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Microscopes and Math Reveal a Moth's True Hue



Maria McNamara

The scales of a moth that lived 47 million years ago look blue now but were yellow-green then.

By SINDYA N. BHANOO
Published: November 21, 2011

The brilliant hues of moths and butterflies are not from pigmentation, like the colors of our skin or eyes. Rather, they come from tiny structures in the scales that scatter light to produce colors.

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Now, researchers have determined the original colors of a fossilized moth that lived 47 million years ago.

Maria McNamara, a paleobiologist at Yale University, and her colleagues used electron microscopy to study the moth's scales, and then mathematically analyzed the scale structure to determine what the colors originally were.

"The original colors would have been yellow-green across the wings," Dr. McNamara said. "Today when you look at it, it's actually more of a blue color."

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She and her colleagues report their findings in the current issue of the journal [PLoS Biology](#).

About 20 specimens of the moth were discovered in the Messel oil shale in Germany, a trove that has yielded thousands of fossilized insects, fish and mammals.

The moth is a relative of the burnet moths and the forester moths, species found in Europe and Asia, Dr. McNamara said.

These moths are toxic and unpleasant to taste, and their bright colors serve as a warning system to predators. It is possible that the ancient moths had developed this same warning system and were also toxic, Dr. McNamara said.

"Finding any trace of color at all is very important in terms of ecology," she added. "We can reconstruct the original colors and the communication strategies of these insects."

A version of this article appeared in print on November 22, 2011, on page D3 of the New York edition with the headline: Microscopes and Math Reveal a Moth's True Hue.



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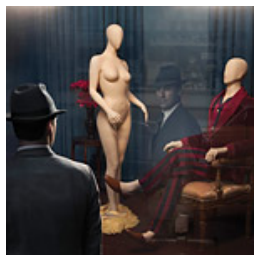
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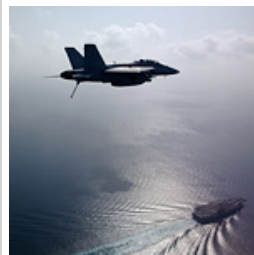
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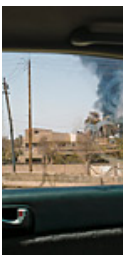
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