

EAC12 Q&A Session 16

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Good evening. This is the question and answer portion of Session 16. The last session of this conference, my name is Eric Marks and I am the emcee for this live stream.

Enrique: In your research, when you say they switched from freehand to bipolar (anvil percussion) to continue to reduction stages, why do you think they switched when the core is smaller if it is still possible to use freehand?

Yes, thank you for the question we say there is a suite in the knapping techniques because we saw in the archaeological report that there were some selection for blanks, for a specific type of instrument, manufacture instrument, or artefact, especially with we saw a difference between knives or cutting instrument and scrapers and what we saw is that the difference is related to, blanks for a cutting instrument were thinner. So that type of blanks were very difficult to obtain by freehand percussion. So our hypothesis was that the suite were for [an election] made by antique knappers to obtain that type of blanks that could prepare that type of instrument with sharp pebbles. That was the original problem that we faced when we start to solve the archaeological record. By the experimental analysis, we tried this and we found that that those type of blanks were obtained, making these suite when cores were small enough to try to use bipolar knapping, but still be used by... or reduced by freehand percussion but the option, or the election were, because of that.

Okay. Thank you. Is Camila and Roxana on? The question is: **I liked that you decided to group all those three categories in one, since they are not really that different. And I can imagine how some artefacts would not be perfectly classified in any one of those three but I liked the idea of the use of those tools as roughing tools used in percussion and not just simple scrapers, as we usually see them in publications. Have you tried using it to modify deer antlers?**

No, because we don't have any archaeological records of these kinds of things in Argentina in this part of the world. So we only use these four bones.

It says the different pattern and frequencies regarding polishing microfractures, crushing and rounding that you observed in gouges, chisels and [coal] chisels, where these expected?

Yes, they were. And because this kind of microwear use traces, usually are associated with hard materials that work. So if the..., in these three different kinds of use, with these three different [...] of use, are generating the same kind of patterns and we were expecting that and we found that.

Thank you. Débora: **were the quartz pebbles used for the experiments from the archaeological quarries mentioned in your presentation?**

Yes. All the pebbles used were collected near the archaeological sites and they all have some, some characteristic of use in the past by these populations that we are studying.

Okay, good. A follow up: **is it correct that the high fragmentation in vein quartz knapping areas were found on the archaeological settlement sites and not in the quarries?**

The fragmentation rate for both archaeological material and experimental material were very similar. We found that around 60 -70% were fractured, we think that there is a very high percentage of fragmentation in quartz material but maybe it could be related to the different type of quartz that we are analyzing in this [...] we found hyalin and milky quartz. Sometimes the fragmentation rates are different in those cases.

Thank you. Marissa: **since you were able to identify two types of points, have you considered given names for these types? I guess it would be easier for other researchers to refer to them, especially if they find the same technological pattern elsewhere. And in another topic, I'm so jealous that obsidian can be found in Argentina because there was no sources in Brazil for us to play with.**

There is a lot of variability although there are two large general types, let's say one that is long and [stem] and narrower and the other one triangular and smaller but there is more variability perhaps among the smaller ones. I don't think we have enough now to undertake that kind of type characterization. I know from the question from the chat that there was a suggestion of doing statistical analysis and, you know, to define types. So that's of course, very interesting as an avenue also because we haven't done it because we are still trying to assess the level of similarity with other sites. And also because we are reluctant to adjudicate, names might actually simplify the diversity that we see, but that doesn't mean that we are reluctant to look into that in the future.

Yes. Thank you. Jose: **were the oven temperatures measured in the active fire and after the ashes removed? Would you please tell me if there are any taphonomic studies observing changes in the bones of funnel remains after being cooked in this type of oven?**

Linda (for Jose): Okay. It's just, this is really quite a slow cook method and it's quite gentle. And so, if you're thinking about heat damage on bones that really leave strong marks, then you're thinking about things like roasting or bits where you're really exposing some of those bones to the flames. It's a bit like doing a slow cook, so when you do it right, the meat just falls off the bones and it is so good. So, um, I don't think it would have strong traces on the bones.

Thank you. Luydy: **first of all, congratulations on the initiative of making these experiments with axes. You only mentioned the flaked axes from the Aratu culture, but we know that Amerindian groups produced much more polished than flaked axes. So my question is: aren't there also polished axes in the Aratu culture and if they exist, couldn't the flaked axes be just a preform for the for the polished ones?**

Jose for Luydy: So his answer is that he doesn't believe that they are preforms. They're actually finished like that, flaked axes. And he thinks that because of the size, that presents 500 blades that have no polishing at all. So even for the other sites where they have some hundreds of axe blades, they have no evidence at all of polishing, just flaked axes with use marks.

We have a question for Mercedes. **Do you find that new students are enthusiastic to learn more about experimental archaeology? Or is it something that you have to persuade them to try?**

Well, I guess that nobody needs to be persuaded to try and have fun with rocks. Well, that's my opinion, but the things that it takes a while for the students and the colleagues to realize that learning flint knapping is a sort of mid to long-term commitment, right? So you have to also study a lot of the theory behind it and you'll have to practice and you'll have to have the materials and also

it's, at least from my point of view, it's quite important to have other colleagues to practice together, to have someone to help you when you get stuck, at some point. So I don't think that the students or colleagues they need to be really persuaded to break rocks, but they also have to know that this is something that you don't learn in five minutes and you'll have to be dedicated and dedicate your time to learn.

All right. And a follow-up, it says: **at the moment your Institute seems to be focused on lithic and bone technology. Do you plan to expand on to other technologies in the future?**

I'm not sure, that really depends on people who could be interested in, for example, working with pottery but then I also know that this demands, you know, structure and special labs or equipment, to do that properly. I believe that at my lab, we're pretty sure open to most of the ideas, even the craziest ones. So the thing is that we, well for historical reasons and for special interests in terms of what I'm mainly interested in studying, we began with the lithics and then we expand that to the bone tools, mostly because of my PhD student, Gabriela. And so, well, I will never say never it really depends on having collaborations and people interested in doing that.

Okay. Thank you so much. **JC: considering how many previous assumptions about lithic technology you disproved through your project, do you have any future plans for similar projects using experimental archaeology to ask new questions about old collections?**

I'm still working with some lithic points from Southern Brazil, expanding all this big territory of Brazil. But the idea is also applied in [other thermal] artefacts, and also compare flakes like we did in the article of EXARC in 2019, which was just more focused, but now expanding this. So also for what we call [...] which is a [firm] artefact from what people are calling here Itaparica, traditional Itaparica industry and also some very specific types of bi-facial tools from southern Brazil that... they were called [...], which are some bi-faces that are very similar with what we [...]. Someone could look at them and call them like an Acheulean hand axe because they're so similar. But also some that we are calling boomerang [...], which are bi-faces that... they really look like boomerangs. So we're also planning to make experimentations on these to better understand this technology and make these comparisons in statistical terms.

A follow-up that says: **the bone that you used was weathered and showed evidence of some splitting when you knocked it in your experiment. Can you speak a bit about how your results might differ if you were to knap bones, which were not weathered or have been treated in different ways?**

So, to answer the question. I don't know. I would try use maybe a fresh bone to compare the results, but it's a future project. I'm working on it.

This follow-up was: **why did you decide to use percussion rather than the groove and split method to make these bone tools?**

Because we don't have any mark on the bones that tell us that people used some instrument to make marks, before the [cracked] bone, the [broken] bone. So I thought that split the bone with a hammer stone could be the right way to make this experiment. The artefacts in Brazil are different to that we found in other countries, for example. So I try another way.

Okay. Thank you so much. Felipe: **do you take as a relevant aspect the distance from raw material sources? You said that [they] are present locally, but are there any difference in the presence in the landscape?**

Yes. There are distinctive differences between the location, on the micro landscape, the area surrounding the sites. For example, in two of the sites, you can find abundant presence of volcanic rocks, including natural quarries and areas where some of the raw material comes in a shape that are really, really similar to overall morphometry and volumetry of the finished tools, especially regarding larger tools, but while the cherts and the quartz they're mostly found on Riverside. I believe it's one of the reasons because they, geologically speaking, they're not present abundantly on the surface as the volcanic rocks, the way they are formed. So the river when, as it cuts through the landscape brings them forward and they accumulate on these pebble beaches that are commonly found on the curves of the rivers. I hope that answers the question.

It does. Thank you so much. Now a follow up: **can you tell us more about the limitations of using historical records to base your experiments [on]?**

Yes, there are a few, especially regarding the... one of the aspects of Southern Jê research is that a lot of the known Southern Jê groups, which have been written about are Kaingang and Xokleng, when there are also other linguistic groups which existed such as the Ingaí'n, [...] but there is no written [record] about them. So while we are also dealing with Southern Jê groups and using historical research to inform some of these experiments they can already have been the..., they were probably already different,... you need to be careful not to put the written source and the present into the past as like a direct control C control V. So you need to be kind of really critical of what to choose. And in many cases when the written sources were written about these groups, they already had different habits from what we can kind of perceive about the archaeological record on this. For instance, most of them were already in contact with metal tools and were using metal tools for working bone or working wood. While at the same time, you also have continuities such as some historical reports that say that they were using flake tools for producing bowls and like smoothing the surface of the world. So it's kind of like really tricky ground [we walk on], that we need to be really careful what we choose and how we also implement it as an experiment.

Thank you so much. Lorenza, next question is yours. **The experiments on quartz are all very interesting. I hope you guys keep developing it. Have you statistically compared the experiments flakes with the archaeological ones from the Bibocas II and did you conclude the archaeological ones were from bipolar (anvil) flaking?**

Regarding the first question, we didn't perform a statistical analysis. Our focus was more on the qualitative side. And regarding to the second question, yes, we compared the archaeological flakes with experimental ones and we observed that there were flakes from both percussions. [There was] percussion with a hard stone hammer and bipolar percussion. The experiment helped us to differentiate them. Thank you.

Okay. And there's a follow-up. **How do you differentiate hertz cones and bulbs observed by oblique bipolar percussion from those obtained by freehand percussion?**

Actually the hard stone and the bulb are the same in both types of percussion. What allowed us to identify if the flakes are from bi-polar percussion and not freehand percussion is the crushing on the lower face, close to the impact point.

Débora, we have another question for you. **Have there been any cores found in the archaeological record? Any [...] flakes in ongoing research?**

Yes, we found some cores in our ecological sites, but the problem was that they were very simple. We found one or two [... ...], so we can't know very much about the chain of production or quartz in the archaeological sites. What we found in all the archaeological sites that we discovered is that people used to clean their houses, these places that we excavate and probably in this process, we lost a lot of information about the sequence of production, of lithic production.

Okay. And there's a follow-up: **Are all vein quartz pebbles quality the same, i.e. grain size, in the area where you selected them or was it a variable taken into account when knapped?**

Yes. There is a difference between hyaline and milky quartz but we use only hyaline in the experimental study because we couldn't find the milky quartz quarries around the archaeological sites. So we use only hyaline quartz but in the archaeological site we found, we registered milky quartz [knap].

Okay. Thank you. It says: Gabriela, **you said the waste material from the [spatula] would be used to make fish hooks? What factors led to choosing to make fish hooks of the material? Also: were there any needles made?**

So yeah, I discovered today watching the video's of this conference that I can use the metapodials to make fish hooks, but I didn't mention that in the presentation, I use the waste material to make points. And I can say that because we see the the points made by deer metapodials in archaeological sites. So I use the waste to do that, but the fish hooks not yet, but I will try.

Okay, Lorenza, we have a question for you. **How could you improve the experiments of transforming amethyst into citrine? In other words, do you know what went wrong in your experiment and congratulations on your work.**

Thank you. We think that the main elements to improve the experiment is the temperature control. We need to be able to better control the rise and fall off the temperature, mostly to avoid thermal shocks. Controlling this we believe that we could make the experiment more successful.

Thank you. I do have a couple more questions for Enrique: **when you say 'very simple' tools about archaeological vein quartz industries found on-site, do you mean unretouched flakes? And if not, what exactly do you mean by simple?**

We said that very simple artefact are those made by a few retouch on bevels. We didn't take into account the retouch plates. We think if we can in the future make some use-wear analysis to understand better the functional election of use of these materials. But until now we only understand the functional use of these artefacts by the retouch better. So we call it simple because it's really one very simple and sometimes there are one or two or three retouch only on these pebbles that probably they were used.

Linda, are you answering questions for José and Oscar?

I can try.

Okay. **Is there any evidence that these ovens were used for foods other than meats, like grains or tubers and was it solely their equivalent of barbecue and beer?**

That I wouldn't like to answer. Perhaps Felipe? I don't know.

I believe that there is some, at least written records that there would also be tubers on, at least on the ethnohistory and, ethnographic accounts. But I am not sure if they have been found on archaeological record.

Okay. There's a question for Enrique, Débora and Samira: **it is not clear to me the difference between the techniques bipolar and anvil. Can you explain this difference a little more?**

Yes. We tried to differentiate these two techniques. Bipolar suppose, they're [rebound] in anvil but anvil technique we think that could avoid these rebound on anvil because we think it was used for bigger cobbles or cores that, taking into account the hardness of quartz it was really impossible that big cores could be reduced by bipolar percussion. So what we think is that in the first... in the initial sequence of reductions, we could put the core or pebbles on an anvil and try to knap to test it or to review the size, to continue working on by freehand or bipolar percussion. That was the difference that we found. And that was the name that we think it could be used for this type of technique. We are testing these type of techniques because of the hardness and all the problems that have quartz to produce and obtain blanks and manufacture the instrument.

Thank you, this question is actually for Mercedes, JC and others on stone topics. **Is it hard to get the right kinds of lithic raw materials, size and quality for your knapping practice as well as your experiments? Bruce always says, it takes a lot of rock to learn to knap.**

Here in Brazil, we are lucky that we can have much raw material for doing these experiments. I wouldn't say that we can find a lot of good raw material because what we have the most here is actually silicate-sandstone and it's not always the best quality. However, this is exactly what they were using here, the hunter gatherers. So, that's what we have to deal with. If we want to replicate the artefacts, we have to use the same raw materials they were using. Usually, lucky for us, the raw material they were using here is mostly the raw material that the sources are very close to the archaeological sites. So we don't have to look for them. In many places we find the archaeological sites nearby. You have a good source of the same raw material they are using in that site. This is not always the case, but for most of the sites we are working with, we didn't have much raw material missing for those things. And for learning how to flint knap silicate-sandstone is not always the best type of rock for learning because it's so hard to get flakes if you're not good. I can say, for example, flint knappers have come from France to Brazil to make demonstrations and et cetera. And we noticed that they really think it's hard to make the tools they used for making in France, because there they have those excellent flints to make those thin bi-faces and when they get here, they get silicate-sandstone. It's not easy to work with. So it's not always successful these demonstrations, but here in São Paulo, we are lucky that we have a very good source of flint and especially I am very lucky because I live nearby the sources. So we collect these raw materials here and we bring it to the capital São Paulo, where the laboratory is located and we can teach our students to flintknap with these materials.

(Linda): Can I just do a follow-up question to that Juca, which is... I'm really interested. **So there are no restrictions on collecting the raw material, you have open access?**

Yeah. I think the only things that we do not have full access on raw materials here is when we find out that some of these rocks, especially with flint, they're not the most silicified type of flint but is that fossils of trunks from Carboniferous? So when we actually find out that those are fossils, we try not to collect them anymore, but, when you're not talking about rocks, we have a lot of limitation to work with bones. This is the main problem that we presented in the presentation. You know, we, we don't have much access to bones like antlers because, well, it's forbidden to hunt here and that's good that's actually good that's forbidden, because deers are almost extinct and we need a lot of deer to make these experiments. This is the most hard one. Rocks is not really, really hard.

Yeah, that's an interesting one. Maybe we can send you some antler if you need it.

Oh, please, thank you!

Oh Linda, that would be wonderful. Thank you.

Oh, you're welcome...

...and if anyone else is willing to send us raw material we will be very glad to get it.

Felipe: I'd just like to add a couple of things relating to João and Linda is that also plants are so very difficult to find especially if you're dealing with native plants, which are also protected by legislation. So it's quite tricky to come across those. And as I have experienced myself for some of my experiments and I really liked your point that you mentioned about some of the raw materials being close to the sites that are not the best of quality, but that is what they used because it's the same case that I had and one of the issues I had with finding the raw material was that the quartz and the cherts were a lot less common to be found both in the archaeological record and also to find them as for the experiments, which was really difficult, was a lot of time walking around pebble beaches on the river Taquari to find some.

Juca: This is a question that is always [a point] these studies of raw material, that most of the times they are just collecting whatever it's near and it's flakeable, even when it's not the best thing. But it's also interesting that for some of these paleo-Indian, paleo-American sites in Brazil, they even choose to get the raw materials that are not the best ones, even when they live on the source of a good raw material. This is like very, very weird why they keep doing this. It's not always the case as well, but it's something that we are pointing out in some research.

Thank you. Juca, I do have another question for Luydy. It says: **what were the main difficulties you encountered in your research and [what] would you do differently in future experiments?**

(Juca speaking) So the first thing he's saying is that he was listening to the raw material discussion, and he's saying it's also his case. There are material for those flaked axes in the silicate-sandstone, which is the most common raw material used it in Brazil and also the flint is also common and it's part of the same formations so they're also not going very far to get the raw material. So he says that he found two difficulties in his experimentation. The first one was convincing other archaeologists

that the..., what he was seeing as used active edges, what he was seeing was marks of use and not marks of small grinding by water, water polishing, for example. So the second thing that was difficult to him was also to convince people like, the question they made for him that these flaked axes are actually not preforms, but they're finished as flaked tools because he could see that they were used and also he could see that many of them were broken because of the usage. So because they're made of silicified materials, like flint and silicate-sandstone, they are very fragile materials, different from igneous rocks, which are made the polished ones. So they break much more easily. And that's the reason they're breaking because they were used like they are, without polishing. And he's saying that what he will do different is actually something that most of us working with lithics has the same problem, which is we lack, not just equipment, but also people, researchers that are actually specializing in use-wear analysis, because he needed someone to help him to do the use-wear of these axes. And he got some help from the team, our colleagues from Ushuaia in Argentina, that helped him with this. So this is something that I think we could also talk between us, that's something that people from other countries could help us with.

Thank you. I see that Alissa is on. Your first question is: **do you think that other activities in the past, unrelated to pottery, would have provided people with the physical training required for pottery activities? Or was it something that was specialized specifically to pottery technology?**

Yes. I think that every kind of movement, every kind of work that we do with our body helps us to produce anything, you know. Also our work, we talk about fire and execution of experimental fire. And of course the body and the position of the body, it can contribute to build our muscles [... ...] to do pottery. I think pottery is... it's everything, you know, it's everywhere. So every kind of work that we do with our body can contribute. I think it is.

Did you have any participants who would return regularly and did you observe an improvement in their technique or productions over time?

Sure, yes, and it's very clear to see that, you know. My students, for example, I'm a teacher, I'm a professor of pottery and I can see very clearly the process and how my students can explore, you know, pottery and their body works their position of body. I also see that in my own body and in my own work everyday, you know, as much as I practice, I get better and better and better.

Could you elaborate on the digital social network project that you initiated during the pandemic?

We tried to bring some of our workshops and conversations about pottery and about archaeology to Instagram, because of the pandemic we couldn't get our reunions physically, you know, like in person. So we tried to make it online and to reach more people throughout Brazil and of course international as well. So we bring to Instagram a lot of inspirations about archaeology pottery here in Brazil, about our traditional indigenous people and all their work with pottery to bring some inspirations and some technical knowledge to everyone, you know, everyone who's interested to know a little more about it. We can show it and we can discuss it. Also, we started a lot of videos and interviews with many different potters around Brazil. They are have reference and their work is very, very interesting. So we try to talk to these people and internet make it easier because a lot of them are in the north, in the south. So if we do it in person, it would be difficult, more difficult than how we do it. So of course, the pandemic has all, all of its difficulties. And we tried to, we had to learn how to use Instagram, to pass the information that we have. So also we had this, this kind of interesting thing, you know, to get in touch with people that in person, it would be difficult. So I think

it's a great project that we have, so we can reach more people. We can transfer our knowledge to more people. I think it's great.

Okay, good. And there's a last couple of questions for you. **Is it possible to observe patterns of breakage in pottery and compare them to fragments found in archaeological sites and can these fragments inform us on manufacturing mistakes in the past?**

I'm not really sure if I'm able to respond this question because I'm more potter than an archaeologist, but I'm sure they can respond to you this question, if you contact us and I can elaborate this a little better.

All right, everyone. That was my last question from Discord and YouTube.