1 Secrets of stone skimming revealed

はじめに
河原で、誰の投げた石がいちばん多く水面を跳ねるかを競争したことはありませんか？　水面をスキップするようにみるみる遠ざかっていく石は、まるで魔法にかかったかのようです。ある実験によると、その魔法は科学の力を借りて簡単に身につけられるとのことです。

Want to skim the perfect stone? A team of French researchers have worked out how, using their very own stone-skipping machine.

The motorized catapult fires aluminum disks into a two-meter-long pool of water. High-speed video cameras record the moment of impact, which normally lasts for less than one hundredth of a second.

By tweaking the angle, velocity and rotation of their missiles, Christophe Clanet and his team from the Research Institute for Out-of-Equilibrium Phenomena in Marseilles devised the winning formula for a throw.

To achieve the maximum number of rebounds, the angle between a spinning stone and the water should be about 20°, advises Clanet: “This is the magic angle.”

Spin, speed and shape are also important. A stone is more likely to rebound if it is rotating, they found. This is because spin stabilizes the object and prevents it from falling into the water.

Speedy stones are more likely to bounce than sluggish ones. A five-centimeter disk approaching the water at the magic angle needs to fly faster than 2.5 meters per second in order to avoid taking a plunge. Flat, round discs are ideal as their large surface area creates bounce on impact.

Researchers have studied stone skimming before, says Clanet, but their predictions have been based on theory rather than observation. “This machine gives us a real insight into the physics of this bouncing phenomena,” he says.

Stone skipping has been a competitive pastime for thousands of years. The aim—to achieve the maximum number of rebounds per throw—has remained unchanged since the time of the Ancient Greeks. Jerdone Coleman-McGhee, who in 1992 skipped a stone 38 times on the Blanco River in Texas, holds the world record.

Clanet’s stone skipping project has practical implications: the system may help physicists who wish to model spacecraft descent. As the Space Shuttle re-enters Earth’s dense atmosphere, for example, it also bounces much like a stone.