First great predator not much of one at all

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The meters-long, carnivorous "shrimp" from hell that once ruled the seas of Earth a half billion years ago may have been a real softy, it turns out. A new 3-D modeling of the mouth parts of the *Anomalocaris*, along with evidence that these parts were not hard like teeth, but flexible, shows that the famed predator could not have been munching on the hard shells of trilobites and other such creatures of the early seas.

What's more, there is no evidence from fossilized stomach contents or feces that Anomalocaris' ate anything hard enough to leave a fossilized trace. In fact it was this lack of fossil evidence backing any dietary preference – right alongside other animals that do show fragments of what they ate in their gullets – which inspired the investigation, said paleontologist James "Whitey" Hagadorn of the Denver Museum of Nature & Science.

Hagadorn will be presenting his team's discoveries about Anomalocaris on Monday, Nov. 1, at the annual meeting of the Geological Society of America in Denver.

"It was supposed to roam around the Cambrian seas gobbling up trilobites and everything else," said Hagadorn. But the pineapple-like whorl of mouth parts and the associated whisker-like appendages of Anomalocaris all appear to have been bendable, in the fossil remains, he said. They are not mineralized like the exoskeletons of the trilobites they were supposedly eating.

His suspicions prompted Hagadorn to develop a 3-D, finite element

analysis model of the Anomalocaris mouth. This allowed for testing just how the mouth worked and how much force it could create – in other words, how strong a bite it had. The model turned up some surprises.

"It couldn't even close its mouth," said Hagadorn. And there was no practical way these mouth parts could create the force needed to break open a modern lobster shell nor a shrimp shell, which were used as analogues for a trilobite carapace in the model.

Another interesting discovery made along the way came from studying more than 400 Anomalocaris mouths. In none of them did Hagadorn find any signs of wear. That's strange because if they were genuine teeth there would be chips, scratches and other signs they were being used to munch on hard-shelled animals.

The model, gut contents, feces and wear all suggest Anomalocaris was not a trilobite eater. But they fail to help explain what this impressive beast from the Cambrian was eating.

"Maybe it ingested things and then spit them out," Hagadorn speculated. Another possibility is that it somehow broke down the food it was eating into very fine particles before ingesting it. At this point the only thing that appears certain is that the famed biggest predator of the early Cambrian is more mysterious than ever.

More information: gsa.confex.com/gsa/2010AM/fina … /abstract_181965.htm

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