

UNKNOWN'S PODCAST

Clip from Episode 3: Human Origins Transcript

Host: David Christian, historian, founder of Big History, and emeritus professor at Macquarie University, Sydney, Australia

Guest: Michael Archer, paleontologist and evolutionary biologist at the University of New South Wales, Sydney, Australia

De-Extinction

Michael Archer: Another whole arena that we're working on is trying, and I mentioned this before, trying to see if we can get animals that are extinct back to life again. I started this with the Tasmanian Tiger.

David Christian: That's fascinating because I've always thought this was kind of science fiction, but you're saying, no, this is serious science.

Michael Archer: No, take Jurassic Park seriously?

David Christian: Yeah.

Michael Archer: Ok, there's a lot of silly things in the movie, but it triggered a lot of people to think about it. And certainly, I started to wonder whether the Tasmanian tiger this wonderful king of beasts that was in Australia, which we exterminated in 1936. The last one died in a zoo in Hobart, and it was all humans that did this. Could we bring that back? And when I first asked that question years ago, geneticists said that's ridiculous. Dead is dead. Extinction is forever. I'm not good at believing that, just automatically. So, when I started working with a pickled pup that we found that had been collected in 1866. When I was director of the Australian Museum, we put a team together and started to look in that pup, and we found DNA, and we started to find nuclear genes and mitochondrial genes, and the genome was there. We couldn't keep the project going because the DNA wasn't top quality, but clearly it was there. Now other people have picked up that project, and the University of Melbourne and Andrew Pask and team have started to work with better genomic material recovered from these pickled pups. And they now are saying, and they've got, they've got a \$15 million research support to make this happen. They expect to have the thylacines back, loving and licking us again in maybe 10 years. And I'm, I just want to be around to be the first one to pat one when it comes out. But even though we didn't personally continue with the thylacine project, we started it, and we're very proud of that fact. We're now working with another iconic Australian animal that's extinct, the gastric-brooding frog, an amazing frog unlike any other frogs that swallowed its fertilized eggs, they all developed in its stomach, which acted like a uterus. The eggs turned into tadpoles in the stomach. The tadpoles metamorphosize in the stomach, and the frog projectile vomits out baby frogs. You know, the medical world was going nuts when this was found out, because they thought, wow, how is an animal managing to use its stomach that way. So, they were thinking about biomimetics. Could we learn from this for something that would help us manage

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humans? And then suddenly, the frog went extinct. So, we started to do that. We found an individual, Mike Tyler, in South Australia, who had a colony. I asked him, had he had any frozen tissue by any chance? Turns out he did. So, we put a team together, and we started working on it, and we got the extinct animal's genome back, and we started to create actual embryos in the laboratory. And this, this was stunning to us. And we DNA tested the cells in the embryos, and it's the extinct frogs DNA back and working. We're still now working on how to get those embryos to keep going and to develop into a frog, and that's an ongoing research project we're working on now.

David Christian: Fascinating.

Michael Archer: It'll happen, David.

David Christian: Mike, this is a kind of fun question, really. But what's the weirdest or the most interesting thing about your job that surprises people. I mean, I'm thinking of you at a cocktail party. Someone says, what do you do? And you tell them, what's the weirdest or most interesting part of it?

Michael Archer: Certainly, one of the shocking things that people find hard to believe is the possibility we're doing research and trying to bring extinct animals back to life. But I think that's not the part that amazes me so much. It's some of the things we're finding in the Riversleigh World Heritage fossil deposits that just knocked us out. It turned what used to be jokes into reality about things that were in Australia. I mean, we'd make jokes about drop bears, right? You know these crazy animals supposedly in Australia.

David Christian: Drop bears.

Michael Archer: Drop bears. You know that land on you if you're not looking up, and then tear you apart. Well, we found drop bears in the fossil record. We found these crazy animals that have huge scimitar like claws that we now understand because we have whole skeletons of these things. They're 15 million years old, and they weren't on the ground. They were in the trees above. There were herds of these animals running in the trees above, and occasionally they lost their grip, fortunately, because they ended up as fossils in caves below and fell out of the tree. So, there were drop bears with these. In fact, we just recently found the skeleton of a giant snake. We had the biggest python in the world coming out of these deposits. It's about 10 meters long. And in amongst the giant bones of this thing are the claws of these drop bears. So, we can almost imagine a sort of a huge, horrendous battle that went on between these two. But we found many other animals. We found kangaroos. You think of kangaroos as being nice, sweet, little mindless things munching away on leaves. Well, we found a flesh-eating kangaroo, this is not a kangaroo you would have petted because if you would have lost your hand. It was only eating meat and bones. We found another weird animal that is so strange that we called it thingodonta. It's a thing we've never seen anything like it before. We don't know where it came from. All we know is it was there at Riversleigh with the weirdest teeth. We don't have any idea what it ate, because we've never seen any other animal like this before. We have a

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bizarrodanta. We have weirdodantas. These are animals that are now, they're no longer with us, and it just, I just would give anything for a time machine. I want to know what these animals were like. But yeah, our every day in the laboratory, strange things are coming out of the limestone blocks from Riversleigh as we dissolve the limestone, it's like Christmas every day. All these weird things keep popping up.

David Christian: So, paleontology is showing you that the world is not merely weird, it's weirder than we can imagine in our wildest dreams.

Michael Archer: It means it's weirder than weird.

David Christian: Wonderful.

Michael Archer: Yes, absolutely, I love it. And in fact, it is all about serendipity. I mean, you don't, David Attenborough once said this to me, he loves Riversleigh. So, he was up there a couple of times, and he said that there's nothing more exciting than smacking open a rock, which we do every day, and suddenly you're staring at something that hasn't seen the light of day for 20 million years. And it's like nothing that we ever dreamed existed before, and we couldn't have imagined this animal into existence, and there it is. And it just adds another huge level of mystery. What is it? How did it get that way? What happened to it? How did it live? You know, all these questions are just so fascinating.