April 2007
Volume 18:4

Discovery

Scripture & Science for Kids

Quick! To the Bat-Cane!

Caleb Colley

Bats have an amazing way of flying through caves that are filled with dangerous obstacles, like stalactites and stalagmites. While most bats have decent vision, they also have extremely sensitive hearing. Bats make a sound that humans cannot hear. Do not confuse this sound with the squeaky noise you hear when you stand next to the bat exhibit at your local zoo (bats make those noises when they are frustrated, excited, or mating).

This shrill, high-pitched noise that you can't hear bounces off objects in a bat's flying path, giving it plenty of time to dodge whatever is in the way. This process is called echolocation. Bats make these sounds from a few, to two hundred, times per second. Not all bats use echolocation; approximately 200 species of fruit bats in Africa, Asia, and Australia have larger eyes and use only their sharp vision to avoid obstacles. Other animals, including dolphins, orca, and beluga whales, use echolocation under water, like sonar signals. Echolocation also has been observed in mammals such as rodents, insect-eating mammals, and some birds such as oil birds and cave swiftlets.

Scientists have used their knowledge of bat "vision" to create the UltraCane. It is a new electronic mobility aid, designed to help people—especially the blind—get around more easily and safely. It uses ultrasonic signals which bounce off objects in its path and "echo" back to the cane. The device sends that information to the buttons on the handle, telling the user how far away the objects are and whether they are in front or at head height.

The user of UltraCane gets feedback through his fingers. The signals reach a part of the brain that creates mental maps subconsciously, so, when the brain has become accustomed to the signals, the user can process the information from his cane's echolocation almost effortlessly. More and more mobility trainers worldwide are learning how to use the UltraCane. Those who now can move more easily can thank not only the designers of UltraCane, but also the Creator of all life Who made those remarkable bats!

RoboLobster

Eric Lyons

Of all the amazing creatures to imitate, you might wonder why scientists would choose lobsters. We normally think of lobster as a kind of food to eat at our favorite steakhouse, and not the inspiration for some grand invention. Why would any scientist spend thousands of dollars building a 7-pound, 24-inch lobster-like robot? And why did *TIME* Magazine name it one of the "Coolest Inventions of 2003"?

Scientists are mimicking lobsters because the U.S. Navy is in need of a better way to hunt for deadly explosives (called "mines") on the ocean floor. The ocean can be a very difficult place to look for mines because of the rush of waves and the difficulty of seeing clearly through the water. Now scientists have devised a new way. Actually, they have copied the ways of real lobsters.

Lobsters are excellent at moving both on land and in turbulent waters. They can "automatically" adjust their position in the rough waters of the ocean, and can effectively walk along sand and rocks, preying on starfish, sea urchins, and clams. Scientists believe that RoboLobster will be able to search for mines along the coastlines by mimicking the movement of real lobsters.

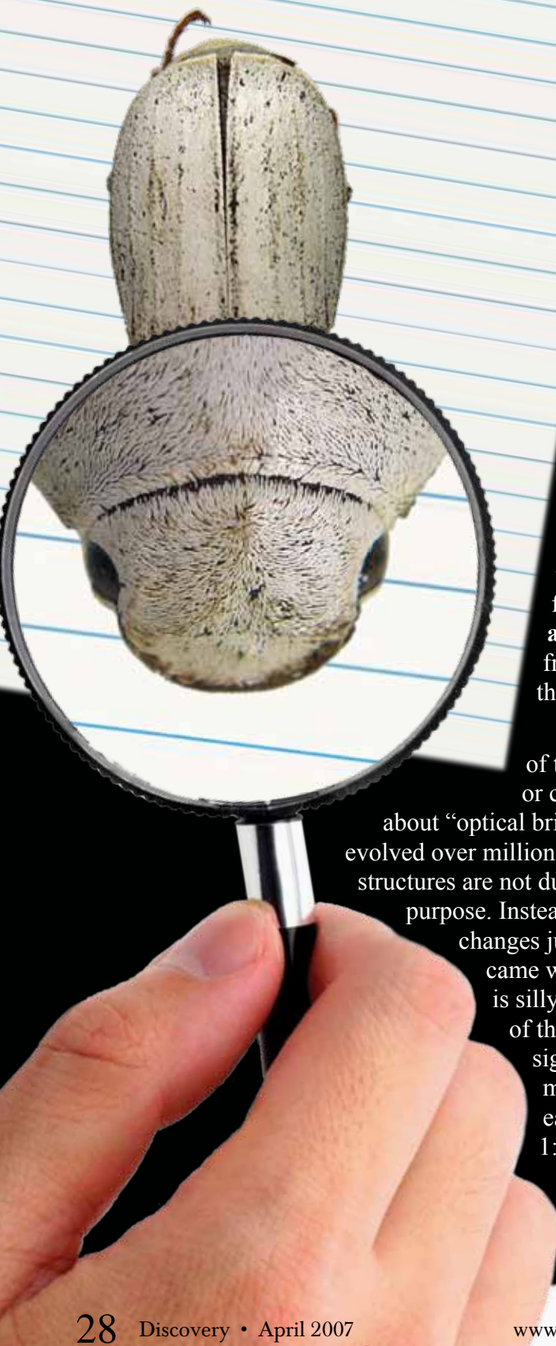
Imagine seeing RoboLobster crawling in the shallow waters off of a beach. Its eight super strong plastic legs work just right to move it in any direction. Its antennae sense obstacles to avoid or destroy. Its claws and tail stabilize it in rough waters. You would conclude that this robot is the product of intelligent design.

Now imagine seeing a **real** lobster scurrying along the same ocean floor. You recognize that its body is designed perfectly for the actions it performs. You observe its claws, legs, eyes, antennae, and tail. You watch how easily it moves around, automatically adjusting its body in the turbulent waters in order to stay in the right position to rest or search for food.

To what do we owe the real, living lobster? Evolutionists say it is the result of mindless time and chance. However, common sense and the Bible say otherwise. Design demands a Designer. "For every house is built by someone, but He who built all things is God" (Hebrews 3:4).

Photo of RoboLobster (U.S. Navy photograph by John F. Williams - 3/2/2006)

WHITER THAN Tide



Dave Miller

If your mother is like many mothers, she works hard to get your clothing as clean as possible. She probably uses all types of cleaners, detergents, and bleaches in hopes of getting your socks, t-shirts, and other "whites" back to their original shiny white condition. But all the efforts of laundry detergent manufacturers cannot compare with the white that God built into His creation.

A research team has been studying a rare Southeast Asian specie of beetle known as *Cyphochilus* because of its unusual brilliance. The *Cyphochilus* beetle's body, head, and legs are covered in long, flat scales. The size and spacing of these scales scatter white light far better than the fibers in white paper. What's more, being only 1/200th of a millimeter thick (that's tiny!), the scales are ten times thinner than a human hair. Scientists admit that this thickness is far thinner than the coatings and paints that are used on paper and plastics. In fact, manmade coatings would have to be **twice as thick to be as white.** Scientists realize if they wish to improve technology—from whiter paper to better white light bulbs—God's design of the beetle has much to teach them.

Think about that. Brilliant scientists hope to mimic the **design** of the beetle. The beetle did not attend a university, study physics, or create itself. Yet the beetle has something to teach smart men about "optical brilliance." Many scientists insist that the beetle evolved over millions of years. They say that its amazing tiny structures are not due to any higher mind, planning, or purpose. Instead, over long periods of time, tiny changes just happened until the beetle became what it is today. But that thinking is silly. The fascinating, complex design of the beetle points to the Master Designer. The Bible says it well: "God made…everything that creeps on the earth according to its kind" (Genesis 1:25). "Let them praise the name of the Lord, for He commanded and they were created" (Psalm 148:5).

A BODY-BOT?

Dave Miller

The year was 1966. My classmates and I were herded aboard buses by our school teachers in Phoenix, Arizona for a "field trip" to see a newly released science fiction movie titled *Fantastic Voyage*. The story line: Russian scientist, Jan Benes, who held the secret of how to shrink soldiers for an indefinite period, escaped from behind the Iron Curtain with the help of a CIA agent. While being transferred, their motorcade was attacked and Benes' head was struck, causing a blood clot to form in his brain. A group of scientists then were miniaturized, along with a submarine, injected into his bloodstream, and had one hour to travel to his brain and remove the clot and get out before the immune system recognized them as a foreign body. As I remember, the teachers wanted us to see the internal marvels of the human body as the crew made their way from the arm, through the heart, and on to the brain.

While scientists can't shrink people, Australian scientists are developing a miniature robot that they hope will be able to propel itself through human arteries to perform delicate medical procedures. Only two human hairs wide, the 250-micron microrobot will send images and perform microscopic tasks in areas of the body where current surgical procedure is risky. Once inserted by means of a syringe, the microrobot will be guided by remote control to the target site to perform its assigned tasks, and then return to the point of entry so it can be removed.

One of the obstacles researchers have faced for years is how to design the propulsion system. Since electromagnetic motors aren't practical, this microrobot's design is based on the *E. coli* bacterium of the human intestine. It includes flagella (fluh-GEL-uh) that propel it through the body. The flagella are made from human hair.

Once again, men turn to God and His creation to solve their problems. God built into His creation the principles that make the Universe work the way He wants it to work. Intelligent men are able to tap into the intelligent designs of the Master Designer to produce amazing technology that helps people. "Know that the Lord, He is God; It is He Who has made us, and not we ourselves" (Psalm 100:3).

Activity Page

Copy a Creature Contest

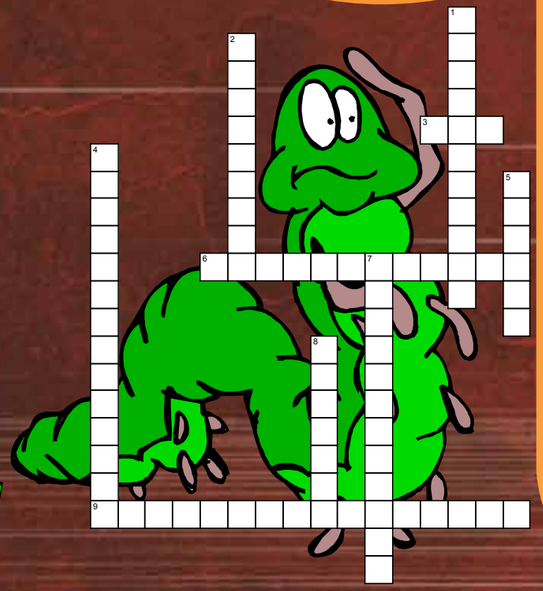
Hey Kids! This month's *Discovery* is special because we are starting a new contest to feature your creative writing and drawing talents. The contest for this month is called Copy a Creature. Simply think of how the design of a particular animal could be copied to make a new invention. Draw a picture of the new object and write a paragraph to explain how it is related to God's design, and how people can use it. Be creative and have fun. We will select some of the most creative ideas and feature them in a future issue of *Discovery*. All winners will receive a special prize. But hurry! Copy a Creature ends in May, so get your biomimicry ideas to us soon!

SEND YOUR WORK TO
DIGGER DOUG
230 LANDMARK DR.
MONTGOMERY, AL 36117

True or False

1. ☐ It makes sense to believe that all of the animals, which scientists spend countless hours and billions of dollars studying, are the result of mindless time and chance.
2. ☐ A new microrobot's design is based on the *E. coli* bacterium.
3. ☐ Termites evolved the ability to keep their large termite mounds the perfect temperature.
4. ☐ God made lobsters with the ability to move effectively in turbulent waters.
5. ☐ There is a beetle that has scales whiter than any piece of paper on Earth.
6. ☐ Biomimetic means mimicking (or copying) nature.
7. ☐ God made everything over a period of 15 billions years (Exodus 20:11).
8. ☐ UltraCane was built to hunt for deadly explosives called mines.

Crossword Challenge



ACROSS

3. "He Who built all things"
6. The idea for the design of a new building built in Harare, Zimbabwe came from this
9. Most of the silk in our clothing comes from these

DOWN

1. The scales of this beetle scatter white light better than the fibers in any white paper
2. A new electronic cane that mimics the echolocation of bats
4. Miniature robots used inside the human body mimic this
5. The silk from this animal is (pound for pound) five times stronger than steel
7. The process of making high-pitched noises that bounce off of objects
8. What a RoboLobster imitates

Hey kids, send your questions about the Bible and/or science to Digger Doug! Digger Doug also loves to receive your poems and artwork (which is sometimes featured in *Discovery*). Digger Doug can't return what he receives, so keep a copy for yourself.

SEND TO:
DIGGER DOUG
230 LANDMARK DRIVE
MONTGOMERY, AL 36117

Dear Digger Doug,

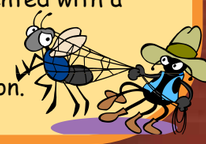
What kind of animals or insects give silk?
—Jamie, St. Albans, WV

Dear Jamie,

This is an excellent question. Almost all the silk in our clothing is from moth caterpillars. But many different types of silk are produced by a huge variety of insects, such as lacewings and spiders. Silk is the strongest of all natural fibers. Pound for pound, the silk from certain kinds of spiders is five times stronger than steel, and can stretch 30% farther than the most stretchable nylon, and is twice as flexible. World production of silk products has approximately doubled during the last 30 years.

Scientists are using God's silk design to develop soft, lightweight bullet-proof vests for policemen that would protect officers even better than current vests. Lately, many scientists have tried to mimic the spider's complex silk-spinning process, with little success. Companies like Nexia have experimented with a "spinneret" to form a consistent fiber.

Once again, we see that God's design sets the standard, and science mimics God's perfect creation.



APOLOGETICS PRESS, INC.
230 Landmark Drive
Montgomery, AL 36117
(800) 234-8558 (Orders)
(334) 272-8558
www.DiscoveryMagazine.com

Nonprofit Organization
U.S. Postage
PAID
Montgomery, AL
Permit No. 513

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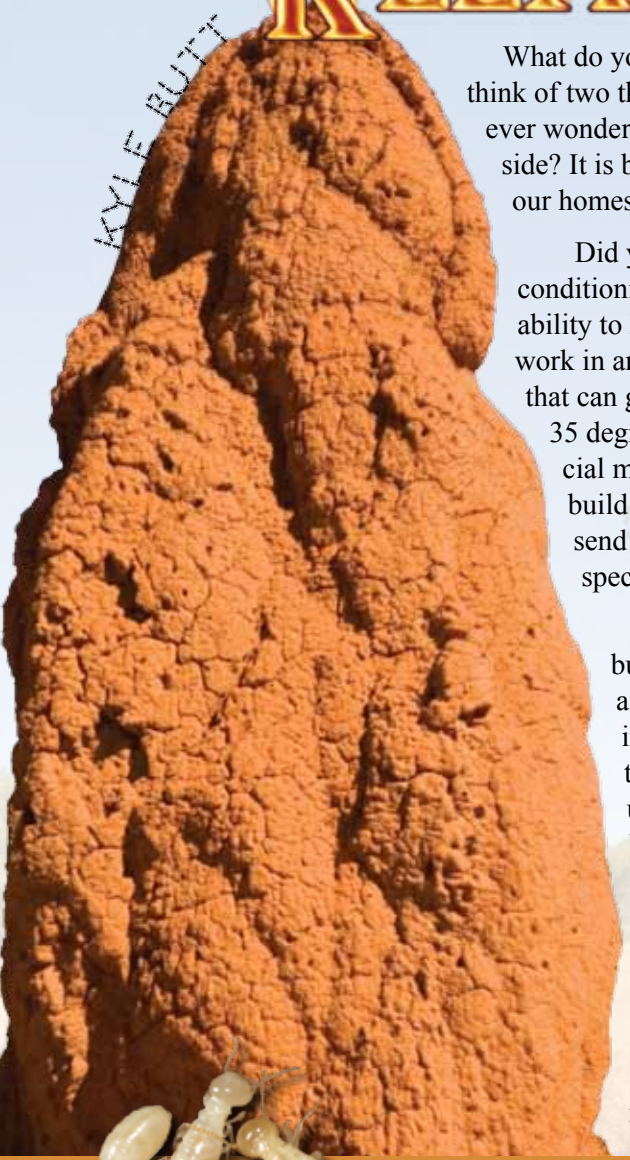
KEEPING IT COOL



KYLE BUTT

What do you do when it is 100 degrees outside in the middle of the Summer? I can think of two things: go swimming or stay inside in a cool, air-conditioned house. Have you ever wondered how your house can be 75 degrees inside when it is over 100 degrees outside? It is because engineers have learned to build machines that can pump cool air into our homes and pump hot air out.

Did you know that nature has some engineers that have mastered the art of air-conditioning? Termites. That's right. These little wood-eating insects have an amazing ability to keep their large termite mounds the perfect temperature. Termites need to work in an environment that stays about 87 degrees. But termites often live in areas that can get extremely hot in the day, about 104 degrees, and cold at night, about 35 degrees. How do they keep their houses "just right"? Termites build special mounds with several vents that send hot air out the top. They also build vents at the base of the mound that trap the outside breeze and send cool air flowing through the structure. During cool nights, the special vents and airflow keep the mound warm.

In the city of Harare, Zimbabwe, architect Mick Pearce built an office building called Eastgate. He modeled his building after a termite mound. His biomimetic (nature-copying) building is a work of art, and it is very efficient. The building stays the perfect temperature, but uses only 10 percent of the energy used by other buildings in the area. The builders of Eastgate believe that they have saved over 3.5 million dollars in energy costs, simply by copying termites.

Where would termites learn to build an air conditioning system? They could not have evolved the ability, because they would have died before they learned to get the temperature to stay 87 degrees. The only honest answer is that God, the Ultimate Engineer, created them with the ability to build air-conditioned mounds. When we see design like we see in the termite mound, we should look to the eternal Designer and give Him our praise.

ANSWERS

TRUE OR FALSE: 1. F; 2. T; 3. F; 4. T; 5. T; 6. T; 7. F; 8. F. CROSSWORD CHALLENGE: Across—3. God; 6. termite mound; 9. moth caterpillars; Down— 1. *Cyphochilus*; 2. UltraCane; 4. *E. coli* bacterium; 5. spider; 7. echolocation; 8. lobster.

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