Dale Russell: A Purpose to it all

Dr. Dale Russell's entry in American Men and Women of Science shows that he earned his M.A. in 1960 at the University of California at Berkeley, obtained his Ph.D. in geology four years later at Columbia University, and is now Curator of Fossil Vertebrates at the National Museum of Natural Sciences in Ottawa. Russell is a worldrespected paleontologist — a scientist who reads the fossil record to study ancient life. He is the author of A Vanished World: The Dinosaurs of Western Canada, and the editor of the proceedings of a conference on dinosaur extinction, held in Ottawa three years ago.

Russell almost seems a disciple of Baron Georges de Cuvier. In the late 1700's in France, Cuvier founded the sciences of comparative anatomy and vertebrate paleontology — it was said he could reconstruct a whole animal from a single fossil bone and taught that life on Earth was periodically obliterated by floods. This theory, catastrophism, has since given way to the concept of slow and random evolutionary change driven by natural selection. If Dale Russell's ideas gain ground, however, a new look at catastrophism may get back into biology books.

Russell, like Cuvier, is noted for his fossil

reconstructions. One of these is Stenonychosaurus (STE-no-NI-ko-SAW-rus), a small dinosaur whose fossilized remains Russell found in Alberta. The most striking features of this metre-high creature are its relatively high brain-to-body weight ratio (implying high intelligence for a reptile) and eyes that, looking forward, probably saw their world in three dimensions. Stenonychosaurus was apparently taking the dinosaurs away from their old stereotype of slowness and stupidity.

Russell and his colleagues did more than reconstruct Stenonychosaurus. They made an educated guess at what it might have evolved into, had it not been wiped out 65 million years ago with the rest of the dinosaurs. The result is one of the great might-have-beens — an intelligent 'dinosauroid' with such human characteristics as bipedalism and a large brain (see photo above).

Also like Cuvier, Russell champions a type of catastrophism. New evidence, and new examination of old evidence, have convinced some paleontologists that evolution does not proceed with perfect smoothness. Even if this theory of 'punctuated equilibrium' becomes more widely accepted, however, it has yet to be explained. The dinosaurs were not the only creatures to disappear (in evolutionary terms) overnight. 'Great dyings' have happened periodically for the last half billion years. What could be powerful enough to scour most species, at such long intervals, from the face of the Earth?

In the early 1970's, Russell was one of the earliest, most active proponents of the idea that nearby supernovae (exploding stars) could have snuffed out species on this scale. However, newer evidence points to comets or asteroids as more probable killers, and Russell now accepts them as better explanations.



Russell (right) and friend

Like most scientists, Russell thrives on debate. He espouses one theory even more controversial than extraterrestrial megadeaths: the idea that evolution is progressive and directional, rather than merely random as a majority of biologists may now hold. Not surprisingly, his theory of directionality brings charges that his reasoning is 'unscientific'.

Freelance writer Paul Tisdall interviewed Russell late last summer in the suburban Ottawa warehouse where most of the National Museums' dinosaur fossils are stored.

Science Dimension: How did you first become interested in dinosaur extinction?

Russell: It's always interested me. I wrote a paper years ago that said we don't know why the dinosaurs became extinct, and that science shouldn't sweep the question under the rug with palliative suggestions like 'withdrawals of the seas.' These can't be tested rigorously, and obscure more than they reveal. They give the illusion of answers when we scientists really have nothing intelligent to say.

Then in 1967, Terry and Tucker proposed the supernova model. I said, 'Hey, here's a mechanism that could cause a sudden extinction on Earth.' I was enthusiastic, and it was fun to learn a little astrophysics. But it floored me that so many paleontologists wouldn't consider the model. I had the feeling that instead of saying 'We've got something here that might be interesting, something we can test,' they were saying 'That's a little embarrassing — it goes back to things we've been trying to get rid of for years, like Lamarckianism and vitalism.' (Jean de Monet, Chevalier de Lamarck (d.1829) held that acquired characteristics could be inherited; vitalism states that chemistry alone cannot explain life — Ed.)

But now, "with a growing acceptance of comets and asteroids as possible extinction vectors, people can no longer ignore mass-extinction catastrophes. Don't get me wrong, though. Some of my best friends are gradualists.

Science Dimension: It's been suggested that mass extinctions may be the main driving force of evolution, particularly if they recur every 26 million years or so. Do you agree?

Russell: That's a valid point of view, but I don't think it's time to believe it yet. Despite their huge effect, these mass extinctions probably have no biological meaning: they're just something crude and rude from outer space that hits us hard. They happen so infrequently that the biological systems of Earth can't and don't adapt to them. The overwhelming force behind life still remains natural selection.