Are Animal Inventors?

By Gail Jarrow and Paul Sherman

Some of them make their own tools.
You use inventions every day. For some simple ones, think of a spoon or hammer. Other inventions are complex, such as a car or telephone. Many people think that only humans invent tools.
Not so fast. Some animals use tools, too. For example, fire ants use moss to soak up water and carry it home. Sea otters use rocks to crack open mussel shells. Does that mean that these animals are also inventors?
Finding out isn’t easy. We can’t ask an otter how it knew to use a rock as a hammer. Was it born knowing this? Or did it copy another otter’s invention?
Scientists often approach these questions by watching animals in nature. They have noticed that all sea otters—young and old—use rocks to break hard shells. All do it basically the same way. And all fire ants use their moss the same way, too. So tool use by otters and fire ants may be an inborn ability.
The Termite Catcher
For some other animals, it’s a different story.
Chimpanzees use a stick to catch termites. A chimp finds a branch, strips off its leaves and side branches, and breaks the stick to the ideal length. Then it carefully pokes the tool into holes in a termite mound. The termites attack the stick. When the chimp pulls out the stick, it’s covered with tasty termites. Unlike sea otters, individual chimps construct and handle their tools differently.
There is another clue that chimps invented this tool.
Young chimps learn the skill by watching older chimps.
The first few times a youngster makes a probe from a stick, the tool is crude and doesn’t work well. By practicing, the young chimps improve their tool-making skill.
A Rodent’s Dust Mask
Scientists gather more clues about an animal’s use of tools by observing how the animal behaves in a new situation. Dr. Paul Sherman and Gabriela Shuster used this approach with naked mole-rats. These gerbil-sized African rodents live in underground tunnels, in colonies of up to three hundred members. In Dr. Sherman’s laboratory at Cornell University, their homes are plastic tubes, in which they often gnaw holes with their large front teeth.
Before gnawing at the plastic, a mole-rat picks up a piece of wood shaving or root husk. The animal places the shaving or husk behind its front teeth. This shield keeps plastic dust out of the rodent’s throat and windpipe while it gnaws.
Dr. Sherman and Ms. Shuster weren’t sure when mole-rats started using these “dust masks.” No one had noticed if the rodents used the wood shavings when the animals were first brought into laboratories twenty years ago. Scientists also don’t know if wild mole-rats use dust masks when they gnaw at dirt because no one has ever seen them working underground.
To learn more, Sherman and Shuster added bricks of fine sand-stone, similar to the mole-rats’ native soil, to the plastic tunnels. The mole-rats sometimes used the dust masks, but not as often as when they gnawed at plastic. When the researchers added cork, plastic foam, and clay, all of which broke off in chunks, the mole-rats never used wood shavings.
Did the mole-rats invent the dust mask to keep fine, irritating plastic out of their throats? Mole-rats in several laboratories use the wood shavings the same way. This could mean that naked mole-rats are born knowing how to shield their throats whenever digging creates fine dust.
But only the older mole-rats use the shavings. This could be a clue that the younger ones aren’t born knowing how to use shavings as dust masks but have to learn it from their elders. That would mean at least one mole-rat invented the tool. Instinct or invention? No one is sure yet.

**A Puzzle for Ravens**

Another animal tool-user is the raven. This bird collects rocks, then drops them on intruders. Is the raven inventive? To find out, Dr. Bernd Heinrich gave ravens a problem they had never seen before.

He tied meat to the end of a long string that was attached to a perch. The ravens could not pull bits of the meat loose by flying and grabbing at it. The only way to eat the meat was to pull the string up to the perch. But Dr. Heinrich made the problem harder by choosing a string that was too long to be raised with one pull.

At first the ravens pecked at the string or dived at the meat. Finally, one bird sat on the perch and pulled up a short length of string with its beak. The raven used its foot to clamp the string to the perch, which prevented the meat from falling back to its original place. The bird then used its beak to yank up another length of string. After repeating this several times, the bird could grab the meat.

Eventually, most of the other ravens pulled up the string in a similar way. Once a bird figured out the solution, it used the method perfectly every time. Because none of the ravens solved the problem immediately, Dr. Heinrich concluded that they had invented a solution.

Did some birds learn the solution by watching the first raven, or did each one figure out the problem alone? He couldn’t tell, but his experiment showed that at least the first raven had been an inventor.

Animals other than humans probably won’t invent complicated tools like computers or airplanes. But some of them are more inventive than you might think.