortable out there and I know that's, it's all on you, if you survive or not.

Daniel Scherl (1h 2m 0s):

Yeah.

Kseniia Ashastina (1h 2m 0s):

And this kind of challenge I like to take.

Daniel Scherl (1h 2m 3s):

Well, I'm curious, what do you like to do with your spare time when you're not off, you know, scientifically figuring out the world?

Kseniia Ashastina (1h 2m 8s):

That's a good question. Well, I like LEGO, as we already know and I still like reading and I like being outside, so, and also I have a fear of hate, height. How do you call it? Height? A fear of Heights? Yeah! Fear of Heights. That's why I decided to do the climbing thing. Cool. And bouldering. So this is what I used to do regularly now with the Corona time, not that regular. So I'm not...

Daniel Scherl (1h 2m 31s):



Kseniia Ashastina

Paleoecologist, and Paleobotanist

So wait, you actually rock climb?

Kseniia Ashastina (1h 2m 31s):

Boulder indoors. And I've been in the Alps. So outdoors climbing just once so far.

Daniel Scherl (1h 2m 45s):

Okay, so reading, nature, hiking and climbing.

Kseniia Ashastina (1h 2m 49s):

Reading, eating, nature. Yeah. Hiking, climbing, yeah.

Daniel Scherl (1h 2m 49s):

Eating, yeah.

Kseniia Ashastina (1h 2m 49s):

Uhhh... important! [Both laugh].

Daniel Scherl (1h 2m 56s):

What's your favorite childhood book?

Kseniia Ashastina (1h 2m 58s):

Hmm. It's from a Russian author.

Daniel Scherl (1h 2m 58s):

Okay.

Kseniia Ashastina (1h 2m 58s):

That would be Suteev. He made a lot of nice books and growings about animals. And they're funny stories. But if we're talking about the international one, then it would be Astrid Lindgren. You know, she's the Swedish author, "Karlsson-on-the-Roof." I'm sure it's translated into English. She's an amazing person. She was an amazing woman and she has great, great stories for children.

Daniel Scherl (1h 3m 29s):

That's cool.

Kseniia Ashastina (1h 3m 29s):

Maybe sometimes naughty. I think even as an adult, you would enjoy reading her books.



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Daniel Scherl (1h 3m 36s):

Okay. What's the first book that you read or movie that you saw that made you cry

Kseniia Ashastina (1h 3m 41s):

About the movie that would be "Free Willy." [Daniel laughs]. I really loved it. Actually, I was obsessed by killer whales since then. And as I am still obsessed with them, it's my dream to see an Orca whale, a real Orca whale in the wild.

Daniel Scherl (1h 3m 58s):

Are you religious?

Kseniia Ashastina (1h 3m 58s):

No, I'm not.

Daniel Scherl (1h 3m 58s):

Do you believe in God?

Kseniia Ashastina (1h 3m 58s):

Umm... certainly, I believe there is something out there. I'm not sure what's that. Is it a guy or a girl? Is there just one or many? I think that Greek mythology is quite cool.

Daniel Scherl (1h 4m 15s):

It is.

Kseniia Ashastina (1h 4m 15s):

Because they had several gods and they were as real people with their, I don't know, strange features and character. Some were jealous, some were stupid, that's great.

Daniel Scherl (1h 4m 32s):

So have you had to choose dogs or cats?

Kseniia Ashastina (1h 4m 35s):

Um, dogs. Definitely dogs.

Daniel Scherl (1h 4m 35s):

Ahhh, God yes.

Kseniia Ashastina (1h 4m 35s):

You're too?



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Daniel Scherl (1h 4m 38s):

Yes.

Kseniia Ashastina (1h 4m 38s):

How cool!

Daniel Scherl (1h 4m 38s):

Oh yes. Very much. Yeah. A huge dog lover. Yeah. What's one of your all time favorite movies now today?

Kseniia Ashastina (1h 4m 44s):

Oh, I think I don't have any yet, but the movie that I watch gladly watch over and over again would be "Up."

Daniel Scherl (1h 4m 44s):

Oh yeah.

Kseniia Ashastina (1h 4m 44s):

I really liked it.

Daniel Scherl (1h 4m 56s):

What's one of your favorite foods?

Kseniia Ashastina (1h 4m 58s):

Oh, I think everyone, anyone who would ever try the mushroom soup that my grandfather did would be a fan of it. And that it's literally the best thing you can eat. He always used to go into the forest and pick up the mushrooms himself. Then we would peel them together, cut them together, put them on a thread and let them air dry outside our house. So it's amazing smell, and it's so, so delicious! And the other thing you can get nearly everywhere would be pelmeni, I think?

Daniel Scherl (1h 5m 28s):

Would be what?

Kseniia Ashastina (1h 5m 28s):

Pelmeni. These are Russian dumplings.

Daniel Scherl (1h 5m 39s):

What's inside them?



Kseniia Ashastina

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Kseniia Ashastina (1h 5m 39s):

Meat. They're Russian. [Both laugh].

Daniel Scherl (1h 5m 39s):

Now can you make, do you know how to make them?

Kseniia Ashastina (1h 5m 46s):

Yes, we did it with my grandma. Always when we were children with my cousin, sister and my granny, and I still do them alone.

Daniel Scherl (1h 5m 46s):

What about favorite ice cream flavor?

Kseniia Ashastina (1h 5m 56s):

I really like chocolate with crisps, but I must admit we have way less ice cream flavors here or in Russia. The one I really liked and I made it myself as well later on, was raspberry basil. So delicious!

Daniel Scherl (1h 6m 16s):

If you could continue to live a healthy life, how long do you think you'd like to live?

Kseniia Ashastina (1h 6m 21s):

I already failed. I don't live healthy life. [Both laugh]. I mean, chocolate! They amount of chocolate I consume... no way. That's not healthy. I dunno. I think I would love to see my great grandchildren. That's pretty much the time.

Daniel Scherl (1h 6m 35s):

Are you afraid of dying?

Kseniia Ashastina (1h 6m 35s):

Uhh, right now, not. I'm more afraid of my family members dying. I don't think it would be... Okay, I have no idea how it would be, but it's usually that I'm more worried about people around me than about myself, and dying is also...

Daniel Scherl (1h 6m 58s):

What are you most passionate about in life today?

Kseniia Ashastina (1h 7m 1s):

Oh, would we awful to say ice cream? No. Well, I'm really passionate about the nature and I'm really keen on growing



Kseniia Ashastina

Paleoecologist, and Paleobotanist

people's awareness on the environmental issues that are taking place right now. Which really take care of what we're doing, how we're consuming, how much we're consuming and be responsible, starting from right... Yesterday! [Both laugh].

[Daniel Scherl](#) (1h 7m 29s):

If you could travel back in time right now and see your 10 or 12 year old self, what would you tell your younger version of you?

[Kseniia Ashastina](#) (1h 7m 37s):

I would say, "Go girl! Future Kseniia will take care of this!"

[Daniel Scherl](#) (1h 7m 40s):

Awesome. What do you think is the purpose of art?

[Kseniia Ashastina](#) (1h 7m 40s):

Oh. The purpose of art would be, hmm, moving people's emotions, I think to unravel what's inside and make them think about the things they maybe would never think of in their daily life. What do you think?

[Daniel Scherl](#) (1h 8m 3s):

Ahh, no one's ever actually put that question back on me.

[Kseniia Ashastina](#) (1h 8m 3s):

Ah hah.

[Daniel Scherl](#) (1h 8m 3s):

Honestly, my answer is very similar to what you said. I think it's to create something that allows a human being... I think art is something that allows people to touch what it actually means to be human in many different forms. And it allows us to understand the expression of what it is to feel.

[Kseniia Ashastina](#) (1h 8m 25s):

Mmm hmm.

[Daniel Scherl](#) (1h 8m 25s):

Yeah. What does success in life look like to you?

[Kseniia Ashastina](#) (1h 8m 33s):

Success would be a freedom of doing what you want to do without harming anyone else around. So without harming or without damaging the people around you, without harassing



Kseniia Ashastina

Paleoecologist, and Paleobotanist

their freedom, people around you and any other living beings. So it's, it's really happiness to be yourself, to know what you want and to be able to do it somehow.

Daniel Scherl (1h 9m 1s):
What's your spirit animal?

Kseniia Ashastina (1h 9m 3s):
Well, the first thing that comes to my mind would be Gulo gulo. Do you know this one?

Daniel Scherl (1h 9m 3s):
No!

Kseniia Ashastina (1h 9m 3s):
That's the Latin name for Wolverine.

Daniel Scherl (1h 9m 3s):
Wolverine.

Kseniia Ashastina (1h 9m 3s):
Yeah. It's not because I'm that bad ass, but because Gulo gulo, the Latin name, the scientific name for Wolverine literally translates as glutton, glutton. So hungry, hungry, and that perfectly fits. [Both laugh].

Daniel Scherl (1h 9m 31s):
Alright. Well it's time for one of my all time favorite questions on the, on the show. If you could sit with anybody from all of human history, alive or dead, except for your own family, or Jesus, Mohammad, Moses, any kind of prophet, and you can sit with them in a really cool old timey pub for four hours, who would you talk to, what would you drink, and what would you ask them about?

Kseniia Ashastina (1h 9m 52s):
That's a really hard one. I have no clue actually. Okay... It would be either Papanin, this was one of the Russian explorers of the Arctic. He had a cool expedition back in thirties. He with three other guys. So there were just four guys out on the ice floor and they were drifting around the Arctic ocean for several months and collecting all the data of all of the climatic parameters there about the ocean parameters and everything. And they were the first ones who did it for several months. And I think this is



Kseniia Ashastina

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amazing what people used to do in the Arctic and Antarctic. Yeah. A hundred years ago or 300 years ago. This is something we still think it's really harsh region to go there, to work, to have expedition there. It's really hard to organize logistics and everything, clothes. And I think.. whoah! Guys back there just took their dog sleds and went there. And I would definitely ask him about his experience there.

Daniel Scherl (1h 11m 0s):
What are you going to drink?

Kseniia Ashastina (1h 11m 0s):
Well, I think he would really appreciate a really good cup of hot tea.

Daniel Scherl (1h 11m 7s):
[Laughs]. Of course, after being in all the cold. What's the first question you're going to ask him?

Kseniia Ashastina (1h 11m 11s):
How many dogs did he eat?

Daniel Scherl (1h 11m 7s):
[Laughs]. That's fantastic.

Kseniia Ashastina (1h 11m 16s):
Mmm hmm.

Daniel Scherl (1h 11m 16s):
So the last thing we do on the show, it's a little game I have called "299 Philosophical and Life Questions with Moonbird." You get to pick two numbers from 1 to 299, and I'm going to ask you those two questions. What are your two random numbers?

Kseniia Ashastina (1h 11m 36s):
I have no idea if they've been on the show already. So 222 and 13.

Daniel Scherl (1h 11m 40s):
222 and 13. Okay. This one has not been on the show before. Fantastic. 222. What's the most useful thing you own?

Kseniia Ashastina (1h 11m 48s):
Useful thing. I think it's duct tape. [Both laugh]. You can do everything with it and you should have it on expedition.



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Daniel Scherl (1h 11m 55s):

Number 13 we actually already answered during the podcast, so you have to pick a different number.

Kseniia Ashastina (1h 11m 60s):

Okay, cool. Then let's go for 173.

Daniel Scherl (1h 12m 4s):

173... [Laughs].

Kseniia Ashastina (1h 12m 4s):

It was on the show?

Daniel Scherl (1h 12m 4s):

This is going to be great. No!

Kseniia Ashastina (1h 12m 4s):

Uh oh!

Daniel Scherl (1h 12m 4s):

How would you rate your looks on a scale of 1 to 10?

Kseniia Ashastina (1h 12m 19s):

My looks? Well, well the outfits or like...

Daniel Scherl (1h 12m 22s):

No, like, like how pretty do you think you are?

Kseniia Ashastina (1h 12m 25s):

Well, now I'm not that ugly. [Daniel laughs]. I would be... hmmm... 4.5?

Daniel Scherl (1h 12m 25s):

You said 4.5?

Kseniia Ashastina (1h 12m 25s):

Yes. It's not that bad.

Daniel Scherl (1h 12m 25s):

I appreciate you trying to be humble, but I think that the fans of the show would probably give you a much higher number than that. So we'll just leave it up to them.



Kseniia Ashastina

Paleoecologist, and Paleobotanist

Kseniia Ashastina (1h 12m 43s):

Oh, thank you.

Daniel Scherl (1h 12m 43s):

Kseniia, I can't thank you enough for being on the show. It has been fascinating talking with you and I really appreciate you taking the time to Zoom in from Germany. I wish you the best of luck with your career. And I hope we get to bring you back on the show again, down the road and hear some updates about what you're doing.

Kseniia Ashastina (1h 12m 59s):

Thanks a lot, Daniel. That was great pleasure talking to you. That was extremely easy to talk to you.

Daniel Scherl (1h 12m 59s):

Oh, thank you.

Kseniia Ashastina (1h 12m 59s):

Thank you, all the listeners, and subscribe!

Daniel Scherl (1h 13m 8s):

Yes, subscribe! What she said. [Both laugh]. Talk to you soon. Take care and have a great day.

Kseniia Ashastina (1h 13m 8s):

Thanks a lot.

Daniel Scherl (1h 13m 26s):

Friends and listeners, as you can hear, science is cool! So if you're interested in learning more about the sciences, there are a kajillion, yes, a kajillion resources out there from online training to local schools, to your library, to friends, to professors, there's just an innumerable amount of places you can go to learn. I encourage you to do so and help make the world a better place.

You can also make the world a better place by supporting this show. We are on Patreon at patreon.com/moonbird that's patreon.com/moonbird. [a plane flies by outside and is head over the microphone]. Hey and a plane just went by. They **also** want you to support the show!

Daniel Scherl (1h 13m 56s):

And if you'd like more Moonbird in your life, and hey, who



Kseniia Ashastina

Paleoecologist, and Paleobotanist

wouldn't? Head on over to [memoriesofamoonbird.com](https://www.memoriesofamoonbird.com) or visit me on social media @memoriesofamoonbird. And remember... that plane just went by... because of science. Stay safe!

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