Peoria Academy of Science
Entomology Section

Engineering Examples of Insect Watching

Science and engineering are full of examples of inventions originating from insect watching. Here are a few.

Paper making - T'sai Lun, an official in the court of the Chinese Han Dynasty (105 C.E.) observed wasps macerating plant materials and developed a recipe to form paper based on these observations. He used mulberry leaves, old rags, fish nets, and hemp waste (along with other fibers) which were mashed by hand and left to ferment. The resulting materials was then sieved while wet and allowed to dry. Fun fact - paper was originally used for wrapping delicate objects and medicines. It would be another century before it was used for writing.

Chainsaw design – Joe Cox watched western pine sawyer beetle larvae [COLEOPTERA: Cerambycidae: ***Trichocnemis spiculatus*** LeConte, 1851] bore through timber with their serrated mandibles. He watched as they cut through wood in every direction. Based on his observations through a magnifying glass, he developed a chipper chain. This cut on the sides as well as back and forth and did not need to be sharpened as often. He patented his idea and became a multi-millionaire in the process.

Skyscrapers – the Exoskeleton Tower in Cheongna City, South Korea was inspired by termite mounds. The tower requires much less energy to heat and cool due to the air flow (similar to what evolved in termite cities millions of years ago).

James Webb Space Telescope – researchers studied the intricate folding patterns of rove beetle wings [COLEOPTERA: Staphylinidae] to engineer the necessary compact folding and secure deployment of the telescope.

Artificial pollination – researchers at MIT are designing robotic insects which could swarm out of a hive and perform artificial pollination. These drones can fly 100 times longer than previous versions.

Surgical needles – Temple University engineers have developed surgical needles which can be precisely positioned with less tissue damage (to inject treatments or remove a sample of cells). The design of these needles is based on honeybees and mosquitos.