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the big bang

EVERYTHING YOU WANTED TO KNOW ABOUT DINOSAUR SEX (BUT WERE TOO AFRAID TO ASK).

Writer *Vanessa Murray*

AT A BRITISH SCIENCE CONFERENCE IN 1987, A PALAEONTOLOGIST NAMED DR BEV HALSTEAD INVITED A WOMAN ON STAGE AND POLITELY ASKED HER TO DROP HER SKIRT.

A tense, collective breath echoed around the auditorium as the garment hit the ground. Halstead had a reputation as an eccentric, but the stunt seemed uncouth, even for him. What on earth was he up to?

Halstead explained that the woman was his partner, Dr Helen Haste. She had graciously agreed to help him demonstrate an aspect of brontosaur behaviour that he was studying: sex.

Wearing a pair of skin-hugging tights, Haste walked over to a box near the podium. She rested her hands on it, leaned over and extended her left leg up into the air. "Imagine this is the female brontosaur's tail," Halstead said grandly. He then stepped in closer, lifted his own leg and curled it around Haste's.

The pair stood swaying for a moment so that the image could sink in. Then Halstead offered an explanation. He said the strange formation showed how brontosaurs could have had rear-mounting sex: by intertwining their tails in order to connect their genitals.

The crowd squirmed. But that didn't bother Halstead. He wanted to make a stir. He also wanted to make a point. Halstead thought the mating habits of dinosaurs were a vital part of palaeontology. And yet only a handful of his peers bothered to write about the subject. A combination of prudishness and a lack of evidence seemed to stand in the way. Halstead was trying to change that. He was trying to open the door for a new discussion.

Unfortunately, though, it didn't really work. Very few followed Halstead's lead, and even today dinosaur sex is still a relatively obscure field of research.

Those who did pick up the torch are still stuck on the same few basic questions. Did male dinosaurs have external penises? What position did dinosaurs mate in? How could a gargantuan female sustain the weight of a male, or vice versa? How did long-necked dinosaurs have sex without fainting from loss of blood pressure to their tiny brains?

There's one obvious hurdle in the way of finding answers to these mysteries. No one has ever unearthed a dinosaur's reproductive organs – the soft tissue is simply too delicate to endure the ravages of time. And without knowing what dinosaur genitals look like, it's tough to know how they were used. The only thing that is certain about dinosaurs and sex is that they did it, and they did it well enough to roam the earth for more than 150 million years.

When pushed, most palaeontologists will tell you that dinosaur coitus probably involved 'cloacal kissing': the matching of slit-like openings that were used for both sex and excretion. When the stars (and the cloacae) aligned, the male would deploy an internal penis-like organ to deposit sperm into the female. It's a similar method to the one used by a lot of birds and reptiles. The only difference is that male dinosaurs had to make sure they kept one foot on the ground so that they didn't crush their mates.

There is another theory, though. Some people believe male dinosaurs did indeed have hulking, big external penises. These experts point to the fact that a few very old species of birds (ones that are evolutionarily close to dinosaurs) are, ahem, well endowed.

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Penis or no penis, it's safe to assume that dinosaur mating sessions were a sight to behold. "Trying to imagine two 20-tonne-plus animals with telephone pole-sized tails getting down and dirty? It's difficult," says Dr Stephen Poropat, a palaeontologist at Uppsala University in Sweden. "Dinosaurs ranged greatly in size – some were the size of chickens, others were as tall as five-storey buildings and weighed tens of tonnes. The smaller ones would've had to go about things pretty quickly – taking any time to enjoy it would have been dangerous. But sauropods like Argentinosaurus were huge and would have probably been quite leisurely; I think they could've taken as much time as they wanted or needed to."

Poropat also points out that pre-mating rituals such as strutting, dancing, and fighting, probably differed from species to species. "A dinosaur's physical characteristics would have greatly influenced how it went about attracting a mate. Some dinosaurs like Velociraptor and Ornithomimus had feathers, and they probably used them for courtship and display, like many birds do today."

Of the all the dinosaurs that have been identified, one species' sex life is debated more than any other: the Stegosaurus. The spikes along its hips and spine were effective at repelling attacks, but presumably didn't lend themselves to rear-mounting.

So how did they do it? Some think mating stegosaurs angled themselves to face each other belly to belly. The other view is that the male turned away from a standing female and backed up, kind of like reversing a car.

Ken Carpenter, from the Utah State University Eastern Prehistoric Museum, doesn't buy this. He insists the female squatted on her forelimbs and raised her rear and tail into the air, like a cat. The male then positioned himself behind her, slightly off-centre. He rested his forearms on a non-spiky section of her back, aligned his cloaca with hers and… you know.

The image is enough to make you blush. In fact, for some people it's so exotic and strange that it's kind of arousing. Over the past few years, an unlikely subgenre of literature has arisen around the idea of dinosaurs going at it. It's called dinosaur erotica. Titles including *Taken by the T-Rex, Ravished by the Triceratops* and *Running from the Raptor* leave little to the imagination, but sell well – at least, enough for some writers to quit their day jobs.

Of course, these texts are pretty liberal when it comes to science (they usually involve a lot of human-on-dinosaur-action), so they don't offer much when it comes to understanding the truth about sex in the Mesozoic period. For that task palaeontologists continue to rely predominantly on the study of exhumed skeletons. Every year, new fragments of information are unearthed, which help fill in the blanks. One of the most significant discoveries of recent times is the concept of 'medullary bones'. They're bits of calcium-rich tissue that are only present in the skeletons of pregnant female dinosaurs. Why is that interesting? It allows experts to start deducing more about what everyday life was like as a knocked-up dinosaur.

For example, not too long ago a group of palaeontologists noticed something unusual about three T-Rex skeletons that contained medullary bones (meaning they were pregnant when they died): they were each surprisingly small. In human terms, they were teenage mothers. Why would the dinosaurs be sexually active at such a young age? The most popular theory is they were desperate to pass their genes on as quickly as possible. After all, they lived short and dangerous lives, and their window for breeding could be cut short at any time.

This explanation doesn't exactly gel with Halstead's somewhat romantic view of dinosaur sex. When he started thinking about the subject in the swinging '70s, he envisaged courting and playfulness. He saw something… tender.

"Tropical reptiles spend an awful lot of energy just flirting. They just live happy lives," he once told an interviewer. "That's how I like to envision dinosaurs. It must have been… well, charming is the word." •

THE SPIKES ALONG A STEGOSAURUS'S HIPS AND SPINE WERE EFFECTIVE AT REPELLING ATTACKS, BUT PRESUMABLY DIDN'T LEND THEMSELVES TO REAR-MOUNTING.