

EAC12 Q&A Session 8

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Good evening everyone. This is the question and answer portion of Session 8. My name is Eric Marks and I am the mc for this stream.

So starting off, our first question is for the [Crannog Centre](#).

Do you find that you get more local visitors or more visitors from elsewhere, mainly from Scotland, the UK or elsewhere?

Great, thank you. I'll just say the time also here with Jason, who is doing the textile project with me, if anybody just...just so that you know that. Thanks, Eric, thanks for that question. I suppose the short answer is that we're roughly sort of 50/50 split between locals and people from elsewhere. But it's quite interesting really that in, if you like, a pre-COVID environment, we were definitely reliant on that very large proportion of visitors who came from overseas. We used to have large coach parties, coming up, especially with one particular US tour group. And it's a good income string when you get a coach party, because instantly you've got, you know, 40 or 45 people, or even if the coach has only got 28 on, but basically you've got all of those people coming through your doors at the same time. So from an income point of view, that was a very important thing for us. Interestingly, now that we have have been going through COVID last year and we're now trying to sort of think about a post-COVID environment for the museum we're definitely looking towards, sort of future proofing ourselves against a reliance on the overseas visitors. We were beginning to do that anyway before the lockdown, and we've definitely begun to connect more with our local residents than we had perhaps in the past, before about sort of five or 10 years ago, there wasn't much connection to local people, but certainly in the past four years, we've begun to sustainably do that and invest in developing various sort of longer term links with our local communities. And in a way, our mantra is, which is something that Aidan had touched on in his presentation, our mantra, if you like, is something like, "Only by connecting to the communities of today, can we connect to the crannog community of two and a half thousand years ago". So what we've done in the past couple of years to connect more to local residents is, we've managed to, well, we've certainly increased our volunteer hours. We used to have just a few a year, you know, in recent years, but last year, sorry, 2019 - we're not already recording 2020 figures - but in 2019 we've recorded 4,000 hours of volunteer hours, which was absolutely fantastic. And obviously those people are largely going to be from our local catchment area. We've also increased our open season. We used to only open from April to October, but now we open from February to December and we really only close in January for maintenance, which isn't much fun in the middle of all the snow, but that's how it is. We also do things like free events for local people. So for example, our Celtic Yule event is always free. And again, because that's held in the winter, the chances are that that's more local people who will come to that than tourists. And we've also got various schemes, like our apprenticeship scheme, which recruits local school leavers from the area to come and work with us for a year and things like that. And we're definitely going to increase that sort of... keep that trajectory going when it comes to local residents. We think that a post-COVID environment is going to completely rewrite the way in which museums work and our reliance on regular old income streams, such as the visiting tourists and coach parties and things... we're going to totally rewrite and revise how we have to find our money coming in. So I hope that gives some sort of an answer to the questioner? It does. And that kinda leads into the second question.

How connected do the local residents feel about the centre?

Yes, well, on the strength of all those... on those things that I've just mentioned there, the proof's in the pudding really. With our recording of data such as volunteer hours and so forth and the fact that we've started to get these local schemes up, we are definitely seeing much more of a connectedness to people and much more of an awareness. We're just about to do a big development project on the other side of the loch. And we got a Community Asset Transfer Scheme to get a bit of forestry land Scotland, land to do that. And we would not have got that Community Asset Transfer if we hadn't been able to demonstrate that there was very strong local support for what we want to do and that was evidenced through lots of sort of data gathering over the past two or three years. But also sort of qualitative as well as quantitative data and recording it in different ways. People's experiences with us as well as just facts and figures about their own sort of demographic data and so forth. And all of that data that went into a huge bulk of supporting information for our CAT application. So I think that the proof's in the pudding there into how connected we are with our local people, because we wouldn't have got that scheme if we hadn't been able to prove that we did have their support.

Great, all right.

I have a question for Caroline.

How does one go about finding coloured earths for paint? Thank you, that's pretty much the main question people have usually about how to make their own pigments. Generally, the answer is that you have to forage for colours and that's a whole range of different skills, but it can very easy and very natural as well. Personally, for example, when I started, I used to go on the seaside, so just go to the beach and I was lucky enough to be at the time..., not so long ago, in the South of England where some of the beaches are actually completely covered in colours when you want to see them, if it makes sense. But generally if you walk around wherever you go, in the countryside, for example, you should go for walk through woodlands, ideally, even in your garden, you might find some clays. I prefer starting with clays because they dry very easily, they are very pleasant to use and to grind [...]. really. You can also find coloured sands. But generally look for the side of [...], of roads. Of course, be careful if there are some chemicals sprayed on the shoots, for example, but if you find some coloured clay and the colour can be just a different realm [...] colour, you can use them to make your own pigments. After that, there are some people, who forage colours in cities as well. I'm not used to that myself because I live in very rural areas but you can find that as well. Personally what I prefer to tell people who want to start, is an interesting piece of brick. Brick or tiles or even broken unglazed pottery and sort of things, because it will always be clay [that is cooked], but it's a clay. You can grind it as hard as it is. If you find on the side of a field a very old brick, for example, in my view, an incredibly bright red colour compared to modern, very orangy ones. That again, you can just grind in a pestle and mortar and use water to levigate it, to separate the particles and make pigment out of it. Cool. I live in the South Eastern United States and we have a lot of iron in our soil. So our clays are really bright red and they stain our clothes very bad. So, but that's what I used to back when I was using like dirt paint and clay paint. That's really cool. All right.

I have a question for Margaret.

First off, I'm glad to see an experienced engineer getting involved in experimental archaeology. We have a couple in DARC and it really makes a difference to have practical understanding of material and stresses. I was curious about the hurdles as a ramp. Your demonstration has no side supports and I was wondering about the amount of deformation.

One of the interesting things is that in the images that appear in this book, it seems that they use ladders much more like ramps to begin with, before they made them much more vertical, if I can use that as an explanation. So what I was amazed at is, when actually put that ramp when I put the hurdle down, it hardly bent at all. I was expecting it to almost touch the ground and it didn't..., with no side supports, but in one of the images, what it shows, if you look very closely, is there's almost like two

vertical poles. And then the hurdle is fixed somehow to those vertical poles. And then the people are then walking on top of the hurdle. So it's a whole area that I don't think anybody's looked at that I'm aware of.

Okay, there is also a second part.

Is there any hint in the illustrations about the..., what distances they were spanning without support or how much you saw in the experiments of the amount of bent in the hurdles before the slope became too [unclimbable]?

Well, my experiment was concentrating mainly on using them as a scaffold board rather than a ramp because I wanted to sort of narrow it down a bit. And, one of the issues when testing was that there was a lot of spring in them. They were quite bendy, but they weren't actually flimsy. The amount of load that they could hold was quite considerable, really. So it's an area that really needs further testing. So that's why I'd like to look at them as a fabric material rather than a sheet material.

Okay, gotcha. I have a question. Well, I would say that they span equally as well as sort of modern scaffold boards would they provide the same sort of working area.

Okay, so roughly six feet or two meters or so?

Yeah, well it's more the shortest width of that three, four foot, or just over a meter and then whatever length you require, really.

Okay, interesting.

The next question is for [Aidan](#) and al.

What is the ratio of male to female depictions in the figurines?

Great question, we don't really know because to make a decision would require a phallus-centric interpretation as it were. The figures generally don't have a depiction of genitalia, which would be the way, obviously, that we would decide upon the biological sex of a figure. Most of the ones that Mike was talking about there, the Kilbeg figures, there's nothing to say. If anything, there's certainly, you know, there's no prominent phalluses on any of them. And to illustrate the point, there is a figure from Ralaghan in County Cavan, which is Early to Middle Bronze Age and it has typically been interpreted as a male figure because there's a hole down at the waist level or below the waist level with people have interpreted as holding a, maybe a stolen phallus. But as far as I understand that phallus never survived and what you have there is a hole, which of course could be a vagina. So no specific answer...one vague in the details on that one. And even when we do have the evidence it's interesting that people would reach for the kind of the male warrior figure rather than necessarily, you know, the female figure. But it's a very interesting question. Thank you.

Okay. And follow up.

There's the making of the replica figurines. Did you approach it from a purely technical perspective, a groove this big here, et cetera, or did you also allow artistic interpretation?

That question is bang on to actually what happened. So it was a collection of archaeologists and artists. And when we gathered as a group, on a cold day in December 2016, with our bronze axes and with our alderwood, we basically discussed this and everybody said they would go for whatever it is they want us to do. So the artists and some of the archaeologists went for a more expressive, interpretive approach, which is to make the figure they wanted to make, or whatever figure they felt was coming out of the wood. Some of the wood had kind of branches on it and so on. But Michael Stanley, who's the archaeologist who actually excavated the Kilbeg figure in the bog, he very determinately went to make the Kilbeg figure as he remembered it, cause he had that personal connection. And down the years since the ones that we have found more interesting are the ones which most evoked the Aboriginal Bronze Age figures rather than the other ones. And we erected them, just inside the Gates of CEAMC. And they have been watched by the general public and passers-by for years and have always provoked questions. People always ask us, what are they, what

are they? And we would tend to say, well, we don't really know. Thank you. You're welcome. Thank you so much.

All right, next question is for Martha.

You mentioned how a lack of skill might have impacted some of your experiments. How are you planning on to account for this in the future experiments?

That's a great question, thank you. So first of all, if I get the opportunity to do any more work on this research topic, which I would love, I would, like to do more of what I'm doing at the moment, which is talking to people and presenting and getting other people's perspectives. I'd like to get some more formal training from more experienced people. But I'd also like to just repeat what I've done. Obviously, there was a huge amount of limitation, which I explained in the presentation due to COVID, which not only hindered the resources, but also hindered my ability to be around peers and to share knowledge and experience. And then from that, it was very much quite an isolated situation. So I'd definitely like to repeat my experiments, increase the amount of repetition so that I can not only learn through doing, but also, record it and use that data. So I think that's mainly it, it's a mixture of learning from others and learning by doing, and improving upon what I've already done, by better recording methods, more time, and better resources. I hope that makes sense.

It does. And the second question is to you also.

Do you know why the raw material for the points was suggested by David and all to be either human, wild boar or brown bear? And has it been considered to do ZooMS (Zooarchaeology by Mass Spectrometry) analysis?

Yeah, brilliant. This is one of the really big questions about the collection. I mean, there's so many..., I mean, this collection of [...] the work was started on it, and then unfortunately, was stopped. And there's just, there is so much to do, which is incredibly exciting, but also quite overwhelming as well. One of those things is about species. There's probably two main reasons why David et al believed those three, but the most likely the first is because, I think I mentioned Ireland has a very different mammalian fauna, kind of portfolio, I guess, to the rest of Europe. There was no...there weren't any ungulates, there was no deer, no cattle. Deer didn't come in, I don't know actually at what point deer came in, or I'm sorry, during the Neolithic deer came in, and cattle wasn't until the very end of the Mesolithic and the beginning of the Neolithic. So at the point in time that these artefacts were produced, there was just... those animals didn't exist in Ireland. So the only ones that were present that we know of, at that moment, were brown bear, which has clearly been recorded previously, humans, ourselves, and wild boar. Obviously there's much smaller mammalian fauna, but those aren't viable for, or unlikely to be viable for the use of producing bone points that we're seeing in terms of size, in the collection. I think there's a possibility and some debate as to whether there were wolves in Ireland at that time. That's something I'm not completely sure about. So whether that would be an option. The other reason for those three is because I think in the collection and also in [Loch ...], which is one kilometer away, with a much smaller collection have had an identified human ulna bone, modified into a bone point. So there is at least one confirmed human bone and point, possibly two. So that again influences the quite unusual idea of having human remains as tools. ZooMS (Zooarchaeology by Mass Spectrometry) was noted as something that they wanted to do in the program going forward. But again, unfortunately, due to Peter Woodman's passing and the hiatus in the project, that's something that hasn't been done. That's something again, if I had the opportunity in the future, I would really like to do, because I think this topic is not only important for understanding this assemblage, but may be able to tie Ireland into other trends that we're seeing such as the use of human bone in bone points in The Netherlands in relationship to Doggerland. Thank you so much.

Alice, are you ready, here's one question for you.

You mentioned that some primates suck out the silica from stones. Do you know if there is any evidence for this in tools used by early humans?

Thank you for the question. This is a very interesting question. What we see is there are some pounding and cracking stone tools, even in the early Oldowian phases. There have been some use-wear studies, where they were comparing stone used for cracking nuts with the stones from Oldowian sites. And they are seen, and they have a comparable usewear, but we don't..., we are not completely sure how those tools were used and especially like, if we refer to silica and edible silica, that's a different question because for example, silica can be dangerous to human beings, especially [...] silica, so we, we see comparable, pounding tools between chimpanzee, for example, or primates use and early phases of Oldowian, but we don't think that early humans were eating or eating silica out of rock.

Okay. Very interesting. We have a second kind of question for you two. It says very interesting investigation. **If we look at modern humans, can we see any obvious skeletal differences between hunter gatherer and modern man, like the overbite having come in after grain entered our diets?**

That's a very interesting question and it's very broad. What we've seen - that was a bit out of the topic of the presentation - but what we've seen actually is that there are differences in the physiology and skeleton between Neanderthals, so Neanderthal species and modern human species, or homo sapiens. The reason of those differences of course goes..., they can be related to diet components, but as Neanderthals they were still hunter/gatherers, what we think is that the difference, especially in the thumb morphology were more related to the functionality and therefore to the dexterity implementation of the human hands. But of course there are some interference with diets because different diets can, for example, cause some pathologies on the osteology of the human hands. I hope that answered the questions. Yes. Thank you. Okay.

Phoebe (Baker), I have a couple of questions for you. **You said that the birch tar combined with ash was the strongest. How did you investigate this [...] machine? How did you define a strong glue?**

Thank you for the question. I actually wasn't expecting any questions. So that's yeah..., thank you. So what I was doing, and this was kind of the exploratory phase of my research was, I looked at a range of different, I guess, recipes of birch tar, so with different additives so I tried one with beeswax, one with rosin and one with holly ash. And I've tried a couple of combinations between rosin and ash and beeswax and resin. And then the way that I tested them... so I left them to dry for a couple of days between two pieces of leather and the way that I tested them was by, putting one side of the leather in a clamp. And then the other piece of leather that had been glued together with it, had a grommet in it. And I hooked that to a machine that measures force, but I think it was just in kilograms rather than Newtons. And I used a lever to pull that backwards and I measured how many kilograms it took to pull apart that bond. And then at that point, my only way of seeing which one was strong really was a comparison to itself as between the just birch bark tar with the other recipes, which the holly ash was getting kind of six kilograms of weight whereas the birch bark tar alone was only getting 0.35 kilograms of weight. So there was quite a big difference and I hope that answers it. It does. Okay.

Part two was that you left us hanging. What were the results of your further experiment?

I left you hanging because I literally have finished pulling them apart today, this afternoon. So I have not done any analysis yet because this is kind of my dissertation research. I'm a little bit behind because of COVID. But at the moment, the ones that I did a 20% inclusion of ash, so 80% tar 20% ash, seems to be kind of the most consistent one. So I tried mixtures up 10%, 20%, 30%, 40%, and then a few at 50% and a few at 60%. And whilst the 30% and 40% still had ones that were quite high..., so kind of, I did get a couple that were 16 kilograms, which was way more weight than I expected. They tend to, once you hit about 30%, it seems like I haven't done any analysis yet, so I could be a bit wrong, but it seems that they start to become quite random. So the 40% one, I had one of my

strongest ones, I think, it was about 15 kilograms, but then I also had one that fell apart with only two kilograms of weight. So, it seems that if I was making it, I would stick to the lower..., to the 20%, because it seems more consistent. I hope that answered it. It did, thank you so much.

Okay, let's go back to Lawrence and al.

The first question is: in the videos, you sometimes use two hands and sometimes use one hand when using the tool. Was it a personal preference or did you see one that was more efficient or comfortable?

So Noora's our use-wear specialist in the project and Chris is the person you saw in the video who was basically using the hafted core axe for digging. And I took over from him and I was using two hands because of the arrangement of the core axe angle in relation to the handle. The second video you saw was Chris using a smaller handle and he was holding in one hand and he was working wood. And if you can unmute, Chris, he could probably explain why he went one-handed with that. And we were both using two hands for the digging.

Chris: Yes, I'll try to speak to that, thank you, Larry. It really was just kind of personal preference and to do with control. So it was a small piece of what I was chopping. I have done further experiments. We have research in the department, which I can't say too much about, a PhD which has just been completed, which speaks to the kind of ergonomics of using two hands and hafting the amount of force that you can apply. So in this case it was personal preference, but one of the benefits of the handle was that you can apply significantly more body force using two hands when you need to. Hope that answers the question.

Larry: Just to add to that, when we were both in that deep pit there facing the sands, which were the 500,000 year old sands, it was a vertical trench and the two hands were just basically the way of engaging and getting into that sediment and pulling it down. It's basically as simple as that.

Okay. **For part two, it says, how did the locals use similar tools in this way?**

Well, in terms of digging earth, we didn't observe that, but that doesn't seem to be a tradition using something like an axe or an adze, they use a hoe. These are farming societies and they are breaking the earth with a different hafting arrangement. But in terms of woodworking, the adze is a very, very effective tool, as I said in the video, but also one that's very widely used across this woodland area for shaping wood. It's also used not just for woodworking. It's used in a variety of practical ways, like for example, scraping a skin, it can be used for digging. It's one of those kinds of basic tools, like a screwdriver today you can use for purposes that it wasn't really designed for. You use a screwdriver to pop open a lid on a paint tin or can, that wasn't designed for that. But yeah, it works that way. The adze is one of these multi-purpose tools. The other tools, the axe that people use in the communities. So there's a hoe, an axe and an adze and those three things basically allow them to farm and extract what they need from the woodlands. Why make more tools when those things do what you need? That's true. That's true. Okay.

Part three of that is: It's great to see an archaeologist connecting with the local people in a meaningful way. The wood chopping video reminded me... in Papua New Guinea, I saw a person chop open a tree trunk with just a few chops of a machete. There was a lot of handling skill, not only good materials. Could the resin hafting maybe work if the tool were handled in a certain way?

I'm not sure if that's a question about the arrangement of the haft and the core axe that was in the video made by John Kenyatta. But if it was, I still don't think it would work. And Chris could talk about this as well, because the asymmetry of that stone and the weight of that stone wouldn't work in that particular handle; the handle would need to be changed. Perhaps if you changed the handle and added more resin to it, it might've worked, but we didn't want to impose our expectations on him. We wanted his knowledge of the materials and how he understood the shape of the object, the weight of the object...and he knew what we wanted to do with it, so working wood..., so hard contact. But because it was out of his experience, you look at the iron, the iron edge and the axe and

then the adze, they are very thin, very lightweight by comparison. So I think we'd worked with him over time and maybe this is something we could go back to, him and others, who have the indigenous knowledge and say, all right, you've become familiar with these things and let's see what you do with them. That could actually produce some really interesting results because you have the knowledge of the woods and the adhesives. And once they got the understanding of the properties of the stone, then you might have something really effective, which would be particularly useful for understanding the deep past that we were looking at. Thank you so much, all right.

Heading back to the top of Crannog Centre, [Fran](#).

Do you also get inspiration from new experiments, other ideas from your visitors and volunteers?

Okay. Hi, sorry. Yes is the short answer to that. Definitely, because everything we do is in the public domain then, there's no doubt that the visitors, watching as Jason said in the video, you know, they see the failures as well as the successes and that nothing is hidden with what we do with..., regarding to that. But I'll hand over to Jason who can answer that a little bit more fully because he's definitely the one at the coalface when it comes to that.

Jason: Hi there. I just think the fact that all all the experiential work we do here is live anyway. So it could be something that spins off research into a completely new direction. For example, we have a dye that just failed systematically, and then we might have a chemist who's coming around on a tour that suddenly points out why and what we need to add to the dye to make it to work. And all of a sudden it's kind of spinning off in a completely different direction. So I think, you know, our whole approach really is... we're kind of constantly making ourselves vulnerable and we're holding ourselves up to critique. So when the visitors come around, they are welcome to join in. So it's not that we are showing things to people, but we're actually inviting people to take part as they come around the Centre. And sometimes you'll get people that will kind of be sitting for an hour or two and again, that will, might send us off into a whole new direction about basket making or making thread or making chord or... whatever it is. So we are really, really open to that. And I think that's one of the ways that the museum has developed in the way that he has done. Great.

How are you going to source the wool in your recreation attempts? Even heritage breeds are likely to be extinct matches for ancient fibres.

Certainly part of the testing that we're going to do is going to try and identify the sort of closest living sheep breeds to the descendant, if you like, of the animal that would've given us the sheep. But again, regarding the sourcing of that, that's part of the textile project and again, Jason can say a little bit more about that as well.

Jason: Yeah. I mean, as soon as we find out what breed of sheep it is we'll match it as closely as possible. Up until that point, we'll probably use something like soay something like that. A very, very long staple, very, very easy to spin and he's probably the closest to our prehistoric ancestors kind of the sheep that they were using. I think just in terms of sourcing the fleece, this links really back to the question we were talking about earlier on about, how do we connect to our local community. And, you know, we're connected with our local farmers and every spring they bring all the fleeces down. You know, they can't get rid of them, they can't sell them. So all the fleeces are brought down to the Crannog Centre and then they become garments or tablet weaving. So again, and we've got people locally who have got primitive breed sheep as well. So that's what we'll be doing, so hopefully this year, again, it will be soay sheep.

Okay. [Caroline](#), I have a couple of questions for you.

Were you an experienced artist before, did you have a lot of experience with this type of material or technology and how steep was the learning process?

Oh, thank you for the question. I'm still not an artist. No, I have never been... that's the interest I have is that I like painting buildings. And the examples I produced for the conference are actually some of

my most finest work, shall we say, otherwise it might be one or two colours. So that's what I quite like actually, experimenting without the background of modern, artistic knowledge. So I feel like I both lose from not knowing what kind of softness of paint brushes I would use for such and such a paint or how binders all work, especially modern ones. But on the other hand, I'd never heard about a [...], for example, before I started looking at pigments and I never used to do [...] to pigment to grind them with a sort of glass or whatever the name, a glass... very smooth pebble, shall we say, that makes an extremely fine paint.

(Okay.)

People would use something like that. So the learning curve is incredibly steep. I learn every time I need somebody who knows art in itself, so who knows geology, or who forages or walks quite a lot. It's always very, very interesting. So hopefully to answer the question is: I'm not an artist. I don't think you need to be an artist to start making pigments. And I'm hoping I will get a better understanding of all these possibilities and solutions, but later on when I know more about the actual archaeology and evidence that are around and maybe cross both one day! All right, okay. Here's another one for you. It says,

Have you ever explored botanical pigments or found any evidence or indication of their use i.e. pigments from plants as distinct from dye?

Yes, to have met Jason at the Scottish Crannog Centre, I can confirm that there is a world of colours [really lying] into the plants, the organic pigments. So the dyes, yes, I've done a tiny little bit of natural dyeing for Iron Age colours because one has to, at some point. The difference there is that... as said in the talk, you have organic and inorganic pigments. So the organic ones, the plants, the dyes pigments are very different and work on a completely different base than the mineral, the inorganic, the stones and herbs ones. You can turn a dye, so a plant material into a mineral pigment by a technique we call 'laking'. So if you make a lake, you are dyeing a white material, for example, chalk, if you grind it, you can get [a dye to adhere] to it. And to get in the end, when it's dry, a coloured pigment, a coloured mineral. So that exists and that's existed in antiquity. I don't know at all when it started. I can mention mainly [Middle Age] that have been very, very popular, especially in..., well, where we have texts. So the Greco-Roman world. I think they were used mainly on the Tanagra figurines, the very, very fine, sculptures. You'll have to look it up, Tanagra. But they were only used on clay figurines and also as a basis for makeup, for cosmetics. And some other ones, some of the lakes are mentioned as pigments by Vitruvius, the Roman author, who wrote 'De Architectura', about pigments [...] buildings and fashions and all that sort of things. So lakes from plants turned into a mineral pigment definitely existed. I have been asked about [...], especially in Iron Age and British Iron Age contexts. You can lake [...], it was more popular to lake indigo, to make an indigo paint and indigo pigments, in Roman times and in Roman texts. So you can make it, but as far as I know of other people doing experiments, you get a very light airforce type of blue that can look slightly on the grey side of things as well. So there you will have the difference between what is possible to do and the actual archaeological or textual or historical or ethnographic evidence of what exists.

Oh yeah, that was great. Margaret, I have a question for you.

It says, is there a minimum thickness of willow with these woven branches that you think make our hurdle usable as a standing platform above the ground? Did you experience or try out these hurdles above the ground yourself?

Yes, I did. We did a..., it wasn't very far off the ground. Just a couple of inches, but, yeah, we put a hurdle, suspended slightly. It felt a bit more like walking across a trampoline because there's so much given in it. It's quite springy. It's quite an experience, which is interesting. When it comes to the minimum thickness withies I think one of the amazing things is that as you're combining an engineering material with what is a textile, or woven textile, you get a combination of forces that make it stronger. So, I mean, to actually answer the specific question I would say up to about one

centimeter and above would make a good hurdle, but what you actually get is something in textiles called the crimp, which is a sort of up and down weaving combines with the..., as you are making a hurdle, you're actually pre-stressing - that's an engineering term - the withies. And so when you load it, these forces start canceling each other out, which makes for a much, much stronger, product in the end. And I think it's that that was never really been looked into. I mean as I said in my presentation, what I couldn't believe is that modern day, we use hot air balloon baskets, which are woven. They are part of an aircraft, and yet nobody has done any testing on them. And you know, again, as any engineer will tell you, the thought of actually taking people up in the air in a contraption that has never been tested for its strength just seems unbelievable. That's very true.

Aidan, I have a question for you. **Among the storytelling side of experimental archaeology, what can help in selecting the 'more interesting' stories which can be told about the past? And should we?**

Yeah, that's a good question. Well, I suppose it's kind of the example of this conference is...what is it, 80 papers, told by hundreds of people, telling multiple stories. So I suppose my response would be a personal one to that. As an archaeologist, I see myself as a storyteller, and I'm not interested in monumental architecture or structures of power, all that kind of thing. I actually am more interested in dwellings and daily life and the routines of making your way in the world, of raising a family, all of those kinds of things. It's what the anthropologist Clifford Geertz said. What do people do? What do they think they are doing and to what end are they doing it? So if you were to take the kind of the example of the anthropomorphic figures there, we would see them as artifacts of the past to be gathered into a museum to be curated, to be conserved, to be managed, all of those things. And we kind of capture them as objects in the ways that Haida and the Tlingit said shouldn't be done to the totem poles of the Pacific Northwest that they shouldn't be in museums, they're meant to fall into the ground. They're meant to get covered in moss and rot and go back down into the ground and they often are... when they haven't been taken... often in colonial interventions. But for me the wooden figures are about people in the past, who had intentions, who had hopes, who had fears and they had stories that they wanted to tell. And one of the stories that they were telling is through one of these figures, so for me experimental archaeology...for me, just for me personally, it seeks out the ordinary, the routines of people who don't have a place in powerful structures, who don't have a voice in history and for example, I regard houses, ordinary houses as the place where society is made, rather than public assembly sites or whatever. I mean, all of those things are important as well. So I kind of go with the American historical archaeologist James Deetz 'Small Things Forgotten'. But in answer to the question, you know they're the stories I'm interested in. And clearly from this conference, there are scholars all across the world... and let me repeat again, as I've been saying on Twitter and social media over the last couple of days, it's just stunning. EAC 12 is a model for how all global conferences should be carried out. And I'd say that you know, there are much better funded and more powerful organizations like EAA or SAA or you know, organizations across the world, the quality of the conference and the ability to reach a much larger number of people and the ability to have people to be able to speak at this conference who could not otherwise do so. I think EXARC should... and all of the people involved in the organization of this conference should be delighted. And in a sense, EXARC has enabled multiple stories to be told. So should we tell these stories... people should tell the stories that they want to tell and there is no one way of, you know, experimental archaeologists deciding which stories are the important ones and which are the ones that don't need to be told. But it's a great question. I think it's up to every scholar to be thinking about what stories they want to tell. And for me, the kind of work that we do at CEAMC is in a sense ordinary people's lives, the skills and knowledge that they had, the things that they made, things that they used, the ways that they lived together and rather than anything, you know, massive [...] monumental landscapes, but that's just me. Thank you. Thank you. This next question is for you also,

it says:

Is there a possibility that the figurines were a part of a burial ritual?

Oh, that's a great question. Yeah. I mean, these are all great questions, but I think that's actually what it is. So in Bronze Age and Iron Age Ireland, we have in our boglands, and it is a similar pattern across Northwest Europe, obviously, we have tended to think about bog bodies as being ritual deposition in certain circumstances or maybe over-influenced by kind of Roman texts and so on about what's actually going on. But we need to remember that in the past and in many societies, the boundaries between people and things and animals are quite fluid, and there isn't the straight distinction, you know, I don't really understand post-humanism, but I think that one of the aspects of it is that we need to put ourselves back into the world. So what is actually going on in these bog lands? They're certainly bringing human corpses out onto the bogs and they often show evidence for violence. But they do other things too. They carry out and put into bog pools ordinary objects, like quern-stones for grinding grain, wooden vats of butter, which are going into the bog, which could be there for preservative reasons, but it could also be actually offerings in some sense. The Pallasboy, a wooden vessel, this is a large wooden trough, which had a long life. It showed evidence for damage and repair and use and maybe it was used for heating water, maybe inside an Iron Age house, but at some stage the people who made and used it over the years decided that object was now either dying or dead and they carried it out onto a bog, and it would be a heavy thing, and they put it into a bog pool and they pinned it into position using branches, sharpened branches actually, which is exactly what happened to some Bronze Age and Iron Age bog bodies, that they were pinned into pools, in water. I think what the Kilbeg figures and figures like that are... what we're seeing is the very end of the story. There's an awful lot that we're never going to know but essentially could it be used in burial ritual? I think this is what's actually happening. It's a great question. I think what's actually happening is people are regarding something that we'd regard as a thing, as animate, that it had a life, it may have been a short life in this example, I think that our own experiments demonstrated that it probably was erected vertically in a bog for a period of time, probably in terms of months rather than years, because it certainly had been exposed, but what wasn't badly damaged, and its sharpened point was perfectly pristine. So it was standing in, in waterlogged soil, which is anaerobic, so that it's very well preserved and then at some point, they made the decision it's time for this to be buried. And that's what they did. So we see in that process how people in the Bronze Age and Iron Age are moving through the world and in terms of people, in terms of objects, in terms of landscapes, in terms of things and also in terms of those key stories of birth, life and death which are coming to all our humanity, I suppose. Thank you. Thank you.

Martha. In stage one, you decided to grind the surface of the bone. Did you also consider other methods like chopping and if so, why did you choose grinding?

So the reason why I grounded the surface of the bone for regulation is actually because it was specified in the publication. So the first stage of the publication by David et al was the regular regulation of the diaphysis of the bones, the central part of the bone through a oblique grinding, but with the distal ends, the joints, still attached, which through my experiments, I found that that just really didn't work. So the only reason why that's the only method I tried was because it was specified in the proposed production sequence, which I was testing. In the future it would be really good to look at other methods for doing this. It would be interesting to see if there would be a difference if you removed the distal ends prior to trying this, but I still have concerns about this method because the thickness of bone and profile varies. So if you're grinding an edge that looks as if it's thick on the outside, you could.... that should be wearing a weakening [of] the core material itself, which is what I experienced and also because just using a static grinding surface, which in my case was flat, the natural curve of the bone meant you couldn't target areas. So yeah, it would be really interesting. I think it would also play a part in how the bone is initially processed, which is not something I'll get

into now, but something I'm also interested in within bone and osseous studies that we don't necessarily talk about the initial processing of bone before our experimentation. So whether having fresh, what you call green bone, dried bone boiled bone and aged bone, how they might affect this stage and the methods that you could use to alter them.

Okay, that also goes into the second one question:

Due to COVID your options in raw materials were limited. How did it affect your research?

Yeah, this was, this was a huge problem. I think I explained we were really limited to resources. So I was only able to get my bone from one local butcher's, who were incredibly kind and gave me any bone off-cuts that they had. Initially I specified that I only wanted to be working with pig bones, because of discussions I'd had with specialists at UCD saying that realistically, that was the closest I was going to get to a wild boar. It would be very difficult for me to get wild boar material and that especially with COVID, absolutely. Obviously I can't really use..., especially for [...], can't really use brown bear or human bone fit for such research. So initially this was a big problem. It meant that the number of experiments I was able to do was limited. So I was only able to repeat each experiment three times, which I completely understand from a scientific rigor perspective it's just not ok and also I would have been hoping that for each experiment, I would start off with a fresh, previously unexpected piece of bone, so that I could then compare that material to the collection and isolate different macro-wear to each activity and therefore get a better collection with which to use. But again, because I didn't have enough material, I just had to use what I had. However, this did mean that I actually got a better understanding for how one stage of the production sequence affected the other, which I think was actually a really important point for me, understanding, for example, where the regulation of..., the initial regulation of the bone through grinding weakened the material, how that then affected the removal of the distal ends and the methods that I could use with which to do that. Also I was forced in the end due to shortages at the butcher's, to use cattle bone, which obviously from a proxy perspective was not realistic for Ireland. However, again, by using this in my mind, I thought, okay, well maybe I can look at the amount ..., the size of bone and what that can produce in terms of the tool and material wastage. So actually comparing the cattle bone in some, what I know, is not the same for the brown bear in terms of size. And I actually found that the brown bear, sorry the cattle bone, produced workable material so that the final points that I have were all made from the cattle bone and it was thicker, it held up better and produced sizes of points, which I could see similarities with in the collection. The pig bone, in comparison, was incredibly fine and brittle. And I think here that needs to be possible a discussion about using modern domesticated animals, which are killed young, and which are bred for meat, to wild animals whose... potentially their bones are going to develop in quite a different way, they're going to be old, older. So it'd be very interesting to then later, again, in further research to look at and see how that affects things. I know that it's a very long answer the question.

No, that was great.

Okay. It says [Alice](#) and al.

Was there much variation in the gestures/sequences used by your modern knappers that could have been a difference more attributable to a style/school/community of practice difference?

That is a very good question, actually. And this was a question we asked ourselves when we decided our experiments program, because we were interested in the ergonomic side of the study, but we were also..., we were also asking ourselves if personal style or tradition of flint knapping, different flint knapping schools might have influenced our results. So what we did actually, at the beginning let's say... we planned an experiment assembly with our flint knapping participants, which came from different schools, different countries and I think the five of them represented five different countries, covering three different continents. In this way we had assembled and could cover, let's say, traditional personal styles of flint knapping schools. But interestingly, what we observed from our

results is that there is..., actually there is a very limited way, or very limited grips or grip types that can be used to hold [...] specific tools. For example, there are limited grips and they can be employed for, let's say, using and holding hard hammer stones, except for the basketball grip, so the five fingers, thumb [to] fingers grip, which was the one that was the most employed across all participants. There are not many other grip styles that can be used. So this gave us an idea that actually the ergonomic strategies of the human hands around the stone tools and the tools themselves they were really related to the ergonomics and to the shape of the tools. We also analysed internal variability among the different participants, which I didn't speak about that during the presentation, but we just submitted a paper and that is part of the paper. What we have seen then, although there was some internal variability, for example on the holding of the soft hammer stone, like handle [...], the internal variability was not that large. So again, the final conclusion was that the ergonomics and the shape of the tools then will require and recruit the different hand grip types. So I hope that that answered the question.

It did, thank you so much. [Phoebe](#).

Have you used any Palaeolithic glues in your own clothing creations?

That's a good question. I mean, the answer is quite sure, I haven't, but I would really like to do that in the future. And I also would quite like to investigate, using sewing technology, so like needle and thread, as well as the tar in the same point, I think that would make a really strong seam [and assess that].

Yes, I believe so too. Now the second question is:

Do you find there is a mix/recipe that you prefer using yourself? Maybe not the strongest bond, but a pleasant or easy to use mix between birch tar and ... wax or ash etc?

Oh, that's a good question. I think actually the ash, if I didn't have gloves, I think holly ash is quite caustic. So I think, I probably wouldn't choose that one as my first one. And I found that the rosin took quite a long time to melt and it was still quite..., when you tore them apart, you could still see bits of rosin that hadn't melted properly. So I think probably the beeswax would be my favorite. It also had the most noticeable change. It was a very matte colour, whereas the others were still quite shiny. So I think, I think beeswax is my favorite, even though it was not the strongest at all.

Going to theCrannog Centre.

Fran, have you been able to determine the staple length and crimp of the fibres in your sample? Diameter would be easier, but these other qualities must be challenging.

No, that's what the testing is going to be done. In fact, this is so timely because just last Thursday, I went down to Glasgow University to take the fragment down, in order to get those tests done. And one of those things will be to determine the staple and also the thickness of each individual fibre. So we should have the results of that by the time of our interview for the EXARC conference. We're going to book a slot for that in August to give designer Dr. Susanna Harris at Glasgow Uni time to do the analysis. So if you tune into that, then you should have some answers, hopefully.

Okay, thank you. The second question (for [Jason](#)) is:

How did you get the colour purple and what is the next type of loom you are going to use and how is it different to a warp-weighted loom?

So the colour purple was from a lichen called Ochrolechia and you find it on east facing granite. Again, it's another interesting process of how was this discovered. It has to be soaked in urine for a minimum of three months before you get any colour coming out of the urine. So I think it's beautiful that you get this colour, you find it in archaeology from the Iron Age in Austria but again, the question is how did people discover that and what were they doing to discover that? Sorry, the second question was...

What is the next type of loom you're going to use and how is it different to a warp-weighted loom?

So the next type of loom we're going to use is called the two-beam loom. So if you can imagine a

frame...standing on the ground, and it's got a bar at the top and a bar at the bottom that rotates and the wool is wrapped over the top of the bar and round and round and round, in a spiral over the top bar, over the bottom bar. And so you can imagine that when you weave as you..., you can move the bar that's far from the bar at the bottom and you'll end up weaving a tube of material. And you actually find this in Roman weaving, you find it indicated on... illustrated on Greek vases. It is different from a warp-weighted loom. With a warp-weighted loom you have a tablet-woven border that sits at the top of the loom... that's attached on. And you have multiple threads that hang down in pairs and you have sets of weights that are on the bottom of the threads. And then you have what's called heddle rods and they are attached to groups of threads, which you pull forward to create different what's called sheds or the gaps in between the..., gaps in between the threads. So technically they are very, very different. The two-beam loom is far easier to use, our twill sits much easier on it. I think there is an assumption that, you know, because from the Neolithic to probably about 1100 AD, the warp-weighted loom was assumed to be used for all textiles and also, you know, we've got a two-beam loom, we have multiple different types of textiles found during the Iron Age that suggest we probably have multiple different types of looms as well, each seating a particular kind of twill. So that's how it's different. I mean, what I find with the warp-weighted loom is to set it up a particular [2/1 twill] and what that means is [it goes] under two and over one, under two and over one. And then on the next row, it moves [a cross run]. So you end up with a diagonal, or you can get a [lozenge] thread on that particular kind of loom. It's very, very tricky to set it up, so moving on to..., it took maybe six to eight weeks to get it right, to get it set up. And this was actually working with an experienced weaver. So it wasn't to do with the fact that we didn't know what we were doing, we did. But technically it took that long to set it up. Whereas when we get a small... a model of a two-beam loom, which is now actually on the EXARC World Tour, we're able to set it up in a day and a half. So that's not actually saying that's how they did it in the Iron Age, but it seems to be the simplest possible solution. So the next mystery that's going to be solved is, did our textile actually come from this area, because our 2/1 twill, as I said, it's very, very unusual to see that in Northern Europe in 500 BC. You find it in Roman weaving, you see it 5th century AD in an English piece of linen, and then you don't see it much later on until the 10th century AD, when you start to see it woven into wool. So as I said, we've moved on to a tubing loom, and we're trying to find out the quickest, easiest way to weave our twill, in the best possible fashion, to see how much wool we can make using that loom. Both looms can be used. Both looms have got their strengths and weaknesses, but as I said, the two-beam loom, it looks like it's highly likely that [it's woven our] particular kind of twill, which is why we're moving over to that now. The only thing we've got in order to create this tubing loom has actually been a medieval etching. So we've almost had to back-engineer that and work out how it's worked. But we have got there now. We've actually got one set up and ready to go. So by the time we get to our interview in August, we'll be able to let you know how that's gone and then again, how the weave compares to making the same kind of twill on a warp-weighted loom. Thank you so much.

Okay, Martha, this is my last question.

As for future research, are you planning to recreate the finished shape of the pointed bone? And if so, what tools and techniques are you going to use? Are you also considering the use of these pointed bones by performing experiments and use-wear analysis?

Great, thank you. Yeah, so yes, simple answer is I would love to do future research and actually produce a really good reference collection for all these tools. A slightly more complicated answer is the collection actually has great amount of variety morphologically. So, we're still waiting. I think Eva David is currently in the process, I believe, of producing a final typology of the collection based on the work that was done before. So once that's been seen, and hopefully after looking at the collection in more detail, which wasn't possible before, once a better understanding of the range of possible

different types of tools that are actually in a collection or different forms, then yes, I would love to create a variety of those. But because that hasn't been achieved yet, I think it'd be really difficult to say what tools and techniques would be appropriate. I definitely think, in terms of tools that may not be much more variety than what I looked at before, just looking at the toolkit that's available in Ireland at the time. Again, similar to [the fauna... is] quite a lot of differences than the rest of Europe at the time. It would be great to do some more experimentation on production and then use-wear analysis and then eventually, also looking at function because there are questions around function, and possibly, some possible evidence of hafting as well. But again, what order this is done in and the opportunities to do any of this work is kind of still remaining. And so short answer, yes. More complicated answer is it's so multifaceted, really exciting, but a lot to do.

Yes, I understand that. Okay. That was my last question. Does any of our presenters have questions for each other?

Martha: May I ask a question of Margaret? Sure, go ahead.

Margaret, I was really interested in..., based on the success or the positive results you got from the wicker hurdles, do you think there're maybe more uses or scope to use these resources in modern society given sustainability, given that compared to a lot of other hardwoods that we use in modern society, that these can be coppiced and grown relatively quickly and managed and support local ecosystems and biodiversity?

Well, that is a brilliant question in so many ways. Although I was obviously looking at scaffolding because that's where my interest starts, the actual use of woven materials is just such a massive area from Neolithic walkways to boats to..., I was listening to a talk by one of the excavators on Skara Brae and he was suggesting that they used stone roofs, because there wasn't enough timber in the area. So then I began to think, well, if there wasn't enough timber in the area, was it a woven roof that they used to support that? And when it comes to modern society, yes. I think the whole idea of coppicing and the landscape and using this material in a modern sense would be absolutely brilliant if it can be done and I can't see why it shouldn't be done. So thank you very much for that question.

Martha: It reminded me of hedge laying and the intrinsic strength that hedges have and their role in [herd] management, which we often don't appreciate anymore. And as a food source for locals and encouraging biodiversity in our time, this is a living example and then the [...] example, I feel like there's an interesting comparison there.

Margaret: Absolutely you're right. I mean the hedges around Devon, where I live in the UK, I mean the use of those, rather than just as we do now, sort of just go around, chopping them all off as they grow, yeah, there's so much potential. If we can only put a..., if you want, a technical number on it so that we know how it performs, which is a bit sort of where obviously the engineering comes in, whereas this conference is more about the archaeology side of things and how it was used in the past. But I think yes, you're spot on with how it could be used in the future.

Good. Jason, I do have a question for you.

We have a drop-weighted loom at our Neolithic longhouse, which leads to some discussion whether it's too modern for the period and we didn't get it to work. Would a two-beam loom be more suitable for Neolithic in southern UK? Or, realistically, no loom at all..?

That's a massive question. I think the [...] that leads to the statement that the loom didn't work, I remember saying that quite a lot of the time. And I remember when we were trying to set up a warp-weighted loom and half the time I wanted to throw it into the loch, you know, and anyway, that's probably not a very scientific approach, but I can understand that statement about the loom didn't work. I think in order to answer that question, I can probably do that and maybe on Discord afterwards, is to try and find out what kind of [twill] were you trying to weave? How was the loom set up? When people are using the warp-weighted loom, there is an assumption about the way people

used it in the past. And for anyone who doesn't know what a warp-weighted loom is, if you've got threads hanging down, you've got the weights on the bottom. And you have pairs of threads. So you've got one at the back of the loom and one hangs over the bar, the front of the loom, and people will try to work out these ancient twills and think it's not going to work. And the problem really lies in the fact that there has been an assumption made of these two sets of weights, one at the front, one at the back, and that's not actually come from archaeological evidence. It's actually come from someone who is researching a PhD thesis in 1956. And they find a photograph of some Norwegian weavers who were standing at a loom and they were weaving a blanket and they've got these three sets of weights. And so an assumption was made that this is how they were set up. But of course, there's no evidence to support that whatsoever, it's just based on this particular video. In order to make any..., I mean, I find to make a walkway to the loom work you need a single line of weights. If you don't split them in half, you don't have two or three rows of weights. If the weights fall in a line, you can pretty much get any twill that you like. It would be interesting to know why the loom didn't work or why it was assumed it didn't work.

For the Neolithic, I think there is an assumption that the warp-weighted loom was the one that was used. The two-beam loom is normally associated with the Eastern Mediterranean. The two-beam loom is very, very easy to set up. It's extremely simple to set up, but as I said, this really goes back to what kind of twill, what kind of weave it is... Is it a tabby weave, is it a 2/1 twill, is it a 3/1 twill, is it a diamond twill? It all depends on the weave you're trying to make, but as I said, I can answer that more fully in the Discord chat and maybe that could open up a debate and I could, we could kind of, open up a dialogue about exactly why it didn't work and then maybe I could help him maybe providing thoughts on how it might work in the future or a different kind of loom set up for a different kind of walkway to the loom. So I'd like to open up that debate and help out if I can.

Thank you so much. Do we have any other questions?

Margaret: I have a question for [Aidan](#), if I might.

I was wondering you had built a roundhouse that got burned down? My understanding is?

Yeah.

And you're rebuilding it?

Yes.

I was just wondering with either or all of them, what you were doing, whether you had a ring beam, to sort of support the walls a bit or, and what weave you were using with that?

They're two great questions. So we had a house which was burnt down by a little 15-year old Scott in May 2019. CEAMC was broken into and they set it alight. So what we actually did was we did an excavation on it there about two weeks ago and now we're building a slightly larger one. These are post and wattle buildings, up to six, seven meters across in diameter and there is no element in that post and wattle building which is thicker than your wrist. So there are no internal roof supports and there's no evidence for big post holes and like that. The door frames are built of oak jams, but everything else is essentially hazel rods and [sails]. So one of our questions in our experimental archaeology project, and there is a pile of videos on our YouTube channel which show it..., was how did these buildings work? Like the largest building that we have, which is built of post and wattle like that is 11.2 meters across in diameter and again, with no evidence for any internal [roof support]. So what we looked at was... we looked at some of the ethnographic evidence. So the Sarakatsani goat herders in Northern Greece, they built these simple structures, roundhouses, built of branches. The Wichita people in Kansas, there are photographs in the early 20th century of these massive houses, which are again, built of branch material and we have medieval references in Ireland to, you know, the Irish building houses of branches and bracken. So what we decided was that what we were probably looking at was a giant inverted basket, in which there is... which is called an architecture non-differentiated structure. There was no wall and there's no roof. It's all wall and it's all roof. So what you get is a domical basket, which is essentially an inverted domical basket, it's not conical, it's

domical and a dome has basically huge strength in every meridian, horizontally, diagonally, and vertically. So despite the fact of the elements being really light, like no thicker than your wrist as I said, it's holding up a..., it held up a ton and a half of heather. It would have lasted longer, if it hadn't been burned down and as you've identified yourself in the question the key thing is the weave. It's not simple as in wattle we're all familiar with, it's a type of braid. I need to show you the images of it. Essentially what happens is that once the vertical drop, and even the verticals are complicated except there's no single vertical, it's continually inserting new verticals into the interstices between wattle. So as you go up, you're essentially... like building a basket. And then the horizontal rods are behind one post. They come out to go in front of two. Then the next one is behind, one was out in front of two and all the way around, and then go back to the start and you take that first one and put it behind one and in front of two. So essentially what happens is that all of the rods are kind of braiding around each other, like a rope. So instead of [...] wattle, you get this essentially [braids...] weave, which consumes a fair amount of wattle, but it's immensely strong. So not only are you making a strong basket, you're making an extra strong basket. And looking at that now... we were..., you know, our own experiences, you could probably build this in about two weeks if you had all the materials to hand and a final point I would make, is there in amongst the Sarakatsani goat herders in the late 19th, early 20th century in Greece, these roundhouses were made by the women of the village. These nomadic peoples... for the cheese maker and the cheese maker would come and he'd make cheeses in this specially built house. And they would just use branches and build it exactly the same as the way I've described. So one of the things we say to people is, you know, house building, you know, it doesn't have to be a man's work. You know, you've got a house there, it looks like a basket. Who mostly makes baskets? So we found that also to be kind of a nice little challenging of gender stereotypes... no heavy..., there's no heavy physical work involved. It's just patience and weaving. As I've said before, experimental archaeology enables you to be provocative about all of the assumptions that we carry around in our heads about the past..., thank you.

Margaret: Fascinating. I'd love to speak to you some more on that and obviously see what you've actually done. I have had a look at your pictures on Facebook, but it obviously isn't quite the right resolution to pick up [every detail].

You should get in touch with me. I'd be happy to share with you all the information that we have from [...].

Brilliant. Thank you.

And maybe you might come and visit yourself.

Yeah, that'd be even better. There's one other point. In your talk you were talking about the alder being called Redwood - Redman - One of the things that I found fascinating when I was stripping some willow, the sap was already rising and I came back the next day and it looked more like rhubarb. It was an amazing colour.

Yeah.

And it was just that whole way that wood can have that colour as well. It lasted for about a week before it sort of dissipated. So I was fascinated to hear that those images that were made were made of a wood that changes colour.

Yeah, and it's the colour of blood. The red colour is very striking. Alder, it's a something in the chemicals and under the bark and it produces this red colour, which fades to a brown afterwards. But, I seem to remember, I think it was even red on your hands. And I don't think it's any accident that these figures are mostly made of alder because of...like that same thing I said before, that objects and people not being distinct from each other, you've got a wood which bleeds! So do we and the boundaries are literally fluid!

Yeah, amazing.

Thank you, Margaret.

Thank you as well.

Again, I want to thank everybody for their wonderful presentations and wonderful questions from our audience and have a good night.