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# The Solitary Bees Biology Evolution Conservation

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Some Assembly Required  
 Field Guide to the Bees of Great Britain and Ireland  
 Plant-Pollinator Interactions  
 Animal Architects  
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## LUCAS FRENCH

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**Some Assembly Required** Cambridge University Press  
 An exciting and accessible new view of the evolution of human and animal life on Earth. From the author of national bestseller, *Your Inner Fish*, this extraordinary journey of discovery spans centuries, as explorers and scientists seek to understand the origins of life's immense diversity. "Fossils, DNA, scientists with a penchant for suits of armor—what's not to love?"—BBC Wildlife Magazine Over billions of years, ancient fish evolved to walk on land, reptiles transformed into birds that fly, and apelike primates evolved into humans that walk on two legs, talk, and write. For more than a century, paleontologists have traveled the globe to find fossils that show how such changes have happened. We have now arrived at a remarkable moment—prehistoric fossils coupled with new DNA technology have given us the tools to answer some of the basic questions of our existence: How do big changes in evolution happen? Is our presence on Earth the product of mere chance? This new science reveals a multibillion-year evolutionary

history filled with twists and turns, trial and error, accident and invention. In *Some Assembly Required*, Neil Shubin takes readers on a journey of discovery spanning centuries, as explorers and scientists seek to understand the origins of life's immense diversity.

### **Field Guide to the Bees of Great Britain and Ireland**

Cambridge University Press

After volume 33, this book series was replaced by the journal "Evolutionary Biology." Please visit [www.springer.com/11692](http://www.springer.com/11692) for further information. This latest volume continues the series' focus on critical reviews, commentaries, original papers, and controversies in the field of evolutionary biology.

**Plant-Pollinator Interactions** Princeton University Press  
 Darwin famously described special difficulties in explaining social evolution in insects. More than a century later, the evolution of sociality - defined broadly as cooperative group living - remains one of the most intriguing problems in biology. Providing a unique perspective on the study of social evolution, this volume synthesizes the features of animal social life across the principle taxonomic groups in which sociality has evolved. The chapters explore sociality in a range of species, from ants to primates,

highlighting key natural and life history data and providing a comparative view across animal societies. In establishing a single framework for a common, trait-based approach towards social synthesis, this volume will enable graduate students and investigators new to the field to systematically compare taxonomic groups and reinvigorate comparative approaches to studying animal social evolution.

**Animal Architects** William Collins

"This is a brand new, fully updated edition of the natural history classic first published in 1973 as *The Pollination of Flowers*." "The importance of insects in pollinating flowers is today so well known it is easy to forget that it was discovered little more than two centuries ago: before that, it was believed that the concern of bees with flowers was simply a matter of collecting honey." "But the methods by which pollen reaches the female flower, enabling fertilisation and seed production to take place, include some of the most varied and fascinating mechanisms in the natural world. The *Natural History of Pollination* describes all the ways in which pollination is brought about: by wind, water, birds, bats and even mice and rats; but principally by a great diversity of insects in an amazing range of ways, some simple, some bizarre." "This book is a unique introduction to a complex yet easily accessible subject of great fascination."--BOOK JACKET. Title Summary field provided by Blackwell North America, Inc. All Rights Reserved

**Buzz** Harvard University Press

"Bees play an essential role in the pollination of native plants and agricultural crops across the globe. In North America alone there are more than 4,000 bee species. In spite of their abundance and diversity, there is no accessible field guide for the non-expert. This book will remedy that situation by providing a carefully crafted introduction to bee identification for eastern North America. No portable field guide could include coverage of the myriad species in the region, so the book concentrates on identifying bees at the genus level. It includes information on the 72 different genera that are found east of the Rockies"--

*The Dark Side of the Hive* Princeton University Press

Based on nearly 40 years of teaching, this book thoroughly describes the principles and fundamentals of insect physiology. Readers will quickly understand the terminology needed to navigate the voluminous, scattered literature in the field. With approximately 1500 references and more than 240 figures and tables, *Insect Physiology and Biochemistry* is useful as a core text for upper division and graduate students, as well as a valuable reference for scientists who work with insects in genetics, biochemistry, virology, microbiology, and behavior.

*Bee Basics* Princeton University Press

Intraspecific communication involves the activation of chemoreceptors and subsequent activation of different central areas that coordinate the responses of the entire organism—ranging from behavioral modification to modulation of hormones release. Animals emit intraspecific chemical signals, often referred to as pheromones, to advertise their presence to members of the same species and to regulate interactions aimed at establishing and regulating social and reproductive bonds. In the last two decades, scientists have developed a greater understanding of the neural processing of these chemical signals. *Neurobiology of Chemical Communication* explores the role of the chemical senses in mediating intraspecific communication. Providing an up-to-date outline of the most recent advances in the field, it presents data from laboratory and wild species, ranging from invertebrates to vertebrates, from insects to humans. The book examines the structure, anatomy, electrophysiology, and molecular biology of pheromones. It discusses how chemical signals work on different mammalian and non-mammalian species and includes chapters on insects,

*Drosophila*, honey bees, amphibians, mice, tigers, and cattle. It also explores the controversial topic of human pheromones. An essential reference for students and researchers in the field of pheromones, this is also an ideal resource for those working on behavioral phenotyping of animal models and persons interested in the biology/ecology of wild and domestic species.

*Encyclopedia of Social Insects* Springer Science & Business Media  
Pollen studies make important contributions nature, into three main themes: pollen structure to our knowledge in many interdisciplinary ture and constituents, pollen evolutionary arenas. Pollen identification is widely used in ecology and the pollen-pollinator interface. reconstruction of, e.g., vegetation, the climate Several papers overlap somewhat or are of the past, and plant biodiversity. Studies perhaps even somewhat contradictory and concerning pollen structure, size and form are reflect the author's own ideas and experience. key issues in basic sciences, as, e.g., plant Some could be understood more deeply by taxonomy and evolution, but are also of consulting other closely related articles. The importance in applied fields as, e.g., plant reader is strongly referred to the respective breeding. In pollination studies pollen is literature list of each article. generally used specifically to identify food of anther ripening and pollen The last steps development (Pacini) and the mature pollen sources of visitors and to reconstruct their foraging routes. Fewer have been devoted to wall structure (Hesse) are key factors to pollen collection mechanisms and to the struc understand pollen dispersal mechanisms in ture and content of pollen in relation to its biotic pollination (Stroo) as well as abiotic pollination (Ackerman). Pollen size, shape, function.

*Insect Physiology and Biochemistry* University of Chicago Press

Native bees are a hidden treasure. From alpine meadows in the national forests of the Rocky Mountains to the Sonoran Desert in the Coronado National Forest in Arizona and from the boreal forests of the Tongass National Forest in Alaska to the Ocala National Forest in Florida, bees can be found anywhere in North America, where flowers bloom. From forests to farms, from cities to wildlands, there are 4,000 native bee species in the United States, from the tiny *Perdita minima* to large carpenter bees. This illustrated and colorful pamphlet provides valued information about native bees --over 4,000 in population --varying in a wide array of sizes, shapes, and colors. They are also different in their life styles, the places they frequent, the nests they build, the flowers they visit, and their season of activity. Yet, they all provide an invaluable ecosystem service - pollination -to 80 percent of flowering plants. Blueberry bees, bumble bees, yellow jacket bees, carpenter bees, and more are explored, including the differences in their gender, nests, and geographical regions that they visit.

**California Bees and Blooms** Princeton University Press

Stingless bees (*Meliponini*) are the largest and most diverse group of social bees, yet their largely tropical distribution means that they are less studied than their relatives, the bumble bees and honey bees. Stingless bees produce honey and collect pollen from tens of thousands of tropical plant species and, in the process, provide critical pollination services in the tropics. Like many other insects, they are struggling with new human-made challenges like habitat destruction, climate change and new diseases. This book provides an overview of stingless bee biology, with chapters on the evolutionary history, nesting biology, colony organisation and division of labour of stingless bees. In addition, it explores their defence strategies, foraging ecology, and varied communication methods. Accordingly, the book offers an accessible introduction and reference guide for students, researchers and laypeople interested in the biology of bees.

Evolutionary Biology Basic Books

Honey bees have been described as exceptionally clever, well-organized, mutualistic, collaborative, busy, efficient--in short a perfect society. While the colony is indeed a marvel of harmonious, efficient organization, it also has a considerable dark side. Authors Robin Moritz and Robin Crewe write about the life history of the honey bee, *Apis mellifera*, highlighting conflict rather than harmony, failure rather than success, from the perspective of the individual worker in the colony. When one looks carefully, the honey bee colony is far from being perfect. As with any complex social system, honeybee societies are prone to error, robbery, cheating, and social parasitism. Nevertheless, the hive gets by remarkably well in spite of many seemingly odd biological features. The perfection that is perceived to exist in the honeybee's social organization is the function of a focus on the colony as a whole rather than exploring the idiosyncrasies of its individual members. The *Dark Side of the Hive* thus focuses on the role of the individual rather than that of the collective. Moritz and Crewe dissect the various careers that individual male and female honey bees can take and their role in colony organization. Competition between individuals using both physical and chemical force drives colonial organization. This book deals with individual mistakes, maladaptations and evolutionary dead-ends that are also part of the bees' life. The story told about these dark sides of the colony spans the full range of biological disciplines ranging from genomics to systems biology.

*Insect Diapause* Vintage

This book not only reviews the basic aspects of social behavior, ecology, anatomy, physiology, and genetics, it also summarizes major controversies in contemporary honey bee research, such as the importance of kin recognition in the evolution of social behavior and the role of the well-known dance language in honey bee communication.

**Honeybee Ecology** Princeton University Press

As seen on PBS's American Spring LIVE, the award-winning author of *The Triumph of Seeds and Feathers* presents a natural and cultural history of bees: the buzzing wee beasties that make the world go round. Bees are like oxygen: ubiquitous, essential, and, for the most part, unseen. While we might overlook them, they lie at the heart of relationships that bind the human and natural worlds. In *Buzz*, the beloved Thor Hanson takes us on a journey that begins 125 million years ago, when a wasp first dared to feed pollen to its young. From honeybees and bumbles to lesser-known diggers, miners, leafcutters, and masons, bees have long been central to our harvests, our mythologies, and our very existence. They've given us sweetness and light, the beauty of flowers, and as much as a third of the foodstuffs we eat. And, alarmingly, they are at risk of disappearing. As informative and enchanting as the waggle dance of a honeybee, *Buzz* shows us why all bees are wonders to celebrate and protect. Read this book and you'll never overlook them again.

*Stingless Bees* Springer Science & Business Media  
Publisher description**Techniques for Pollination Biologists** Timber Press (OR)

Seeley, a world authority on honey bees, sheds light on why wild honey bees are still thriving while those living in managed colonies are in crisis. Drawing on the latest science as well as insights from his own pioneering fieldwork, he describes in extraordinary detail how honey bees live in nature and shows how this differs significantly from their lives under the management of beekeepers. Seeley presents an entirely new approach to beekeeping--Darwinian Beekeeping--which enables honey bees to use the toolkit of survival skills their species has acquired over the past thirty million years, and to evolve solutions to the new challenges they face today. He shows

beekeepers how to use the principles of natural selection to guide their practices, and he offers a new vision of how beekeeping can better align with the natural habits of honey bees.

*Common Bees of Eastern North America* Basic Books

A completely up to date introduction to the commonest group of bees in Britain. Bees, for most people mean honey or bumble bees. In fact, the honey bees and bumblebees make up only a small proportion of the bee species that live in Britain, while the other bees are the great majority (230 or more species). Now it is recognised that these other bees play an important role in the pollination of crops and wild flowering plants. This has prompted much new research. A shift to gardening for wildlife has brought the solitary bees into sharper relief: many people now recognise mining bees, leaf-cutters and mason bees in their gardens, and even provide 'bee hotels' for them. This book draws on the great wave of new knowledge to give a wonderful insight into the complicated lives of solitary bees. The main focus is on the wonderful fascination and complexity in the behaviour and ecology of this remarkable group of insects. It uses many of the authors own observations alongside the studies provided by others, to discover the numerous strategies used by male bees to find females and persuade them to mate. It follows the females in their search for a place to make their nest, and their gathering of materials - symmetrical sections of leaves, mud, chewed-up leaf fragments, plant hair or resin - to make the cells into which they place a store of nectar and pollen and lay a single egg. We watch them sealing up the nest, securing it until the following year when the new generation appears. We explore the interactions between flowering plants and their bee visitors, asking what the plants get from the relationship, as well as how the bees select the plants they visit, and the ingenuity required to extract pollen, nectar and other rewards. Finally, we look at the places where bees flourish, highlighting what can be done to encourage bees and thus ensure they continue to pollinate our flowers and crops.

*The Solitary Bees* Princeton University Press

Honeybees make decisions collectively--and democratically. Every year, faced with the life-or-death problem of choosing and traveling to a new home, honeybees stake everything on a process that includes collective fact-finding, vigorous debate, and consensus building. In fact, as world-renowned animal behaviorist Thomas Seeley reveals, these incredible insects have much to teach us when it comes to collective wisdom and effective decision making. A remarkable and richly illustrated account of scientific discovery, *Honeybee Democracy* brings together, for the first time, decades of Seeley's pioneering research to tell the amazing story of house hunting and democratic debate among the honeybees. In the late spring and early summer, as a bee colony becomes overcrowded, a third of the hive stays behind and rears a new queen, while a swarm of thousands departs with the old queen to produce a daughter colony. Seeley describes how these bees evaluate potential nest sites, advertise their discoveries to one another, engage in open deliberation, choose a final site, and navigate together--as a swirling cloud of bees--to their new home. Seeley investigates how evolution has honed the decision-making methods of honeybees over millions of years, and he considers similarities between the ways that bee swarms and primate brains process information. He concludes that what works well for bees can also work well for people: any decision-making group should consist of individuals with shared interests and mutual respect, a leader's influence should be minimized, debate should be relied upon, diverse solutions should be sought, and the majority should be counted on for a dependable resolution. An impressive exploration of animal behavior, *Honeybee Democracy* shows that decision-making groups, whether honeybee or human, can be smarter than even the

smartest individuals in them.

*The Beekeepers: How Humans Changed the World of Bumble Bees (Scholastic Focus)* Bloomsbury Publishing

Presents a full range of techniques--the newest and most sophisticated as well as the simple, inexpensive, and traditional ones--compiled from the published literature and from the unpublished notebooks and files of pollination biologists. Examines pitfalls and offers cautionary advice about design and implementation of various types of pollination experiments. An important compilation in a discipline fed by a variety of fields and heretofore lacking a single source "how-to" reference. Paper edition (unseen), \$17.50. Annotation copyright by Book News, Inc., Portland, OR

*Hymenoptera of Europe* Springer Science & Business Media

Animal behavior has long been a battleground between the competing claims of nature and nurture, with the possible role of cognition in behavior as a recent addition to this debate. There is an untapped trove of behavioral data that can tell us a great deal about how the animals draw from these neural strategies: The

structures animals build provide a superb window on the workings of the animal mind. *Animal Architects* examines animal architecture across a range of species, from those whose blueprints are largely innate (such as spiders and their webs) to those whose challenging structures seem to require intellectual insight, planning, and even aesthetics (such as bowerbirds' nests, or beavers' dams). Beginning with instinct and the simple homes of solitary insects, James and Carol Gould move on to conditioning; the "cognitive map" and how it evolved; and the role of planning and insight. Finally, they reflect on what animal building tells us about the nature of human intelligence--showing why humans, unlike many animals, need to build castles in the air.

**Neurobiology of Chemical Communication** CRC Press

The most up-to-date and authoritative resource on the biology and evolution of solitary bees which draws on new research to provide a comprehensive and authoritative overview of solitary bee biology, offering an unparalleled look at these remarkable insects.