

# 89 Weather Moves Continents

THE MOVEMENTS OF EARTH'S CRUST PUSH UP MOUNTAINS AND RESHAPE OCEANS, influencing climate. Unexpectedly, the connection runs the other way as well: In April scientists reported that rains may be accelerating India's collision with China.

Over the past 10 million years or so, movement of the Indian Plate—which is plowing north into Eurasia, forming the Himalayas—has sped up by 20 percent. Over the same period, monsoonal rains in the region have intensified. By combining climate and plate movement data in a computer model, geophysicist Giampiero Iaffaldano of the Australian National University in Canberra showed that the monsoons can explain the acceleration. Heavy landforms like the Himalayas slow the motion of a tectonic plate, essentially pinning it down. Monsoons have been shaving away material through erosion, reducing the weight of the mountain range and easing off the brakes, Iaffaldano says. Next he wants to study other mountainous regions, such as the Andes, to see if a similar pattern holds true there. **PATRICK MORGAN**

# 91 Unmasking Earth's First Life

In August Oxford University paleontologist Martin Brasier announced that he had found the remains of one of the earliest life-forms on Earth, fossilized 3.4-billion-year-old bacteria. The claim brought additional intrigue to the ongoing contention between Brasier and UCLA's Bill Schopf, who in 1993 said he had discovered organisms 3.46 billion years old. Brasier publicly questioned Schopf's find in 2002, and the two have been feuding ever since.

The quarrel is juicy enough in itself, but it also carries major scientific importance: The discoveries provide contrasting insights into the identity of Earth's first organisms, as well as what life might look like beyond our planet.

Earth was very different 3.4 billion years ago. No plants grew on the few areas of land that poked above a hot, shallow, Earth-enveloping sea. Meteors struck frequently; the atmosphere was full

of sulfur and carbon dioxide and short on oxygen. Yet scientists believe these were the conditions that gave rise to life.

According to Schopf, the fossils he found in Western Australia indicate that Earth's earliest inhabitants resembled cyanobacteria, single-celled organisms that turn sunlight into energy. Analysis of the surrounding rock suggests they lived in a sea near hydrothermal vents pumping out hot, mineral-laden water.

Brasier's find was just 20 miles away from Schopf's, but it comes with a vastly different interpretation. Mineral evidence near his fossils indicates that these creatures fueled themselves primarily with sulfur instead of light, Brasier says, and lived in shallow waters near the shore.

Paleontologists will keep reviewing evidence to determine which interpretation is more accurate. For now, both discoveries are providing scientists with models for the types of life-forms that could exist on other planets. "When I was young, everyone lost interest if it wasn't little green men," Brasier says. "But now we want to know if there is other life out there, even on the bacterial level."

MARY BETH GRIGGS

# 92 3-D Chips Make Computers Faster

The inexorable trend in electronics for the past four decades has been to do more with less—to make transistors ever smaller in order to squeeze more processing power into a given space on a microchip. Chip designers are now running into a real-estate crunch, however,

so Intel is doing what any densely settled city would do if it needed to accommodate more people in the same area: building upward.

In conventional transistors, flat conductive channels carry electricity to gates that switch a current on or off, creating the ones and zeros that allow computers to process information. Intel's new Tri-Gate transistors, first demonstrated last May, replace those flat channels with thin, rectangular silicon pillars, or "fins," that rise above the surface of the chip. Electricity flows through the transistor on all three

sides of the fin, allowing gates to wrap around the fin instead of touching only one face of the conductive channel. This gives the gates better control over the flow of electricity, boosting the transistor's performance by 37 percent. Intel says Tri-Gate transistors consume less than half the power used by conventional transistors and can be packed more closely together on a chip.

Look for 3-D transistors to begin showing up in PCs in early 2012 and in servers and cell phones soon after that. **HARRY MCCrackEN**



Hard-bodied ticks like this one transmit Lyme disease.

# 90 Chronic Lyme Patients Validated

PATIENTS WITH CHRONIC FATIGUE SYNDROME AND post-treatment Lyme disease syndrome (in which symptoms persist after antibiotic treatment) have spent decades fending off charges that their debilitating exhaustion and cognitive problems were simply imagined. But a study released last February provides tangible evidence that their conditions are real and distinct entities.

Immunologist Steven Schutzer of the University of Medicine and Dentistry of New Jersey examined samples of cerebrospinal fluid, the clear liquid that surrounds the brain and spinal cord, from patients with each syndrome. In identifying the contents of that fluid, he documented different sets of proteins for each group of patients, potential biomarkers that distinguish between the two conditions and healthy controls. Schutzer revealed the marker proteins by removing common, unrelated proteins like albumin and immunoglobulin from the spinal fluid before his analysis. "That lets the smaller proteins—the potential biomarkers—not get obscured," he says. "At least now we know we're not just speculating about the differences between chronic fatigue syndrome and post-treatment Lyme." **KATIE PALMER**