A Man For All Ages

A candid interview with one of Australia's best known and most distinguished earth scientists

Richard Saunders, an audio-video producer, is the President of Australian Skeptics, NSW; Geoff Saunders is a writer. Apart from having parents in common, they are otherwise unrelated.

Michael Archer is Director of the Australian Museum and Professor of Biological Sciences at the University of New South Wales. His work in the field of palaeontology has profoundly changed our understanding of mammalian evolution in Australia.

Mike has long been a champion of the role of scepticism in scientific endeavour, and has been a prominent critic of creationism and other anti-scientific beliefs. He has won many scientific awards, including the 1990 Eureka Prize, but putting all these accolades in the shade was his winning of the 1998 Skeptic of the Year.

The Australian Museum has been hosting the Chinese Dinosaurs exhibition, partly sponsored by Australian Skeptics. Shortly after its opening, Mike Archer was interviewed for *the Skeptic* by Geoff and Richard Saunders.

We began by asking Mike about an amusing episode at the launch of the exhibition.

Mike: You heard about what Bob Carr did at the launch of the Chinese Dinosaurs exhibition? He said:

I'm here to make a very important announcement. The Australian Museum has recovered DNA from one of these Chinese dinosaurs and they're going to bring it back. I'm going to dedicate the Maroubra Rifle Range as the reserve for these creatures.

He said it completely straight-faced and the press just kept on taking notes. Then he said,

Mike here will tell you how we're going to do it. (Thank you very much, Premier!) *However there is a serious problem. The size of the animals that you see around you in these galleries is not going to be good for the Maroubra vegetation, so while we're in there, we're going to take the genes for koala feet and put them into the dinosaurs so they'll all have big, grey, furry feet and they won't damage the vegetation.*

and the press is madly taking all this down. Anyway, we kept this thing going, throwing back and forth. In the end, somebody must have said to Carr that they're not in any doubt that what you're telling them is exactly what's going to happen. So he ended up putting up a piece of paper saying '*Joke, guys, joke!*'

And they're still there looking at him to make sure it's a joke. But in the end the press realised that they'd been had and they were a

little reluctantly laughing at themselves. In fact, afterwards I went up to many of the reporters who were obviously confused and some of them said to me: 'You do have the DNA of these dinosaurs?' You know they still weren't ready to let it go.

Thylacine project

Richard: *Bob Carr is obviously a big supporter of science in general.*
M: On the Thylacine project, he was actually heard to say to his support staff that this is the most exciting thing he has ever heard in the whole world. So he was just blown away by it. And he did help; he donated some State money.

R: *Without a doubt, if and when this is successful it will be the biggest story on the planet.*
M: That's the interesting thing about it. As a member of the Museum Trust said recently: 'My God, just think what it would mean if this project actually works.' You're quite right, it is very hard to envision a project that would be more representative of the 21st century.

We've got Bob Lanza coming in from Advanced Cell Technology, the group from Boston that actually started to produce the first human clones. They have stopped the development of these things. He's the one who, on Discovery Channel documentaries, was saying he can't see why this project shouldn't succeed and why it couldn't be possible in the next10 years. He's coming to Australia.

Geoff: *He was the one who had the house by the lake?*
M: Yes and he has a fossil collection in his house. He's fascinated with extinct animals. He said that the only thing that would have given him any hesitation is not the technicalities of doing the work but the outcome – what we could do with it if we're successful. But in this case he's looking at filmed footage of the animals still pacing around the cage. It's clearly such a recent event that the place where you'd put the animal is its own environment. It's still there, it's still waiting. He can't see any reason why we can't do it and he can equally see no reason why we shouldn't do it.

R: *And obviously it would be far more significant than just cloning another living mammal. Mammals are already being cloned; what's the big deal? If it was a human the media would go crazy, of course.*
M: And you think why would you clone another human? There are enough humans in the world anyway.

But the whole notion of maximising the global genome is relevant here. Here we have a whole family of mammals representing this unique big chunk of the Australian genome that was snuffed out by human activity. To bring that back would be contributing in a major way to the conservation of genetic diversity on the planet, which is not the same thing as, say, bringing back something like a toolache wallaby or a crescent nail-tailed wallaby, both extinct, both our fault, but on the other hand, there *are* individuals of 52 other species of kangaroos. There's not the same imperative to bring back yet another kangaroo that there is to bring back the only representative of a whole family.

R: *Is there another animal in that category like a thylacine; a single representative of a whole family? Nothing springs to mind instantly.*
M: Yes, there is the numbat; and the bilby is also the last representative of an unique family. And there's the honey possum. So we have a number of these in Australia; in fact, you could probably roll off about half a dozen. The loss of the thylacine should lead to extra special attention to the welfare of these unique representatives of families.

G: *A common argument put by the opponents of cloning is that the very fact that there are animals teetering on the brink of extinction is one reason not to try and clone extinct animals. It gives us an 'out'. We can say 'It's OK if species x becomes extinct today. We can clone it tomorrow".*
M: Well, there are two arguments, and one is exactly the opposite. If

you listen to some zoologists at the moment their argument is that if a thing is teetering on the brink of extinction, you can forget it. Don't invest any money in it. Invest it in things that are more likely to pull back or able to be kept from the brink of extinction. So some people have a view that you invest in things that are fragile; others say you don't, because you're wasting your money because it's likely to tip over no matter what you chuck into it. But that's not the question you asked me. The question you asked me is, and it is an issue, aren't there some conservationists who say if this project is successful, and that's what they're worried about, then won't this send a signal to groups that are investing in conventional conservation programs that this is a waste of money?

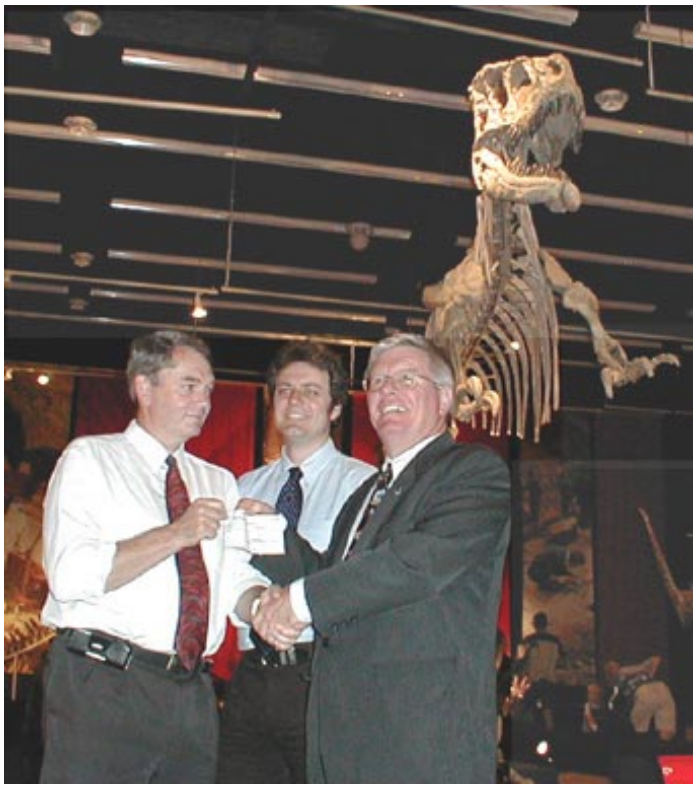
The answer to that simply is that:

1. we have no idea whether this project is going to succeed. So to put off any conventional conservation programs on the off-chance that this project succeeds, would be akin to madness; but,

2. even if it does succeed, the amount of resources, energy, effort, time it's going to take would in itself be probably 50-100-fold greater than the energy required to look after something that's still here and stop it teetering over that brink of extinction.

So, if anything, this is a flagship in favour of the importance of conventional conservation because we don't want to have to do all of this incredible amount of work to bring something back from extinction when we could do less work to keep it alive. So I don't see that as a valid argument against doing this and I think it's important to recognise that we're not putting it up as an alternative, even if some people might say that this is an additional conservation strategy in extreme situations. We wouldn't want to have to use it more than is absolutely essential.

R: *There are of course many other recently extinct animals throughout the world. The one that comes to mind, in the popular imagination, would be the woolly mammoth.*



Mike Archer receives the Skeptics sponsorship cheque from Richard Lead, while Richard Saunders and his bony friend look on.

M: Yeah, but there are several issues with the woolly mammoth. It's a fascinating project but I hate to say it's been gazumped by the thylacine project. We're way ahead getting extinct DNA to work but there are several reasons for this. One, the original effort to bring the mammoth back was going to focus on sperm, getting sperm out of the mammoth, and being able to hybridise with ordinary elephants and then gradually work your way through subtracting from your hybrid what was elephant and retaining what is mammoth.

The problem with that is nobody stopped to consider a little delicate fact about elephants, and that is that when you think about all the natural history films you've seen of elephants, do you ever remember seeing a scrotum swinging in the breeze? The reason is that they don't have external scrotums – they have internal testes. I guess the reason is that elephants have evolved in semi-open forests and when you get such a massive animal backing its family jewels up against a tree by accident, it could have brought the elephant line to an abrupt halt.

So, they internalised the testicles and that means that mammoths will have had internal testicles. As they fell into the crevasses in the glaciers that ultimately froze them, it could have been weeks before the internal portion of the mammoth froze, so these testes would have been rotting away without any blood supply. The chances then of getting intact spermatozoa, I would think, would be close to zero.

Theoretically they could have gotten DNA out of the cells of the mammoth itself and this is more of a typical cloning project, so why couldn't they have done that? My understanding is they have tried and failed to find DNA and the possible explanation is that if the frozen tundra rose to minus 2 degrees Celsius, DNA would start to degrade. Almost certainly during the intervening millennia there have been cycles of warming and cooling. Very likely the mammoths that are accessible to us at the moment near the surface of the tundra have probably warmed up to that minus 2°C, which would have contributed to the loss of DNA. So, so far, no viable DNA's been recovered, in contrast to the thylacine project, and the sperm project seems to be dead in the scrotum.

R: *So once we have brought back extinct animals, what's the next frontier? Extinct plants?*

M: It's interesting isn't it? I haven't actually thought about it, but I'm sure the botanists could come up with a list of an enormous number of extinct plants that have been lost as a result of human activity. I know there was an example and it was an interesting one. I think it was lotus seeds, between 20 and 40 thousand-year-old, that had been found in Eurasia. These have been germinated in a laboratory by putting them into warm, wet mud – an ideal medium for them – and despite millennia of non-growth, they germinated and produced a lotus flower that nobody's ever seen before, with a different number of petals. So there undoubtedly is capacity here for what would technically be extinct plants to be resuscitated.

R: *It's interesting, though, because if they germinated anyway, they really weren't extinct, were they?*
M: Well, what is dead? When you think about these issues, you find somebody squashed on the road and they're technically dead – no brain activity, no pulse, a doctor comes along and certifies this person dead but then you go inside and you take a kidney and you put the kidney in someone else's body and it functions perfectly well – was the kidney dead? Was it resuscitated? Is it a Franken-kidney?

We accept that these situations are okay. Equally, you get this lotus situation where you'd have to say you'd expect a twenty thousand-year-old seed to be gone and, yet, occasionally they germinate. And equally, there's a professor from the University of California in Berkeley, who is extracting DNA from amber. The amber is 30 million years old and the DNA is appropriate to the organisms that he's pulling it out from. In particular, the case that impressed me was he withdrew material from inside an insect, clearly identifiable in amber as a fungus gnat (I've never even heard of a fungus gnat) and when he analysed what he withdrew, it included DNA, and when he sequenced the DNA, it was the DNA of fungus gnats.

So there's no doubt in his mind that he's got viable DNA that has been recovered from an animal that's 30 million years old in amber, raising all sorts of interesting possibilities. So are we really so confident that we know we can define as dead and alive.

G: *Have you had anybody object to the thylacine project on the grounds that they saw a thylacine in their backyard last week, therefore they're not extinct?*
M: My favourite adversary, Mick Mooney, used to argue this, and so did many people in Tasmania. In fact, when we did the documentary with Discovery Channel, Eric Guiler and I had fun over a couple of good bottles of red, thinking about the plot. We thought, well, if we succeed and produce the thylacine, and the girl – because our pickled pup is a girl – is released into the wild and two months later is pregnant, wouldn't that be the lovely way to end the movie?

But there are those people who say it's a colossal waste of time. Carl Bailey, who has written these wonderful books, called *Tiger Tales in Tasmania*, has collated the bushmen's memories of when they used to trap thylacines and what they were like. He's a true believer – he's convinced the thylacines are still out there. If fact he even tells me that he's occasionally been in parts of the bush where he has smelt them. I'm a skeptic. I believe that for an extraordinary claim, you need extraordinary evidence. I have said to Carl that I hope he's right, but I need more evidence than that to convince me they're out there and to stop us from trying this project. So we have a good-natured relationship. Carl thinks he's going to find it before we bring it back and I'm saying to him, if you do, can we borrow a bit of the tissue to assist us in bringing it back? So any rate, there's a bit of banter here.

R: *Well you really can't lose because if he succeeds, wouldn't that be tremendous.*

M: I'm not worried. I don't care how it's back in the world but, on the other hand, I'm a skeptic. Since 1936 there has not been as much as a skerrick of credible evidence. Eric Guiler claimed once that he had definite hair and he actually refused for a long time to let anyone examine this. When it was finally examined, it proved to be wombat hair. There have been no faeces that have the slightest sign of being thylacine.

Contrast that with the question of whether there are foxes in Tasmania. One of the clear and immediate evidences that turned up was a poo that had fox hair in it. Proof that they're there. And that's all we need – a single tiny fragment.

And then on a good day you can drive south from Launceston with your paper and pencil, and tick off the fauna of Tasmania from the squashed critters all the way down to Hobart. And you won't miss any species if you do this carefully enough. They're all over the road; they're all flat and it's a testimony to the abundance of wildlife in Tasmania. Where is the squashed thylacine?

When I asked this question years ago of people in Tasmania who were convinced they were there, the answer was so quick that it took my breath away. It was that Tasmanian devils have a predilection for thylacines and they run around the roads in the morning and eat all the carcasses. So by the time the time people are driving along the roads in the morning there are none to count. And I looked at these people when they told me this, and I've seen that look in the eyes of people I've talked to before and its usually from creationists. This is a true believer of the worst kind, ready to dismiss any contradictory evidence. Anyway, at the end of the day, I'm a skeptic. I don't think there's any evidence that they're out there and therefore I think there is only rationality in trying to proceed with this project.

Part 2 of this interview will be carried in the next issue.