

Bone Idol

Richard Butler

Fieldwork was one of the major reasons I got into palaeontology in the first place. Although fieldwork is not an essential part of my PhD, each year I work as a volunteer with other palaeontologists around the world, building up skills for the future. So far in my short career, I have been lucky enough to collect fossils from Skye, Wyoming, Utah and South Dakota.

All palaeontology necessarily begins with fieldwork. Before they can be studied, fossils need to be collected from rock exposures of the right age and environment. Because rock is best exposed under hot, arid, desert conditions, palaeontological fieldwork is often carried out in some of the world's most brutal environments. In 2003 I spent a month working with the Utah Geological Survey in the remote desert of SE Utah. We camped in a parched-dry, moonlike landscape, devoid of vegetation and over an hours stomach-churning drive along dirt-roads, in a pick-up truck, to the nearest "town". Even the turkey vultures didn't venture as far out as us. During the day temperatures soared towards 50oC and, under our flimsy shade (occasionally blown away by gusts of wind), we carefully uncovered a bone-bed containing the remains of hundreds, maybe thousands, of individuals of a species of dinosaur previously unknown to science.

The heat of the day left my tent like a sauna, so each night I slept under the stars on the back of a pick-up truck. We lacked running water, so our only relief from the baking temperatures was the drive we made every three days to a nearby river, where we would swim and

wash. Despite the harsh conditions, the fantastic company (and the beer) made things very enjoyable, and the fossil site we worked is one of the most important in North America.

Palaeontological fieldwork usually begins with a specific goal in mind. The Utah Geological Survey wanted to find out more about the kinds of animals that lived in Utah during the Early Cretaceous, about 130 million years ago. To this end they had been searching outcrops of rocks they knew to be of the right age, looking for fossils. The quarry I worked at was one of their finds. Having found bones eroding out of the hillside, we began to



slowly uncover and remove the bones. The sandstone was soft, so we gently brushed and scraped the rock from around the bones with paintbrushes and scalpels. The work was painstakingly slow, and there is nothing worse than spending several hours uncovering a bone then watching it explode into powder when you make a mistake. In the field you quickly learn to handle fossils like the priceless objects they are.

As mundane as the work can be, there is always something breathtaking, something magical, about being the first person to ever uncover a fossil. 130 million years ago the petrified bones before us had been living creatures. Some unknown event had killed them in their thousands and buried them with

sand. The flow of groundwater through the sand deposited minerals around the bones, encasing and protecting them in nodules and turning the sand into rock. Now, many millions of years later, ours were the first human eyes to ever see the remains of this animal. Later, when the fossils were prepared in the lab, Geological Survey palaeontologist Jim Kirkland would be able to reconstruct how the dinosaur looked, what it might have eaten, how it would have moved and which other dinosaurs it may have been closely related to.

The dinosaur we uncovered was a member of a rare and unusual family of dinosaurs known as therizinosaurs.

Therizinosaurs are large, clumsy-looking, bipedal dinosaurs, and were only discovered fairly recently. While some of them have huge claws, their teeth suggest that they were primarily plant-eaters. Palaeontologists have argued for the last twenty years as to where therizinosaurs fit in the evolutionary tree of dinosaurs. Now it is becoming clear that they belong with the

theropods, the great lineage of mostly-carnivorous dinosaurs which includes Tyrannosaurus rex and Velociraptor. Some theropods gained the power of flight and evolved into birds, so our large, lumbering plant-eater was a not-so-distant relative of the turkey vultures we'd occasionally see circling in the distance. Most exciting of all, therizinosaurs discovered recently in China preserve impressions of some kind of skin covering, which many palaeontologists believe are primitive feathers. The fossils we uncovered in Utah will, with time, add immeasurably to our understanding of therizinosaur biology, and ultimately increase our knowledge of dinosaur and bird evolution.