Chasing the Ghost Bat and Other Mysteries of Nature

By the editors of *Scientific American*
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Chasing the Ghost Bat is a collection of 36 essays that have appeared in *Scientific American* from 1948 to 1999, although most were published in the late 1990s. The essays are grouped in 7 chapters. The first, titled "The Most Dangerous Animals of All," contains essays on human evolution, as disclosed by fossils, and observations of carnivorous activities by chimpanzees, which include a description of carefully organized hunts by groups of chimps carried out without any detectable communication. The second chapter, "Beasts of the Land," contains descriptions of extinct marsupials, such as carnivorous kangaroos and leonine marsupials that weighed as much as 260 kg (570 pounds), and the extinct carnivorous terror birds of South America, as well as the still-existing Komodo dragon and shrews, tiny mammals with metabolic rates so high they commonly eat more than 3 times their body weight every day and produce venom more toxic than that of any snake.

Chapter 3, "Beasts of the Air and Sea," presents essays on lizards that run on water; the diving adaptations of the Weddell seal, which can descend to depths of 1000 m and stay under water for an hour; the slime hag, a "living fossil" that plays a major role in sea life; and the mysterious giant squid (that really does exist). With Chapter 4, "Beyond the Picnic Basket," the essays begin to deal with smaller creatures, and this chapter deals with ants: the organized behavior of army ants; ants that enslave other ants and have lost the ability to carry out the functions performed by slaves; fire ants; and ants that live symbiotically with caterpillars. Chapter 5, "Wings and Webs," describes mating strategies of spiders, Africanized bees ("killer bees") in the United States, and predatory wasps.

The sixth chapter, "Extreme Plants," contains essays on plants that produce enough heat to warm themselves 15°C (27°F) above environmental temperatures and essays on carnivorous plants. "Small but Deadly," the final chapter, presents essays on single-celled creatures: cyanobacteria and the toxins they produce and the single-celled dinoflagellate, *Pfiesteria*, that is responsible for massive fish kills in North Carolina and Chesapeake Bay and also is toxic for humans. It also includes discussions of killer lymphocytes and the method by which they kill other cells, fungi that prey on nematodes, and, finally, bacteria that live in extreme environments such as the 100°C water around undersea hydrothermal vents, the extreme cold of the Arctic and Antarctic, highly

acidic or alkaline environments, and the extreme salinity of natural salt lakes and evaporative ponds.

I found most of the essays fascinating, although a few of the older ones, particular the 1957 essay on venomous snakebites, were out of date. I was particularly impressed by the wide variety of topics being investigated by scientists from all parts of the world. Information gleaned from some of these studies has been very useful. The thermophilic bacterium *Thermus aquaticus*, first found in hot pools in Yellowstone National Park, has been a valuable component of the polymerase chain reaction procedure, an essential technique for nucleic acid studies. In contrast, many of the investigations, such as the studies of fossils, seem to have little practical value.

In this collection of essays are mentioned scientists who specialize in dating layers of stratified rock, scientists who have spent their careers studying the evolution of pigs in Africa, and scientists (teuthologists) who study cephalopods, a group of marine animals that includes the squid, the cuttlefish, and the octopus. Our society, directly or indirectly, supports these individuals and their research. To be sure, most of these investigators are on the faculty of academic institutions and are paid to teach, but essentially, all of them are required to carry out productive research, and the topics of their investigations are largely unlimited.

Basic science that is of no immediate practical purpose is often the basis for discoveries of immense value. Yet, I ask, of how much immediate usefulness is the study of fossils, or, at even greater expense, astronomy? Even benefits from the space program stem more from developing means for travel into space than from knowledge gained by such activities. Yet, who has not gazed at the night sky in wonder? Who begrudges the millions poured into terrestrial and orbiting telescopes? We willingly pay the salaries and other expenses of astronomers and thousands of scientists in different fields, even though the results of their investigations serve only to satisfy our curiosity. I am proud of that!

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