The Light-Absorbing Butterfly Wing

Butterfly: jeridu/E+/Getty Images; wing scale: Mr. Stephen Karl/CSUF Microscopy Technician

IN ORDER to reduce mankind's dependence on fossil fuels, scientists are eager to improve the light-harvesting efficiency of solar collectors. "The solution to this problem," said a scientist, "may have been . . . fluttering right in front of our eyes."

Consider: To keep themselves warm during cold weather, butterflies spread their wings in the sun. The wings of some species of swallowtail are remarkably efficient at trapping and absorbing sunlight. The insects' secret lies not just in their dark pigment but also in the structure of microscopic, overlapping scales coating their wings. The scales, in turn, contain rows of honeycomblike holes separated by inverse V-shaped ridges that funnel light into the holes. This ingenious structure traps incoming sunlight, making the wings extremely black and warming the butterfly with amazing efficiency.

"Butterfly wings may rank among the most delicate structures in nature," says *Science Daily,* "but they have given researchers powerful inspiration for new technology that doubles the production of hydrogen gas—a green fuel of the future—from water and sunlight." Other promising applications include optical instruments and solar cells.

What do you think? Did the light-absorbing architecture of the butterfly wing come about by evolution? Or was it designed? ■