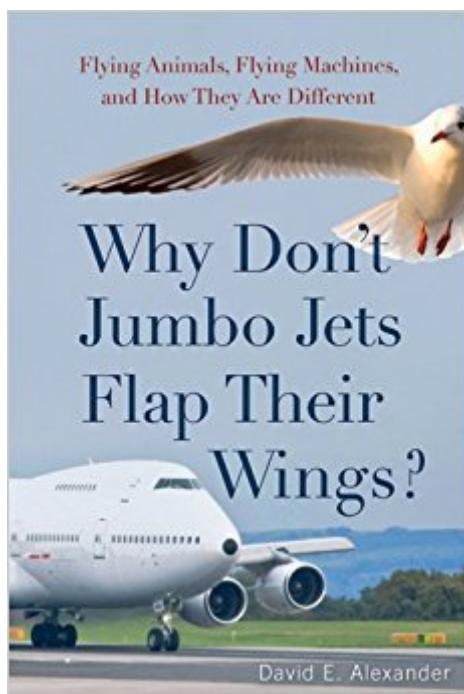


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# Why Don't Jumbo Jets Flap Their Wings?: Flying Animals, Flying Machines, And How They Are Different



## Synopsis

What do a bumble bee and a 747 jet have in common? It's not a trick question. The fact is they have quite a lot in common. They both have wings. They both fly. And they're both ideally suited to it. They just do it differently. *Why Do Jumbo Jets Flap Their Wings?* offers a fascinating explanation of how nature and human engineers each arrived at powered flight. What emerges is a highly readable account of two very different approaches to solving the same fundamental problems of moving through the air, including lift, thrust, turning, and landing. The book traces the slow and deliberate evolutionary process of animal flight—in birds, bats, and insects—over millions of years and compares it to the directed efforts of human beings to create the aircraft over the course of a single century. Among the many questions the book answers: Why are wings necessary for flight? How do different wings fly differently? When did flight evolve in animals? What vision, knowledge, and technology was needed before humans could learn to fly? Why are animals and aircrafts perfectly suited to the kind of flying they do? David E. Alexander first describes the basic properties of wings before launching into the diverse challenges of flight and the concepts of flight aerodynamics and control to present an integrated view that shows both why birds have historically had little influence on aeronautical engineering and exciting new areas of technology where engineers are successfully borrowing ideas from animals.

## Book Information

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## Customer Reviews

This book is for everyone who's ever wondered how something gets into the air, stays there and

lands safely. A close look at the aerodynamics of wings introduces the basic concepts of lift, thrust, drag and weight, the basic forces that affect flight. While the principles don't differ between animals and machines, design and purpose do. Bird and insect wings have evolved to provide lift and maneuverability, ward off predators and attract mates. Manmade flyers, on the other hand— even sailplanes— require a separate means of thrust to create lift. Alexander, who teaches biology at the University of Kansas and studies biomechanics, explains how birds and machines hover; how rotary plane and jet engines work; what keeps airplanes, with their rigid wings, stable in the air; and how various tools help pilots fly blind. Sections on flying predators and aerial combat, as well as human-powered flight, are especially interesting. Extensive references, a glossary and suggested reading should give even novices a good understanding of flight and how it works. B&w illus. (June) Copyright © Reed Business Information, a division of Reed Elsevier Inc. All rights reserved.

"This book lucidly captures the comparative aerodynamics of winged animals and aircrafts with great skill and clarity. This is science writing at its best and is a valuable reference for the specialist as well as for the casual enthusiast of flight."Sankar Chatterjee, Paul Whitfield Horn Professor of Geosciences, Texas Tech University"David Alexander has produced an astonishingly readable and enjoyable romp through topics in flight mechanics. This book cuts through the obtuse and obscure without sacrificing scholarship."Catherine Loudon, University of California, Irvine"You'll find no more transparently clear explanation of all that goes on when you fly in an airplane. Or, in a seamlessly integrated account, what happens when a bird, bat, or bumblebee does the same."Steven Vogel, James B. Duke Professor, Emeritus, Department of Biology, Duke University"This is a well-written and thought-provoking book telling a unique story of both the history and the physics of natural and mechanical flight."James DeLaurier, Professor Emeritus, University of Toronto Institute for Aerospace Studies

Good in parts - especially man powered aircraft

This is an unusual book with an unusual title, posing a startling question which might never occur to a typical reader -- why don't airliners use the wing-flapping strategy evolved by nature and employed by ancient pterosaurs as well as modern birds, bats and insects? The book's subtitle, "Flying Animals, Flying Machines, and How They Are Different," foreshadows the author's intent to take the question seriously and provide an answer supported by an interesting and wide-ranging

discussion drawn from the contrasting (but conceptually related) worlds of biology and aeronautical engineering. Prof. Alexander, an entomologist by profession, organizes the book into ten chapters dealing with flying animals vs. flying machines, opposing gravity with lift, overcoming drag with thrust, the complex problems of turning and maneuvering, the role of the tail, the human need for flight instruments, the art of soaring, vertical takeoff and hovering, predation and aerial combat, and unconventional flight as embodied in ornithopters and human-powered aircraft. A seven-page Epilogue delivers the author's "bottom line" response to the query contained in the title. The main narrative is enriched with many technical details, historical anecdotes, and bits of biological and aeronautical ephemera which help keep the reader interested. Good quality line-drawing illustrations supplement the text throughout. The material on helicopters, human-powered flight, and ornithopters is more extensive than usually found in popular aviation literature, and of course the author's professional expertise in natural flight lends depth and authority to his analyses of aerial locomotion by insects and animals. I recommend this book to anyone wishing to acquire a broader knowledge of the problem of flight as solved first by nature herself and again (much later) through the intellectual efforts of Earth's most intelligent species to date.

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