

**Interview with Ian Tattersall conducted by Jim Spadaccini at The Future of Science Conference in Venice, Italy
September 21, 2006**

For Tech Museum of Innovation

<http://www.tech.org/genetics>

Q: You've written that "evolution is not a long undeviated slog." If it's not that, what is it?

IAN TATTERSALL: Evolution is kind of an experimental process, as a matter of fact. It involves new species being thrown out into the ecological arena and doing battle with competitors and becoming extinct, or being successful and giving rise to other species. So it's not a straight-line process, it's not what we were taught 50 years ago as a straight line, the modification of a single lineage. It's actually a very dynamic and experimental process.

Q: What makes humans so different from our closest animal relatives?

TATTERSALL: Well, humans have a very acute sense of being somehow different from the rest of nature, and that difference is physical, partly, although we're not that different physically from our closest extinct relatives. Our closest extinct relatives were really most basically different from us in the way that they viewed the world, in the way in which they processed information about the world, and, therefore, in their cognitive attributes.

Q: There was a dramatic shift in human development about 100,000 years ago. This occurred well after the appearance of human fossils similar to our own. Can you elaborate?

TATTERSALL: Yeah, the earliest human fossils that actually look significantly like us go back to maybe a 160-, 190,000 years ago. But those very early hominids didn't behave in the distinctive way that we do, and they didn't, as far as we can tell, remanufacture the world in their heads, and imagine different worlds, and different ways of achieving those worlds, which is really what sets us apart from everything else. And the earliest intimations we have of creatures who did that are less than a hundred-thousand years, essentially. Certainly, 75,000 years ago in Africa, there are intimations of symbolic behaviors, which imply these symbolic cognitive processes that make us so different. And definitely by 40,000 years ago in Europe, you have a great flowering of these new cognitive attributes, this new way of interacting and viewing the world around us.

Q: In your book, the *Human Odyssey* you've written that "the shared

possession of DNA is the clearest proof of the common descent of all life forms on Earth." Can you elaborate?

TATTERSALL: We already knew who our closest relatives in nature are on the basis of our common structure with them, but DNA is an extraordinary demonstration of the fact that the very blueprint upon which we and they are made is the same blueprint, with just a few small modifications. And the underlying... the underlying genetic instructions are a very, very good indicator of our closeness to those creatures.

Q: You've been involved in developing exhibits on human evolution. What do you think makes an effective exhibit?

TATTERSALL: Well, I think what's important in a museum exhibit of the past is to bring that past alive. Fossils, by themselves, are very static objects, and they don't really reflect the fact that their own previous owners were living, breathing, dynamic individuals. You have to know a lot about a fossil to be able to interpret it in those terms. And I think one thing that's very important to do with the general public that doesn't have this particular expertise is to be able to present extinct forms, not simply as static fossils, but as living, breathing individuals who had dramatic existences in their own time.

Q: As you know, in the United States a large segment of the population doesn't accept evolution. How do we reach these people?

TATTERSALL: It's very, very hard to reach people who have a received idea of how things came to be the way they are. There's a lot of people that don't want to have their particular beliefs disturbed, and in a sense, you have to... you have to respect that. People's private beliefs are very important to them, and they should be. But what they have... what is important is that people should be made to understand that the scientific view of the world is not at all in conflict with the kind of knowledge that comes through revealed sources such as religion. The two kinds of knowledge are a completely different aspect, and shouldn't be in conflict. In fact, they are complementary. Science deals with the observable, with the concrete, and religion deals with the unobservable, with the abstract, with the ethereal. And those are both parts of human experience, and both of them need attention.

Q: What about the move by some religious people to promote pseudo-science?

TATTERSALL: That's where the problem lies. If religion comes intruding into science, then there is a problem. And I think what everybody needs to do is to step back a little bit and respect the kind of knowledge involved in both... in both

cases. And if that doesn't happen, if people cannot be, for whatever reason, unprepared to respect that difference, it's very hard to know what to do.

Q: You've talked about the future evolution of humans, you've said we're not evolving anymore. Can you elaborate?

TATTERSALL: Well, we've come a very, very long way in our evolutionary story, and the obvious conclusion is that, you know, that we will continue on our trajectory. But we have to remember that in the past, humans were thinly scattered on the ground. There weren't that many human beings in the world, and they lived in small populations, and in small populations it is relatively easy to incorporate novelties, genetic novelties, mutations that arise. New structures, new modifications on old structures can be relatively easily incorporated into the gene pool.

When you have a gigantic population, a human population of the kind that we have today, and that has been developing over only the last 10,000 years, the story changes completely, because the genetic inertia in a large population is such as to really resist a meaningful change. And so under present circumstances, I don't really see that evolution is going to be a major factor in modifying us.

Q: But we will continue to evolve technologically? Culturally? Socially?

TATTERSALL: Cultural evolution is particularly vibrant. And, you know, what has been happening is that at some point in the relatively recent past, humans acquired a new and totally unprecedented capacity, and, essentially, the history of humanity since that point has been a history of learning new ways to deploy that capacity. And that expresses itself in technology, and it's certainly something that's going to continue into the future. I think our capacity is almost inexhaustible.

Q: What is it about studying humans and primates that you enjoy?

TATTERSALL: Well, I'm interested in humans because I'm a human. And I think everybody feels that way, everybody has an interest in human evolution, whether it's... whether it's for or against, you know, we all have strong feelings about it, and we're all engaged in some way.

As for primates, I think we really won't understand ourselves without understanding the larger zoological context within which we exist. But, personally, my primate of choice is the lemurs, the primates that live in Madagascar. And, frankly, I fell in love with them because they're so charismatic and so attractive in themselves as a subject of study.

Q: What have you learned from them?

TATTERSALL: I've learned, essentially, that our... the underpinnings of what it means to be a human go back a very, very, very long way. We are different from everything else, and that is a relatively recent thing, but we're only... we're only able to be the kind of creatures we are because we have this underpinning, because we have this long, long, long human history, or rather, a primate, and prior to that, mammal, and so on, history behind us. We couldn't be what we are today without that long history.