

Podcast Interview: Bettina Schulz Paulsson

PNAS: Welcome to Science Sessions. I'm Paul Gabrielsen. All over Europe stand large stone structures called, appropriately, megaliths. There are at least 35,000 of them, and they date to between 4500 and 2500 BC. Some are tombs and some are standing stones, sometimes arranged in alignments or circles. For more than a century archaeologists have wondered whether these striking structures spread from an origin point or were developed in multiple regions independently. To resolve the debate, archaeologist Bettina Schulz Paulsson, of the University of Gothenburg in Sweden, applied a Bayesian statistical approach. The results, presented in a recent PNAS paper, open additional questions about how people, goods and ideas traveled around prehistoric Europe.

Paulsson describes a visit to a megalithic structure.

Paulsson: There are so many wonderful and unique megalithic structures remaining in Europe, and one of my favorites is for sure the Tumulus of Saint-Michel in Carnac. It is a tomb that is 120 meters long with three grave chambers inside and it belongs to the earliest megalithic phase. When I was the first time there, I was asking people where is the grave? They told me I was standing right in front of it, because it so colossal, that it is hard to believe that it is a grave and today there is even a church on top. You have to ask yourself also how could they build this, what kind of technology were they using? I can go there again and again and I still think, "This is fantastic."

PNAS: Early theories suggested that the custom of building megaliths radiated from a source region such as the Near East. But the emergence of radiocarbon dating muddled the study of megaliths. Early reports of ages at sites were inconsistent with a single origin, suggesting that the megalithic tradition may have arisen in several places independently.

Paulsson: To build a megalith requires an intrusion into the ground. A lot of material which has nothing to do with the construction of the grave and stemming, for example, from earlier settlement layers under the grave is mixed up. So, early researchers worked with all the radiocarbon dates, including the ones from the settlement layers. Today we know much more about the complicated megalithic sequences. And I used the stratigraphic context and the excavation reports for the megaliths to reevaluate the radiocarbon dates. This meant, finally, that many megalithic regions were younger than people originally thought they were.

PNAS: Paulsson sought to place the radiocarbon ages in context and evaluate their quality to narrow the range of possible ages for the construction of a site.

Paulsson: I applied Bayesian statistics to the radiocarbon dates. This method has been of increased interest in archaeology in the recent years, but no one was using it for such an extensive geographical region before.

PNAS: It's a rough framework, she says. But the revised dates help shape a possible story of how megaliths expanded across Europe.

Paulsson: The origin of the megaliths is in Northwest France. We can say this not only because we have the earliest possible onset of data there, but because it's also the only region where we have pre-megalithic monumental structures and also transitional structures to the megaliths. From this, I could work out several megalithic movements and three main phases. As it looks now, megaliths spread in the first phase outward from Northwest France, partly over the seaway to Galicia, Andalusia, Catalonia, Southwest France, Sardinia, Corsica and most probably Italy. We find small early megalithic clusters in these regions. In the second phase beginning around 4200 BC something happened in Europe. We don't know yet what it was, but we see a radical change in burial rites and megalithic architecture called passage graves. Thousands and thousands of passage graves were built along the Atlantic façade in the first half of the 4th millennium BC and they served as collective graves over centuries for these megalithic societies. In the third phase, the megaliths reached Scandinavia and Northern Germany and we find the earliest temples on Malta. Then for a couple of 100s of years there's a time of stasis. And finally, in the second millennium BC there is a megalithic revival in the Mediterranean. That looks like the end of the megalithic burial tradition.

PNAS: So, where in this framework do we find Stonehenge, the well-known megalithic structure in the United Kingdom?

Paulsson: Yes, many people are asking me about Stonehenge. Stonehenge is at the end of the megalithic development. I mean, the site got a long pre-megalithic history, but the stone circle itself as we see it today is at least 2,000 years younger than the earliest megaliths in Europe we know.

PNAS: Paulsson hopes to continue exploring other evidences of cultural exchange during the same time period.

Paulsson: People were able to undertake long-distance maritime journeys at this time. We have evidence for the import of greenstone from Andalusia to Northwest France and there we have to take the seaway into consideration. I was also analyzing the megalithic art and it looks like there is a transmission of symbols outward from Brittany, which is also the region with the earliest megalithic art and the most complex engravings. So, we find similar symbols along the old greenstone trading routes. And this is totally confirming my results from the radiocarbon dates. So, I would like to better define the linkages between these megalithic regions and to discuss megalithic seafaring including the maritime technology these societies were using.

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