

Transcribed soundbite between artist Lauren Gault and Dr Elsa Panciroli in July 2024, for [Samhla](#), an exhibition of new sculpture and events across a range of indoor and outdoor spaces in North Skye.

Lauren:

Hello Elsa. I just wondered if you could introduce yourself and give us a little bit of biographical information and maybe some of your connections to Skye and the Highlands.

Elsa:

I'm a paleontologist, so I study extinct life and I'm also a writer. I write popular science as well, but I'm also a Highlander. I was born in the West Coast of Scotland and I lived there most of my life too until I went away to study. So the landscape is very familiar to me. Skye itself, I think I first visited certainly as a child and since that time I have visited lots of times. But when I became a researcher, I was actually lucky enough to join some of the teams that had begun working there looking at fossils. So I've now been going for several years and I'm co-leading that team now and finding fossils on Skye, particularly the group I'm interested in which is the earliest mammals.

Lauren:

Amazing. And you're based up in Inverness at the moment as well.

Elsa:

Just now I'm based in Inverness. Until recently I was away down in Oxford before that in Edinburgh, but now back in sunny Inverness writing a book and thinking a lot about deep time.

Lauren:

Brilliant. And just I'm sure after we hear your bit we will be really interested, when is your book out?

Elsa:

Well, 2026. So we've got a while to wait!

Lauren:

We'll put that in our diaries. So we spent, I think it was, three days in 2023 on a sort of whistle stop tour of some sites that we picked across Skye and this was one of the places that we visited as part of the project. And I was remembering that when everyone's listening to this, we'll be looking like we did towards the Black Cuillins from Romesdal. And I remembered we had a great conversation on site and on the journey up where you covered everything from the Cuillins volcanic activity and how it shaped the land that we can see around us. I think it's called the trap landscape and how they're also famously magnetic. I just wondered if you could tell us a wee bit about what we can glean about the deep past and the formation of this landscape based on what we can see around us today.

Elsa:

Everywhere you look on Skye, you're really just looking through time. You're looking through deep time and when you're standing there looking back towards the black Cuillin. So those are the really jagged ones looking famous ones. They're the kind of culprits that are responsible for the whole landscape. Really that's the heart of a series of volcanoes. There's actually other sites around the coast of Scotland

that are similar to this. It's the heart of a volcano that erupted when North America and Scotland were separated. Then the North Atlantic ocean was forming. So as the landscapes are getting pulled apart, a bit like you see in Iceland today, this actual fault line where they're getting pulled apart, of course volcanoes erupt and in these eruptions they drench everything around them and thick layers of basalt rock. So that's lava. The whole landscape that you see when you walk up Romesdal is the result of this. The entire landscape is this, what we'd say geologically is very young rock. It's only around 55 million years old. So that tells us that it's very young.

Yeah, so we've covered all the much older rocks, the rocks that I find my fossils in. So I'm finding fossil in rocks that are about 166 million years old. So another hundred million years older. This is as I said, only 55 million years ago and it covered absolutely everything and not just once, but it would've happened repeatedly. So we've had a massive volcanic eruption, a layer of basalt, and then perhaps maybe 10 years, maybe a hundred years, maybe even a thousand years or so with no eruptions. And then suddenly another eruption. Again and again this happened, these layers formed, and you can actually see that looking around you in the landscape in Skye. This is what's called the trap landscape where layer upon layer is set down and then of course over time subsequently it erodes at different speeds so you end up with steps, massive steps across the landscape. And you see that in Romesdal as well. There are sort of little dips and steps in the landscape.

Lauren:

The steps are really, when you first pointed it out, I was noticing them everywhere. And particularly when we travel further into the site, there's these sort of very clear steps. And I wondered as well, I think you had mentioned that you could tell a little bit about the speed of the lava flow. Is that correct? Or the viscosity of the lava in terms of how far it travelled, and I'm just imagining the distance of the black Cuillins to where we're standing now and that huge, it looks like a huge distance, and all this kind of volcanic activity and the floor essentially moving all the time and everything sort of moving at different speeds and paces. And so I think, did you mention that the lava would've been quite viscous? It has to be more viscous to travel such a vast distance?

Elsa:

Well, any volcanic eruption, you think of a volcano as a volcano, it's all just the same. But every volcano has a slightly different composition of rock coming out of them. And so they have slightly different minerals, but also as you say, slightly different viscosities. So they can be really thick and in fact almost solid and that's when we get these volcanoes that are very explosive, huge plumes up into the sky and lots of bits of rock getting spat everywhere or you get ones that's very liquid and that liquid just pours out across the landscape. So actually what you see in Skye, similar to parts of Siberia where the trap landscape, the step landscape got its name, these traps - I've been calling it steps, but actually traps is the more precise name - they look like steps and they would've been a lot more runny so that they could basically travel quite long distances and cover huge amounts of land, but they've been full of bubbles and air pockets. It's not like a completely thick, dense liquid. If you think about something like honey, if you were to whip up honey with a fork and then pour it on the table, it would keep all those bubbles as it's spread out across your table. And it's a similar kind of process happening here.

Lauren:

That's a really evocative image. I'm imagining the table of the honey on a vast scale.

Elsa:

Except in this case the honey's black because this basalt is really dark, it is quite, I don't know, it turns Skye into a bit of a goth.

Lauren:

And that is not good news for palaeontologists because that of course traps or keeps all the fossil finds away from you because you can't permeate or get through that thick layer.

Elsa:

Exactly. But in some cases these layers are adding up to be hundreds of metres thick. And so if we're wanting to access rocks that are at the bottom of that, we just have to wait for the natural processes like coastal erosion to wear them away. And that's exactly where we find their fossils is on the coasts where these volcanic rocks have been removed by the sea and of course by the ice ages. So the other major thing that shaped Skye has been the ice ages over the last two and a half million years, and those have been removing layers and layers and also carving out valleys and glens to make the landscape dramatic like it is now.

Lauren:

I think the thought of all these things potentially existing underneath the basalt that we stand on is really tantalising thought. And also just the images of the movement of the liquid basalt and then the slow cutting of ice and all those various forces that have gone into shaping everything. And I remembered on our walk, I was so delighted when you just picked up this rock, just a random rock from the floor and you said, oh Lauren, this is a crystal infill which would've occurred on the inside of a bubble that would've formed during one of these volcanic eruptions. So I wondered if you could tell us what to look out for if we're wanting to get our hands on some of these bubbles from the very deep past of where we're standing on.

Elsa:

Well, yeah, I mean basalts, and other volcanic rocks are often filled with bubbles when they first form and then over millions of years, water will seep into the bubbles through cracks and due to the fact that rock is porous anyway and fill the bubbles up with water. And of course water carries minerals. And this is where these crystals come from, it's the minerals from those waters mixing with the minerals that are in the rock. And over time basically tiny crystals. So if you're looking for something like that, some places it's really obvious, you'll just look down and you'll literally just see crystals everywhere. And rather than it just being like we've all seen lumps of quartz just lying around, you might actually see a literal bubble. So like half a rock that's broken in half and the infill of it, it's a geode. You can get them in crystal shops, they quite often have fancy amethyst ones, but you don't need to go to a crystal shop - you can see them here. Usually the crystals will be white, maybe clear, but in some places you can also find ones that are pink or yellow or even green or blue, depending on which minerals are in the rocks and you just have to keep your eyes peeled. But they are literally everywhere on Skye.

Lauren:

I mean I think once I started noticing them I couldn't stop noticing them. And then you realise it is just finding ways what to look for and how to look for them and they're there. I was really thrilled to find these over and over again. And that sort of brings me up into talking a bit more about the fossils in Skye.

We'll not find any here, we'll maybe find some crystals if we're lucky, but we'll not find any fossils in this site, but certainly in other sites that we'll visit across the weekend. And when we were up, we were thinking about various things, but we were thinking a little bit about how fossils may have found themselves sort of weaving into stories and folklore and therefore attaching themselves to identities in Skye. And I was really interested in that because obviously people would find fossils and not know what they were and then stories and thoughts and ideas would've been attached to those things or built around those things. I just thought that's a really interesting position that fossils can occupy in people's lives. It's kind of a big question, but I was wondering about sort of expanding a wee bit on the potential role that fossils have played or could play today in our contemporary lives and what your thoughts might be on that.

Elsa:

Well, sadly, we tend to lose a lot of this kind of basically indigenous knowledge about the landscape. When you said people would find them and not know what they were, but they did know what they were, but within their own context, so they would've had their own stories for how these things formed. Because the story I'm telling you is just a new form of story made of science, but that doesn't make it more legitimate than the stories that you would've told. It does make me wonder if you are looking now and seeing this crystal lying in the ground, and of course you can get someone like me to tell you that story, what might they have thought finding half a bubble filled with crystals, perhaps linking it to the faeries or perhaps some kind of myth of how the landscape is formed or maybe nothing to do with any of that, maybe something else entirely that we can envisage.

But I definitely think these things undoubtedly would have played a role when it comes to fossils. I mean they also come in such compelling shapes which are not always immediately obvious that they relate to a living thing. So stuff like belemnites which look really more like bullets or arrowheads, they quite often did think that they were the spear tips of arrowheads or something like that that was used for piercing because they look like they would be when actually they're the inside of the mollusk of the squid like creature, but you just wouldn't think that from the shape that they're in. So I think it's really interesting that there's this kind of step between the physical object and then our imaginations and then how we manage to interpret and link those two things together that would've meant, I imagine these things must have meant something special to people through, and not just in this more recent past, but right back to the first people coming to Skye after the ice age, I'm sure we've been finding these things and interpreting them.

Lauren:

Yeah, I mean it just shows the badly phrased question where it's sort of thinking objects and things only have one definition of what they are, what they can mean. And I suppose it was meaning scientifically, people wouldn't have known scientifically what they were, but they certainly, like you say, they knew what they were because they were in the place in the land that they knew so intimately. So they were just immediately through proximity woven into their consciousness. And of course they were okay. Yeah, we find because there's so many of them, you would be finding them quite frequently.

Lauren:

I started relooking at Ammonites whenever I learned it came from Ammon the horned God. And I was thinking about, I wonder if anyone thought about are they to do with a more invasive horned sheep species or I started building up my own mythologies around things that I've never, I'm not sure if

anybody else would think that way, but they occupy a different place in my consciousness now anyway, just through having experienced them and handled them and seen them in place.

Elsa:

I think these poetic connections do really matter too. We were talking about the steps in the landscape, the trap landscape, the steps that you see. And what I found really amazing is learning from somebody who farms sheep that sheep will also graze in such a way on the hillside that they actually create their own lines and steps on hillsides, which are almost like the miniature sheep made versions of these massive geologically made steps. And I find that fascinating then you think, well imagine, a myth might build up where the big geological ones are actually created by some sort of creator sheep from the dawn of time that's grazed across the land and made these steps because those processes feel the same even though they actually have nothing in the sort of literal sense to do each other, but they have similar appearances. Of course we love to draw connections between shapes with pattern recognition machines, humans, I think we draw lots of parallels between things that are meaningful to us.

Lauren:

That's an incredible thought. I suppose it's like who the different agents are within the landscape, is it a glacier or is it a sheep? They're all creating their own tangible marks and desire lines and yeah, I really, I love that thought. I'm sure Yvonne, who's joining us on the day will love that thought as well from a crofting background.

And finally just sort of talking a wee bit more about your mammalian specialism, I'm thinking about how ourselves as mammals can connect to your research, and I'd learned that some of your finds in Skye have been really key in understanding the development of the small mammals that survived after the last mass extinction, and then how these tiny mammals diversified into the huge range that we see alive today, including ourselves. So I wondered if you could just touch a wee bit on the paleontological significance of Skye in relation to these mammals and how we ourselves connect to those tiny finds that you've uncovered.

Elsa:

Well, Skye wouldn't have looked anything like it does now at the time period that I look at my fossils. In the middle of the Jurassic is the time period I'm most interested in. The fossils come from Skye and much of Skye was fluctuating between being under shallow seas or just above them. So that the area that I work in is from a time when it was just above sea level. So we've got land, we've got a landscape filled with dinosaurs. But what people forget is that at the same time lived our ancient ancestors. So the very first mammals, which at this time period were quite small. If you saw one running across your foot or something, if you went back in time, you would think it was a mouse or a rat. They were quite little, probably most of them would just fit in the palm of your hand.

But actually internally, their skeletons weren't quite the same because very, very early on, rats and mice didn't exist at this time, but that's superficially what they look like. But their bodies are basically being assembled into what is the sort of blueprint that all other mammals are built upon. So they're beginning to have, their limbs are beginning to come more underneath the body, and they've been sprawled out more, their blood is becoming warmer and their metabolisms are speeding up. And things like nowadays, mammals grow really, really quickly when they're young and then they reach adult size and then they stay that same size. But mammals didn't do that back then. They live much, much longer lives and grew their whole life long. So we were this weird mixture of ancestral things and modern things, but by studying them we can see how these different growth patterns and stuff then emerged in us. So it gives

us a very, very early and very ancient insight into where we come from. Before we were anything recognisably human at all. I think even though they seem so distant from us, they are already deeply meaningful to who we are and where we come from. But of course living in a landscape quite unlike, quite unlike seen today and filled with creatures that we can really only just imagine.

Lauren:

Well, I think you've really definitely moved us from volcanic activity right the way through to a very unfamiliar landscape teeming with life that we're now imagining in our minds and how we can connect to those little mouse-like creatures that existed in the place that we're standing on. So thank you so much, Elsa, that was really, really amazing.

Elsa:

Well thanks for having me. It's a pleasure.