

# Deep heat solution to 500-million year mystery

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Scientists from the universities of Leicester and Cambridge and from the British Geological Survey have published new research in the journal *Geology* this month (November) shedding new light on a 500-million year old mystery.

The 500 million year-old fossils of the Burgess Shale in Canada, discovered over a century ago, still provide one of the most remarkable insights into the dawn of animal life. The beautiful silvery fossils show the true nature of the life of that time, just after the "Cambrian explosion" of animal life.

Yet, their existence is a paradox: the fossils have been buried deep in the Earth's crust and heated to over 300oC (~600 oF), before being thrust up by tectonic forces to form a mountainous ridge in the Rockies. Usually such extreme conditions are thought to destroy fossils. But, in the Burgess Shale the most exquisite detail of soft tissues has been preserved.

Now, by careful restudy of its fossils (published in the November issue of the journal *Geology*) Alex Page and his colleagues Phil Wilby, Sarah Gabbott and Jan Zalasiewicz, of the universities of Cambridge and Leicester and the British Geological Survey, have solved this riddle.

They have shown that as the delicate organic tissues of these fossils were heated deep within the Earth, they became the site for mineral formation. The new minerals, forged at these tremendous depths, picked

out intricate details such as gills, guts and even eyes.

Alex Page said: "This provides a whole new theory for how fossils form. The deep heating may not have cremated them, but it certainly left them stone baked"

Once an ancient sea bed, the Burgess shale were formed shortly after life suddenly became more complex and diverse – the so-called Cambrian explosion – and are of immense scientific interest.

Normally, only hard parts of ancient animals became fossilised; the bones, teeth or shells. Soft parts were rarely preserved: many plants and invertebrate animals evolved, lived for millions of years and became extinct, but left no trace in the fossil record. The Burgess Shales preserved soft tissue in exquisite detail, and the question of how this came to happen has troubled scientists since the discovery of the fossils in 1909.

Source: University of Leicester

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