



# ISBE Newsletter

Supplement to *Behavioral Ecology*  
[www.behavecol.com](http://www.behavecol.com)

## CONTENTS

From the President & Editor	1	Book reviews:		Academic position	20
The ISBE Executive	2	<i>The Call of Carnivores</i>	8	Funding opportunity	20
How to contribute	2	<i>Cooperation and Conflict</i>	10	Books for review	21
Conference calendar	3	<i>Smell</i>	12		
ISBE 2022 Stockholm	4	<i>Social Butterflies</i>	14		
Financial report	6	<i>Spider Webs</i>	16		
Spotlight on...	7	<i>The Biology of Molt</i>	18		

## FROM THE ISBE PRESIDENT

I'm writing this as the academic year begins in the Northern hemisphere and we start again on the Covid rollercoaster of risk assessments and recommendations, online seminars and in person teaching, restrictions and new freedoms. ISBE has been experiencing these ups and downs too. Earlier this year, the Executive Council had to make another difficult decision about our conference. When the Australian government decided to keep its borders closed until 2022, we felt we had no choice but to postpone our Melbourne ISBE meeting until 2024. Bob Wong and his local organizing committee continue to work extremely hard in planning an effective, safe, and inclusive conference for the Society and we all look forward to eventually enjoying the fruits of their labours.

In the meantime, we are immensely grateful to John Fitzpatrick and his local organising committee in Stockholm for stepping up and offering to host ISBE2022 in Sweden instead. John and his committee have thrown themselves into this challenge with great enthusiasm, and are working hard to put together a fantastic programme in one of the most beautiful cities in Europe (see also page 4-5). Bob and his colleagues have been superb in supporting the Stockholm team, helping them to get

up to speed quickly with their planning. Organising a conference is hard work at the best of times, so we owe everyone involved in ISBE2022 and ISBE2024 a huge debt of gratitude for their exceptional levels of service in bringing these events together.

Please do come and join us in person in Stockholm – it will be fantastic to be reunited with friends and colleagues from around the world in our shared passion for behavioural ecology, and it's a great opportunity to support a new generation of researchers as they set forth on their academic adventures in these very challenging times. The conference Twitter account @ISBE2022 is the ideal way to keep up to speed and the conference website is [delegia.com/isbe2022](http://delegia.com/isbe2022). The dates for your diary are 28 July – 2 August.

ISBE conferences are a time for new appointments to the Executive Council too, and we will soon be holding elections for the positions that fall vacant in 2022: two Councillors, the Treasurer and the President-Elect. Please keep an eye out for the ballot papers and remember to cast your votes!

Rebecca Kilner  
 ISBE President

## FROM THE NEWSLETTER EDITOR

The pandemic appears to have modified many of our behaviours and habits. Perhaps the increased time spent at home has led to more people reading books. I am not sure if it's a covid-effect, but this Newsletter has no less than six contributed book reviews! This must be an all-time ISBE record.

Many thanks to our book reviewers, and to all others that contribute to this Newsletter and to our Society!

P. Andreas Svensson  
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# ISBE EXECUTIVE

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# CONTRIBUTIONS TO THE NEWSLETTER

## **Your contribution is important!**

The ISBE Newsletter publishes Book Reviews, Conference/Workshop Reviews, Job postings and other advertisements, as well as Commentary Articles of interest to the International Society for Behavioral Ecology. The ISBE Newsletter will only consider work that is not already published or intended to be submitted for publication elsewhere.

**Book Reviews:** Persons involved in the publishing of books who would like these to be considered for review in the Newsletter should contact the editor so that they can be added in the books-for-review list. Authors may submit a list of possible reviewers. Members who wish to review a particular book should contact the editor. The editor will provide reviewers with instructions. Reviews are typically 1500-2000 words. For a list of books currently available for review, see the end of this Newsletter.

**Workshop/Conference Reviews:** Workshop and/or Conference reviews can be prepared in one of the following formats: *Brief synopses* (around 1500 words) and *Longer reports* (around 3000 words). Graduate students and postdocs are strongly encouraged to consider contributing to writing these reports.

**Cartoons:** Cartoonists and other artists are encouraged to submit artwork, either in hardcopy, or as TIFF or high resolution (>300 dpi) gif or jpg files. All cartoons published in the Newsletter will be credited to the illustrator.

**Spotlight on young scientists:** Early career members (PhDs/ postdocs) are encouraged to participate in the section "Spotlight on"; please provide name, education, current address, research interests and selected papers in an email to the editor.

**Upcoming conferences and events:** Please submit information about events that are relevant to the Society. Do this by emailing the Newsletter editor so that it can be included in the "Conference calendar"

**The deadline for contributions to the next issue is Feb 28, 2022**

## CONFERENCE CALENDAR

*The conference circuit remains in a state of turmoil, due to the implications of COVID-19. Many meetings have been cancelled, others are postponed or have moved online, partly or fully. Please check the conference web site for up-to-date information*

### **Entomological Society of America Meeting**

Oct 31- Nov 3, 2021, Denver USA  
<https://www.entsoc.org/>

### **15th Pan-African Ornithological Congress**

Nov 15-19 2021. Elephant Hills Conference Centre  
Victoria Falls, Zimbabwe  
[www.paoc15.org](http://www.paoc15.org)

### **ASAB Virtual winter meeting**

Dec 2-3 "Animal behaviour in a changing world"  
[www.asavirtual.org](http://www.asavirtual.org)

### **11th Australasian Ornithological Conference AOC**

Feb 8-10, 2022 in Auckland, New Zealand (virtual)  
[aocauckland.blogs.auckland.ac.nz/](http://aocauckland.blogs.auckland.ac.nz/)

### **National Wildlife Rehabilitators Ass. Symposium**

March 1-5, 2022, Madison, WI, USA  
[www.nwrawildlife.org/mpage/Symposium\\_Home](http://www.nwrawildlife.org/mpage/Symposium_Home)

### **13th European Ornithologists' Union Congress**

March 14 -18, 2022 in Giessen, Germany  
<https://eounion.org/about/giessen-2022/>

### **The European Human Behaviour and Evolution conferences, EHBEA 2022**

April 20-22, 2022 in Leipzig, Germany  
<https://www.cambridge.org/core/membership/ehbea/>

### **Human Behavior & Evolution Society Conference**

June 22-25, 2022, Detroit USA  
<https://conference2022.hbes.com/>

### **Society for the Study of Evolution meeting**

June 24-28, 2022 in Cleveland, OH, USA  
(ASN/SSB/SSE) [www.evolutionsociety.org/](http://www.evolutionsociety.org/)

### **American Ornithological Society (AOS)**

June 27-July 2, 2022 in San Juan, Puerto Rico  
[americanornithology.org/meetings/annual-meeting/](http://americanornithology.org/meetings/annual-meeting/)

### **International Union for the Study of Social Insects Symposium**

July 3-7. San Diego, USA  
<http://burkclients.com/IUSSI/meetings/2022/site/>

### **International Society for Human Ethology**

July 4-8 2022. Liverpool, UK <http://ishe.org/>

### **International Congress of Entomology**

July 17-22, 2022. Helsinki, Finland  
<https://ice2020helsinki.fi/>

### **International Congress for Neuroethology**

July 24-29, 2022, in Lisbon, Portugal (postponed from 2020)  
<http://neuroethology2020.com/>

### **ISBE 2022**

28 July - 2 August, 2022. International Society for Behavioural Ecology conference in Stockholm, Sweden, [isbe2022.com](http://isbe2022.com) More information on pages 4-5

### **International Society for Applied Ethology**

Aug 2022, in the Republic of North Macedonia  
[www.applied-ethology.org/Events.html](http://www.applied-ethology.org/Events.html)

### **ESEB European Society for Evolutionary Biology**

Aug 14-19, in Prague, Czech Republic  
<https://www.eseb2021.cz/>

### **International Ornithologists' Union (IOU)**

Aug 15-19, 2022. Durban, South Africa, a hybrid conference encouraging virtual attendance  
<https://iocongress2022.com/>

### **International Conference on Biological Invasions**

Sep 13-16 2022, in Tartu, Estonia  
<https://www.neobiota.eu/conferences/>

### **National Wildlife Rehabilitators Association Symposium**

March 1-5 2022, Madison, USA  
[www.nwrawildlife.org/mpage/Symposium\\_Home](http://www.nwrawildlife.org/mpage/Symposium_Home)

### **10th World Congress of Herpetology**

August 2024, in Kuching, Malaysia  
[www.worldcongressofherpetology.org/](http://www.worldcongressofherpetology.org/)



## International Society for Behavioral Ecology Congress 2022

28<sup>th</sup> July – 2<sup>nd</sup> August, 2022  
Stockholm, Sweden

After more than a year of seeing and interacting with colleague, friends and students online, the tide now seems to be turning. The idea of discussing science in person with colleagues from different countries, while catching up with old friends and collaborators and making new ones, finally seems feasible again. With that in mind, we are delighted to announce that Stockholm, Sweden will be hosting the 2022 International Society for Behavioral Ecology (ISBE) Congress, to be held from 28 July – 2 August 2022.

### ISBE in Stockholm

Stockholm is the capital of Sweden and Sweden's largest city. Known as a vibrant, multicultural metropolitan area, Stockholm is a city full of character. Stockholm is commonly ranked among the 'best' and 'most liveable' cities in the world with good reason.



Stockholm City Hall

Founded more than 800 years ago, Stockholm is a mix of historic buildings and a modern aesthetic. Built on 14 islands, Stockholm offers spectacular views of the Baltic Sea, is home to three UNESCO World Heritage Sites, and offers access to more than 100 museums and world class dining and night life. And whether you know it or not, you are probably familiar with many of Stockholm's exports. Alfred Nobel, ABBA, Avicii all hail from Stockholm, while Skype, Spotify and Minecraft were all launched from Stockholm!

Yet despite its urban feel, Stockholm is connected closely with nature. Stockholm and the surrounding areas have many trails that bring hikers to spectacular views and historic locations. The Stockholm archipelago, a collection of nearly 30,000 islands and islets, is easily accessible from the city centre. If you are looking for a peaceful cove, untouched island,

rocky cliff or beautiful Baltic Sea views there is no better place than the Stockholm archipelago.

The conference has been timed to coincide with the Sweden's amazing summers. With daylengths reaching nearly 17 hours at the end of July, delegates will have plenty of opportunities to socialize after the exciting conference sessions have concluded each day.



### Conference venue and activities

The ISBE congress will be held at Stockholm Waterfront Congress Centre, a state-of-the-art conference facility. The Waterfront is located in the heart of central Stockholm, with panoramic views overlooking the city. The Waterfront is only a few minutes' walk from the Stockholm Central Station and offers easy access to the city's many restaurants, bars and museums. Historic Old Town (or Gamla Stan), the earliest part of Stockholm that dates back to the 13th century, is a short walk from the Waterfront. There are also plenty of accommodations options located within walking distance of the Waterfront, ranging from hostels to 5-star hotels.

The Waterfront offers amazing views of the famous Stockholm City Hall, the location of the annual Nobel Prize banquet. As part of the conference activities, delegates will have the opportunity to visit Stockholm City Hall, touring the Blue Hall (the site of the Nobel Banquet) and the Golden Hall (where the ball following the Nobel Banquet takes place).

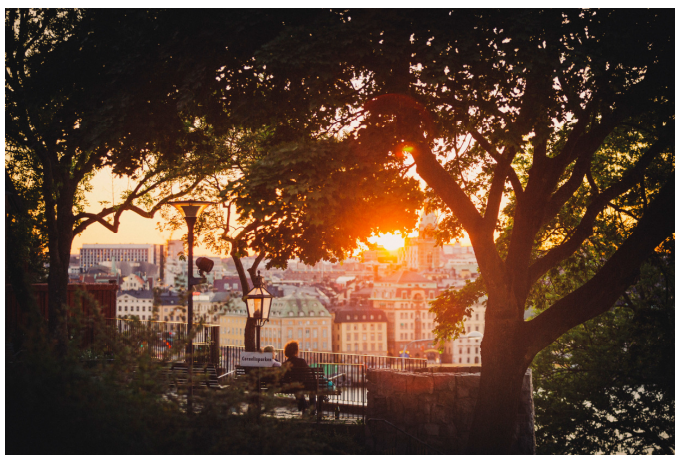
### Travelling to Stockholm

Stockholm is easily accessible from all parts of the globe. There are two international airports (Arlanda and Skavsta) located north and south of the city.



Stockholm airports welcome flights from more than 50 international airlines, with fantastic connections for travellers connecting through international hubs like London, Dubai, Amsterdam, Paris, and Miami. Stockholm airports are well connected with the city centre. For example, from Arlanda Airport, Stockholm's largest international airport, the Arlanda Express train gets travellers from the airport to the Stockholm Central Station in just 18 minutes (from there it is only a short walk to the Waterfront Congress Centre).

If you are more interested in taking the scenic route, Stockholm is connected to other European destinations with an efficient and comfortable high-speed rail service. And once you get familiar with the rail network, you can plan a follow on journey to locations in the temperate south of Sweden to the rugged beauty of locations in the Arctic Circle.



### Getting around in Stockholm

Stockholm is a pedestrian friendly city with a welcoming atmosphere, making it easy to get around on foot. But if you are looking to move around the city faster, you can take advantage of Stockholm's integrated bus, metro (Tunnelbana), train and ferry network that makes getting around the city a breeze. More adventurous travellers may opt to hire one of the many electric scooter or bikes that are available for short term rentals.

### In-person or digital: the elephant in the room

We are hoping and planning for an in-person ISBE 2022. However, we realize some people may not be able to attend in person if travel restrictions remain in

place. We are currently investigating a range of hybrid in-person/digital options and will provide more information about these options as soon as possible. And as the conference dates draw closer, the Stockholm Organizing Committee will continue to stay in close contact with the ISBE Executive Committee to discuss any changes in the global situation. We will be sure to update the community regularly.



### Welcome to Stockholm!

After a challenging few years, we look forward to hosting you for the 18th ISBE Congress. Remember to mark the dates in your diary.

For the latest information, you can also visit [www.isbe2022.com](http://www.isbe2022.com) or follow us on twitter @ISBE2022. And don't forget to register your interest for updates and information at [www.delegia.com/isbe2022](http://www.delegia.com/isbe2022).

*See you in 2022!*

*The Organizing Committee for the 18th ISBE Congress*



## 2021 ISBE FINANCIAL REPORT

The Society's financial transactions for 2020 and our December 31, 2020 account balances are provided below. ISBE's net worth increased by around \$250,000 last year, with revenue from Behavioral Ecology rising slightly, membership fee income holding steady, and share prices for our Vanguard funds climbing steeply. Our major expense during the year was meeting-related: preparations for ISBE2020 were in a fairly advanced state by the time the COVID-19 pandemic began prompting international travel bans, and charges for services such as processing of abstracts and registration totaled ~\$41,000. ISBE was, in fact, fortunate: some scientific societies suffered far

greater financial losses from COVID-disrupted conferences because of nonrefundable deposits they'd paid. We were spared such losses because once it became clear that we would not be able to meeting in 2020, our local hosts acted rapidly to reach agreements that carried forward deposits paid for ISBE2020 to a 2022 meeting. Many thanks to Bob Wong, Andy Bennett, and Devi Stuart-Fox.

Trish Schwagmeyer  
*Treasurer*

<b>2019 Ending Balance</b>		<b>\$986,300.67</b>
	<b>Income</b>	<b>Expenses</b>
USPS postage		\$9.35
UPS shipping		\$48.30
Archiving		\$2,141.00
Waldron Smith Mgt. ISBE 2020 loss		\$40,737.69
Website maintenance		\$708.30
Newsletter		\$1,500.00
2020 Pitelka Award		\$500.00
2019 BE profit share	\$173,075.00	
2019 ISBE membership fees	\$17,145.00	
VG dividend and interest income	\$18,732.25	
VG gains/losses in share prices	\$89,259.26	
Total Income/Expenses	\$298,211.51	\$45,644.64
<b>2020 Ending Balance (transactions)</b>		<b>\$1,238,867.54</b>
BOA checking account		\$25,335.92
VG Federal Money Market		\$135,061.90
VG Tot Int Bond Index		\$165,568.41
VG Int Stock Index		\$211,590.35
VG Tot Bond Market Index		\$382,044.17
VG Tot Stock Market Index		\$319,266.79
<b>2020 Ending Balance (accounts)</b>		<b>\$1,238,867.54</b>

**Name:** Mary L. Westwood

**Education**

PhD student in Evolutionary Biology, University of Edinburgh; MSc in Biological Sciences (2017), Wright State University; BSc in Biological Sciences (2014), Wright State University.

**Current Address**

Institute of Evolutionary Biology, Ashworth Laboratories, University of Edinburgh.  
Email: mary.westwood@ed.ac.uk;  
<https://therecelab.com/people-list/2018/10/30/mary-westwood>

**Research Interests**

Biological rhythms provide organisms an elegant solution to scheduling physiologies and behaviours with a periodic environment. While the role of circadian (i.e., daily) rhythms in natural selection has long been assumed, how these rhythms affect the process of sexual selection is relatively understudied. My research examines how natural and sexual selective pressures drive evolution through a chronobiological framework. My current project concerns male cricket advertisement, and how individuals balance natural selection (via predators and/or parasites) and sexual selection (via choosy females) through modulation of their circadian rhythms.

**Selected papers:**

- Westwood, Mary L., *et al.* 2019. The evolutionary ecology of circadian rhythms in infection. *Nature ecology & evolution* **3**: 552-560.
- Westwood, Mary L., *et al.* 2020. Testing possible causes of gametocyte reduction in temporally out-of-synch malaria infections. *Malaria Journal* **19**: 1-10.



Nymphal *Teleogryllus oceanicus* crickets.  
Photo by Mary Westwood.



## The Call of Carnivores - travels of a field biologist

By Hans Kruuk

*Pelagic publishing, 2019. 200p*  
*ISBN: 978-1784271930*

### Summary

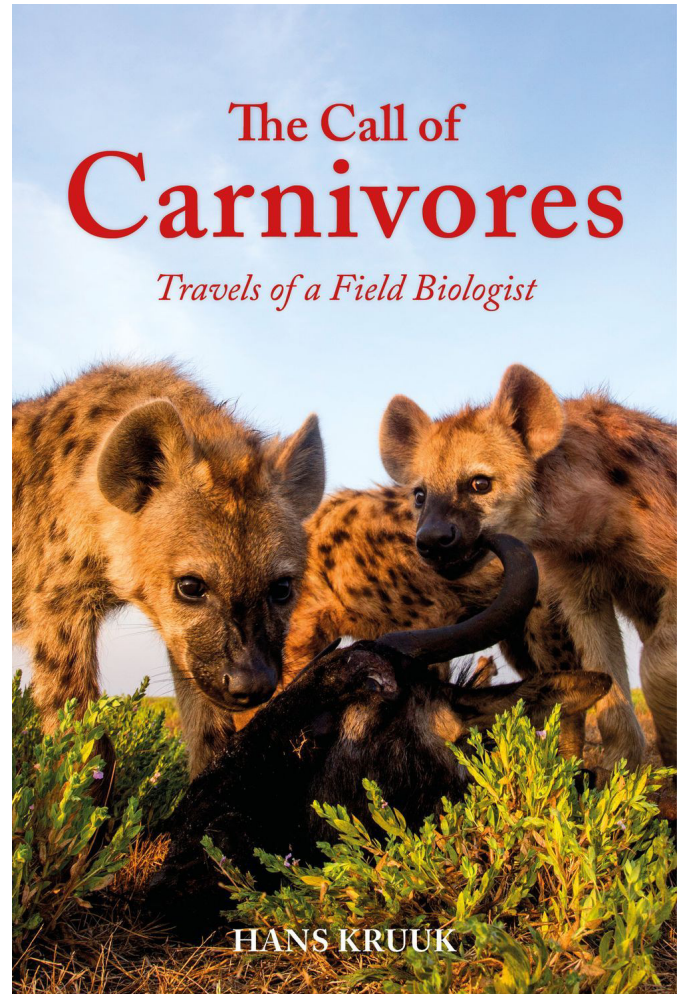
This book is quick, easy, and delightful read. Written for a general audience, Hans Kruuk focuses on his own personal experiences traveling and watching animals in the field. While Kruuk gently touches on the broad scientific questions that motivate his research, the bulk of the book is spent describing the fascinating characteristics of each animal and the joy (and occasional physical discomfort) the author felt watching animals in their wild habitats. Plenty of color photographs accompany each chapter and help immerse the reader in Kruuk's memories. This book will broadly appeal to all readers interested in animals, conservation, or outdoor adventure.

### Review

"The Call of Carnivores" is more a memoir or nature documentary than an autobiography. This book is full of lavish descriptions and personal anecdotes that show what it is like to study animals in the wild. Kruuk does an excellent job at including the reader in his delight and curiosity at trying to discover the reasons how and why animals make their own niches in complex ecosystems. Three overarching topics that Kruuk revisits across chapters and study species include how predators and prey coexist, the benefit of social living to predators, and interaction between humans and wildlife.

Kruuk shares with us examples of observations that led to these questions as well as observations that help in answering them. In between is a smattering of surprising tidbits, exciting events, and amusing or perplexing discoveries. Kruuk often laments at the requirement to "wear blinkers" and focus on one specific study animal when the surrounding ecosystems are full of interesting animals and remarkable landscapes. Overall, he does a good job at introducing the reader to both the physical setting and scientific context of each observation before drawing the reader in to the intimate details of individual animal's lives.

Absent from this book is any description of the author's life outside of his field studies. While the book follows a roughly linear timeline that parallels the author's career, actual details of his professional work are scant and only present to provide a context for his field observations and experiences. Likewise, while Kruuk briefly describes scientific topics such as how to ask a scientific question or how to study ethology, the science is generally relegated to providing broader



context and a framework that connects each chapter to the next.

The book is written in first-person present-tense which serves to bring the reader back to each memory the author wants to share. The sentences are sometimes rambling at places, e.g. "endless plains, "quiet forests" or "elegant impala". Some of this is clearly a result of the author making his best efforts at capturing the feeling of being physical present in each place, but text alone sometimes feels inadequate at fully capturing such qualia. The tone varies throughout from that of the impartial scientific observer to wistful nostalgia for places and experiences long gone.

In Chapter One Kruuk immediately places the reader into his memories of varied and magnificent field sites, setting the tone for what will follow in the rest of the book. He identifies the roots of his interests in studying animals to an enthusiasm for nature that started in early childhood and credits Niko Tinbergen, his mentor, with teaching him a particular way of thinking about why animals do what they do. Kruuk introduces us to a recurring message, that in order to foster an interest in conserving wildlife we need more people to get outside and simply watch and study animals in the field. Chapter Two takes us to Kruuk's first research subject, the Dover sole. He initially studies these fish in a basement fish tank, but his desire to be outdoors and understand the natural roots of sole behavior takes



him to a fishing vessel where Kruuk makes several valuable discoveries. Keen to do more studies on animals in the field in order to understand the natural roots of their behaviors, Kruuk jumps at the opportunity to work for Niko Tinbergen as a student assistant. Working for Tinbergen, Kruuk takes us to the sand dunes where a large colony of black-headed gulls nests on the shore of the Irish Sea in Chapter Three. Kruuk observes how the gulls have a variety of anti-predator strategies that they used against a diverse array of predatorial threats, not all of which are equally effective; Kruuk describes a distressing observation of juvenile gull in the nest eaten alive by a hedgehog.

Chapters Four through Fifteen make up the bulk of the book and these chapters are spent in Africa where Kruuk studies spotted hyenas in the Serengeti, Tanzania. In Chapter Four Kruuk arrives in the Serengeti with the aim of studying what effect wildebeest and zebra culling might have on carnivores. Kruuk is immediately attracted to the highly numerous spotted hyena and quickly makes an exciting discovery, that spotted hyenas are actually adept hunters rather than the scavengers they were assumed to be. Chapter Five describes Solomon, a tame spotted hyena that Kruuk raised from a cub. Solomon's antics teach Kruuk a lot about young hyena behavior and body language, but unable to reintroduce Solomon to a wild spotted hyena clan, Kruuk eventually sends Solomon to the Edinburgh Zoo. In Chapter Six Kruuk describes observations, such as ferocious 'clan wars' on the territory boundaries of neighboring hyena clans, that help him make sense of the seemingly chaotic spotted hyena society. In Chapter Seven he describes late nights driving with just the moonlight to guide his way as he follows groups of hyenas, dominant female in the lead, cooperatively hunting zebra, wildebeest, and even a rhino calf. In Chapter Eight Kruuk discusses human perceptions of hyenas and Maasai stories of witches riding naked on the backs of hyenas. He speculates as to how hyenas came to have such a supernatural association with witchcraft such as their involvement in the mass killings of prey animals. Killing in excess is something most predators do given the opportunity and Kruuk describes several of his experiences observing 'predation gone wrong' in other carnivores.

In Chapter Nine Kruuk shares his observations of the Maasai people that live in the Serengeti and focuses closely on the function of the rock paintings left by Maasai over the years that illustrate hunting stories and other teachings. Moving back to a focus on animal observations, Chapter Ten describes Kruuk's observations of other members of the Hyaenidae family: the striped hyena and the aardwolf. Keen to meet the fourth member of Hyaenidae, Kruuk next travels to the Kalahari in southern Africa to observe the brown hyena in Chapter Eleven. Once in the Kalahari, Kruuk is fascinated by the honey badger and describes the honey badger as a voracious predator that eats everything from scorpions to a small antelope stolen from a brown hyena. Chapter Twelve takes us north again, this time, to a desert region in Kenya where only nomadic tribes live. Kruuk describes the relationship between the nomads and carnivores as

'warfare'. Wild prey is scarce and the nomads suffer substantial losses of livestock to lions and spotted hyenas. Further north, in Ethiopia, Kruuk describes a different kind of relationship between humans and spotted hyenas in the city of Harar where hyenas are valued for the job they do cleaning up waste. Kruuk suspects that the social system of hyenas provides ample opportunity for juvenile hyenas to pick up habits from adults and that this subsequently facilitates their adaptation to so many diverse environments. Kruuk's stories of Africa wrap up with two chapters describing his studies of the vulture species in the Serengeti. The diversity of species that all feed together on the same carcass is remarkable and Kruuk is perplexed as to how so many species can coexist on the same food source. Learning to fly small bush planes helps Kruuk observe the vultures, but not without a few close calls.

In Chapter Sixteen Kruuk travels to the Galapagos for a field project investigating the effect that feral dogs have on the local flora and fauna. Kruuk describes a marvelous and hostile landscape with volcanic eruptions, razor sharp lava fields, prehistoric-looking marine iguanas, and the beauty of the feral dogs that, under presumably harsh selection, became well-adapted to their island environment. In Chapters Seventeen and Eighteen Kruuk takes up a project studying Eurasian badgers. It takes some persistence, radio collars, night binoculars, and some creative experiments for Kruuk to start to make sense of the badger social system (why share communal dens when they forage alone?). Kruuk describes many nights wandering around farmlands in Britain, highlands in Scotland, and steep mountain slopes in Italy as he compares badger behavior and diet across a variety of habitats. During Kruuk's badger studies he can't help but enjoy watching playful otters and as result starts his next project with otters, relayed in Chapters Nineteen through Twenty-Two. The Eurasian otters of Shetland are shy and Kruuk spends many hours crouched silently with his binoculars observing otters diving for food. Curious to see how otters survive in other environments Kruuk travels back to Africa to study spotted-necked otters in Lake Victoria and then to Alaska in the United States to observe river otters and sea otters, and finally to the Pantanal in Brazil where he studies neotropical otters and giant otters. In all three of these places otters contend with serious predators such as crocodiles, orcas, jaguars, and tigers that limit their numbers more than food supply does.

In Chapter Twenty-Three Kruuk travels to Australia to study the spotted-tailed quoll which, due to introduced carnivores, has been relegated to steep ravine habitats. However, he allows himself one more diversion; he becomes intrigued by the nitrogen pollution in the waterways and becomes curious about the effect it might have on platypus. Surprisingly, the platypus appear to be doing just fine. Kruuk describes difficulties with leeches and rocky crevices but finds Australia rich and full of treasures. In the last chapter of the book Kruuk describes a final research project on mink. The mink are not alone in needing protection, much of the wildlife in the Belarusian forests are threatened and Kruuk not only feels the blinkers of scientific research but the difficulty of trying to solve small conservation problems in the face of a massive

conservation crisis worldwide. The mink are difficult to observe and Kruuk's students primarily use radio collars. Kruuk worries that while technology brings new insights into behavior it sometimes excludes the intimate knowledge that firsthand experience of an animal's behavior brings. Kruuk ends the book on this note, the idea that enjoyment of nature and scientific research can and should go hand-in-hand with 'questioning after watching' and that both ultimately contribute to the motivation and knowledge to conserve wildlife.

In sum, this is book about the joys of asking interesting questions in stunning landscapes with magnificent animals. Kruuk's anecdotes are not only enjoyable to read about but also show first-hand how the experience of getting to know an animal is so crucial for developing relevant and productive questions about the species and its relatives. Kruuk leads us through his experiences, from mishaps such

finding a spitting cobra in his vehicle to the excitement of discoveries such as observing aardwolves licking up termites. Relatively light and free of jargon, new students to the field of Ethology may find this book especially appealing and useful. However, this book is also an excellent read for anyone interested in field biology, outdoor adventures, animals, or wildlife conservation. It provides a nuanced insight into the nature of animal behavior research and the realities of the context under which the research takes place. Kruuk finds it nearly impossible to ignore the rich ecosystems that animals live in and the human cultural context that pervades every environment, affects every species, and influences the motivation of many research questions.

Lily Johnson-Ulrich  
Michigan State University, USA

## BOOK REVIEW

### Cooperation and Conflict The interaction of Opposites in Shaping Social Behavior

Edited by Walter Wilczynski and Sarah F. Brosnan

Cambridge University Press. 2021, 250p  
ISBN: 9781108475693

This book, edited by Walter Wilczynski and Sarah F Brosnan, is in memory of Walter Wilczynski, who sadly passed away before its publication.

This volume addresses how the interaction between cooperation and conflict shape social behaviour. It is organized in ten chapters, written mostly by veteran authors, across three topics,

- i) Broad insights from political science to molecular biology (chapters 1-4),
- ii) Neural mechanisms (chapters 5-7) and
- iii) Species comparisons (chapters 8-10).

By integrating the research and views from different disciplines (e.g., political sciences, behavioural ecology), as well as different organizational levels (e.g., interaction between genes or neurons, interactions between organisms), the book aims to generate new insights. To make the book more accessible to non-specialists, each chapter contains boxes to clarify terms or to provide additional information. In some of the chapters outside of my field (behavioural ecology), I would have wished some of these boxes to be even more extensive, as I needed to re-read sections multiple times to fully grasp the content or to remember certain abbreviations (specifically chapters



1, 6 & 7). However, the chapters themselves are well written, interesting and worth the additional trouble.

Walter Wilczynski and Sarah Brosnan introduce the overall topic and explain the key areas of research for each of the different disciplines – biological sciences, psychology, and political sciences. They especially highlight that instead of having to balance two opposing forces i.e., cooperative behaviour and conflict, as was their initial approach, the authors converged on the same theme, i.e., that the two forces are highly

interconnected, and one cannot exist without the other. In the following chapters the authors each introduce their fields of expertise in more detail and summarize key research they and others in their field conducted. Chapter 1, *Cooperation and Conflict in international Relations*, focuses on the international relations between states and asks questions related to why states go or do not go to war, how conflict can be prevented or what might be the pathways to increased international cooperation. William Long introduces main paradigms in international relations, then outlines the history of scientific research into international relations before delving into the topic of civil conflicts, which have become more prevalent over the past 70 years. He examines reconciliation events as a process to mitigate future violence and maintaining social order after violent conflicts. The general introduction, while interesting and well written, contains a lot of terms that were alien to me, a non-native speaker with a background in behavioural ecology. However, the chapter itself, especially the latter part, in which the author presents his own research is a page turner.

In Chapter 2, *Internalizing Cooperative Norms in group-structured Populations*, Erol Akçay and Jeremy Van Cleve introduce social norms, an important component of large-scale cooperation among humans. Because some social norms can turn into social dilemmas and internalizing norms is affected by the belief about the expectation of others, explaining the evolution of social norms requires delving into the evolution of the mechanisms sustaining them. The authors use the theoretical framework for preference evolution to study how social norm internalization can evolve and how the presence of external punishment affects the coevolution of norm internalization and the social norm itself. As with the first chapter, I stumbled a lot over sentences and concepts while reading, mainly because they were alien to me (e.g. norm internalization). In addition, as the authors describe mathematical models, this chapter naturally requires a lot of time to think and digest the presented information, though the authors explain the models well, making it possible to follow along even for 'formula-shy' readers.

In Chapter 3, *Reputation, A fundamental route to human cooperation*, Junhui Wu, Daniel Balliet and Paul Van Lange discuss the function of reputation before describing reputation assessment in the context of indirect reciprocity as well as the wider context of research into indirect reciprocity. The authors go on to discuss how individuals can manage their reputation during social interactions and show some evidence suggesting that reputation systems are more effective than monetary sanctions at solving cooperation problems and maintaining group norms. This chapter also contains a box explaining evolutionary game-theory of cooperation and conflict as well as agent-based modelling both of which are being referred to by a few of the other chapters.

In Chapter 4, *Finding the right balance. Cooperation and Conflict in Nature*, Elisabeth Ostrowski provides an overview over social evolution theory. She discusses examples of selfishness and thus of defection, before examining how fairness is ensured in systems with

defecting individuals, using mostly examples from the sub-cellular level, such as selfish genetic elements. The author goes on to describe the arms races between selfish genes and the counter-adaptations to suppress these, which can for instance lead to cryptic selfish genes. Different populations might fix different selfish genes and the dynamics of selfish genes followed by their suppression might drive speciation (conflict speciation). In the next section, the author describes how sequence evolution can provide a glimpse into the history of conflict by allowing to reconstruct the evolutionary history of specific genes which underpin conflict. She then introduces the 'omics' tools to uncover the dynamics of selfish genes.

In Chapter 5, *Social Living and Rethinking the Concept of Prosociality*, Heather Caldwell and Elliott Albers discuss the term 'prosocial behaviour', which was first used in behavioural neuroscience. It was later used and still frequently is used to describe species, rather than being viewed as a behavioural outcome. The authors suggest a redefinition of the concept of 'prosocial' before discussing the neural underpinnings of prosocial behaviour, such as specific brain regions and neurotransmitter systems. In the next section, they examine the role of the oxytocin and vasopressin system in the formation of social bonds, during agonistic displays as well as a reward system for social interactions.

Chapter 6, *The Role of the Temporal Lobe in Human Social Cognition*, starts off by Katherine Bryant, Christina Rogers Flattery and Matthias Schurz introducing brain regions, specifically those located on the temporal lobe. They examine the differences in temporal lobe structure and function of humans as compared to other primates, noting that the human temporal lobe has multiple structural specializations. In the next section they explore the social cognitive functions in which these sections of the brain are used. In particular they discuss face perception, theory of mind as well as the processing of languages, concepts and emotions. This chapter contains a box with detailed definitions of terms used in the chapter. This was really helpful to make the chapter more accessible to non-neuroscientist readers.

In Chapter 7, *Role of Oxytocin and Vasopressin V1a Receptor Variation on Personality, Social Behaviour, Social Cognition, and the Brain in Nonhuman Primates, with a Specific Emphasis on Chimpanzees*, William Hopkins and Robert Latzman discuss the function of oxytocin and vasopressin, as well as their receptors and the genes regulating their distribution. The authors further examine polymorphisms in the genes that regulate the distribution of these neuropeptides (especially the genes regulating the vasopressin receptor AVPR1A) with regards to personality, social behaviour, cognition and brain variations. This chapter is easy to read even for non-neurobiologist like me, partly due to a box that clearly explains the genetic and genomic concepts and terminology used throughout the chapter.

Between the 7<sup>th</sup> and 8<sup>th</sup> chapter the editors provide an interim summary of Part 1 and Part 2 of the book and discuss the use of comparative approaches when



studying cooperation and competition, as an introduction to the third and last part of the book.

In Chapter 8, *Understanding the Trade-off between Cooperation and Conflict in Avian Societies*, Amanda Ridley and Matha Nelson-Flower discuss within and between group conflict as a major cost of cooperation, which needs to be considered when studying helping behaviours. They use pied babblers as a study system to detail the relationship between group size and within group conflict as well as how individual relatedness can affect the outcome of within group conflict. The authors further examine intergroup conflict, again focusing on the relationship between group size and conflict.

In Chapter 9, *Cooperation and Conflict in Mutualisms with a Special Emphasis on Marine Cleaning Interactions*, Reduan Bshary examines the difference between mutualisms and cooperation as well as the similarities between human cooperation and mutualism. He discusses the evolution of mutualisms and presents the case study of cleaner fish. This chapter is very well written and includes two boxes one on the terminology used and one explaining interdependence as a factor that stabilizes cooperation and mutualisms.

In the final chapter, *The Fundamental Role of Aggression and Conflict in the Evolution and Organization of Social Groups*, Clare Rittschof and Christina Grozinger introduce the importance of aggression and conflict in maintaining and shaping social structures. Using examples from social insect societies – their organization is explained in a box at the start of the chapter – the authors discuss the topic by examining the role of defence against predators and conspecifics on the social structure and organization of societies. This is followed by a discussion of the role of

within group aggression on the evolution of social behaviour. The authors end with a discussion about the role of aggression in facilitating worker division of labour and finally exploring the molecular mechanisms mediating aggression.

Judging from the chapters in Part 3 of the book (I'm more familiar with this literature), the authors of each chapter give a comprehensive overview over their topic, and I learned new things from each chapter, even when I was familiar with the topic. Nonetheless, I feel that chapter 3 & 4 might have been better placed as chapters one and two respectively, as they introduce key concepts which most of the other chapters refer to. Another minor point is that six of the figures in this book are printed both in black and white within a given chapter and additionally in a colour version at the end of chapter 8, in between the references. This placement of the coloured version is a bit awkward, given that the figures are also available in the main text. Furthermore, while the coloured versions of the figures are prettier, they do not add much information.

I have no experience in teaching, nonetheless, I imagine that this book could be an interesting option when preparing a class on cooperation and conflict, due to its broad angle and insights from different disciplines. It also offers a good starting point for literature searches on the topic and thus hopefully succeeds with its aim of being accessible to students and researchers and of generating new insights and leading to further research into this fascinating topic.

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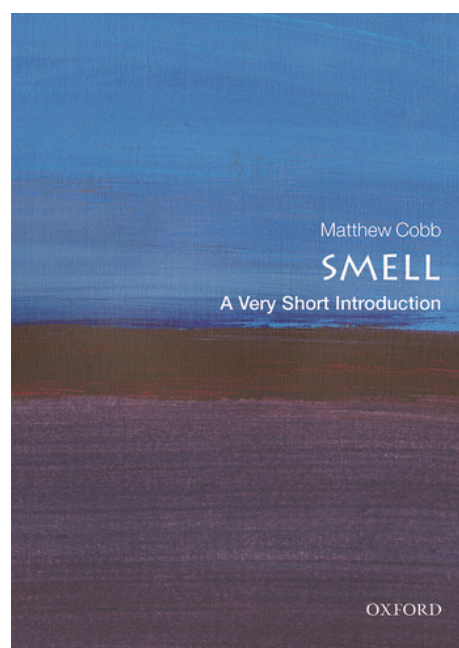
## BOOK REVIEW

### Smell: A Very Short Introduction

By Matthew Cobb

Oxford University Press. 2020. 141 pp.  
ISBN: 9780198825258

The "A Very Short Introduction" series started in 1995. The Smell volume is number 637 of nearly 700 titles. Most of the volumes are under 200 pages, and these are not typical book-sized pages. The *Smell* book measures 11.11 cm x 17.46 cm (4 3/8 x 6 7/8 inches). In keeping with the philosophy of the series, Smell provides an introduction into the topic with current information and a historical perspective. The material goes well beyond entry level, yet the writing is readable and the content approachable. From an academic perspective, Smell serves as a nice supplement to other material for courses in ecology, chemical ecology, communication, and even conservation. Courses in sociology and anthropology might also find the volume of interest.



*Smell* consists of seven chapters ranging from 13-21 pages in length. The first chapter, *How We Smell*, opens with the statement "What is your favorite smell?" setting the tone for an informal, personal guide through olfaction. Four myths of smell are debunked (you smell with your nose, you smell molecules in the air, humans have a poor sense of smell, and humans do not use olfaction very much). Some of the myths might be viewed as semantic, but clarifying these statements functions a gateway to the mechanics of smell with a deep dive into the anatomy to conclude chapter one.

The second chapter, *Smelling with Genes*, continues down the path of mechanisms by building on the discoveries of Buck and Axelrod that were discussed in chapter one. Throughout the volume, comparisons between invertebrates and vertebrates are made, although greater reliance is placed on invertebrates given our deeper well of knowledge. After discussing families of olfactory receptors and how they work, an example is described on human detection of androstenone. This example offers an opportunity to explain variation in sensory perception using human relatives (e.g., Neanderthals and Denisovans). The historical perspective segues from mechanism to evolution for the remainder of the chapter, concluding with an example of olfaction in human evolution.

The third chapter, *Smell Signals*, is perhaps the most diverse in terms of illustrative examples. The chapter explores communication via chemicals in organisms such as *Drosophila*, moths, marine barnacles, social insects, and vertebrates. For the latter, the story moves from the aquatic environment to reptiles with a discussion on the red-sided garter snake, briefly to birds, and then to mammals with a focus on the mouse. The well-studied mouse is depicted as unusual rather than as the classic model system. This perspective is valuable for students, who might explore further what the study of mouse olfaction has revealed and the degree to which it is generalizable to other mammals. Goats, rabbits, and humans round out the third chapter.

The fourth chapter, *Smell, Location, and Memory*, brings the somewhat linear story of olfaction and chemical communication to a close. The abilities of fruit flies, fish, and birds to navigate via olfaction are explored. An interesting section delves into how organisms learn smells, and how smells affect learning and memory. As with other chapters, an example on humans occurs near the end. In this case, babies have been shown to identify odors associated with breast milk, typically treating these as pleasant odors.

The final three chapters, *The Ecology of Smell*, *Smell in Culture*, and *The Smell of the Future* broaden the story on olfaction. Chapter 5 discusses pollination, parasites, predators, and parasitoids, introducing the terms allomone and kairomone. The topics illustrate coevolution in multiple guises, revealing the importance of odors across the span of eukaryotic life. Once again, humans serve as the concluding topic in the chapter with an exploration into everyone's favorite fiend, the mosquito! This final story in chapter 5 sets up the topic of smell in human culture, starting with an interesting story on the cave painting of Lascaux in France. Outside of perfume, the topics covered here (the politics of smell, the ethnography of smell, the smell of culture, and the smell of cities) are ones not often covered in biological courses. As final chapters often are composed, the topics cover a wide range. The initial coverage deals with global warming and potential affects of rising carbon dioxide levels on olfactory function. Next, the challenge of building artificial noses is discussed. A short section examines a few applied uses of odors to control crop pests (e.g., aphids) or human pests (i.e., the mosquito). The final topic on recovering the loss of smell (anosmia) makes one wish that the publication of this volume was a few years hence so that data from COVID-19 patients who lost their sense of smell could be included.

*Smell: A Very Short Introduction* is a well-written starter into the broad arena of olfaction. Because of length restrictions, the literature coverage is limited but enough key findings are described to allow the interested reader a trail to follow. Coverage is certainly not phylogenetically equal in large part because of our knowledge base but also likely the choice of the author. *Drosophila* and humans comprise a good portion of the examples. The challenge for such a volume is the focal audience. As a primer to the topic, I would be tempted to assign readings out of order, perhaps starting with the first two sections of chapter one (through the myths) and then jumping to chapter 6 on human culture. Depending on the course, chapter 5 on ecology might be earlier in the reading assignments than its place in the volume. Authors realize that chapters can be artificial separations of material, and for the most part, *Smell* does an excellent job of segregating yet connecting topics. The size makes it easy to take with you on a journey, and the topic entices you to sniff your way down the trail to its conclusion.

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## Social Butterflies

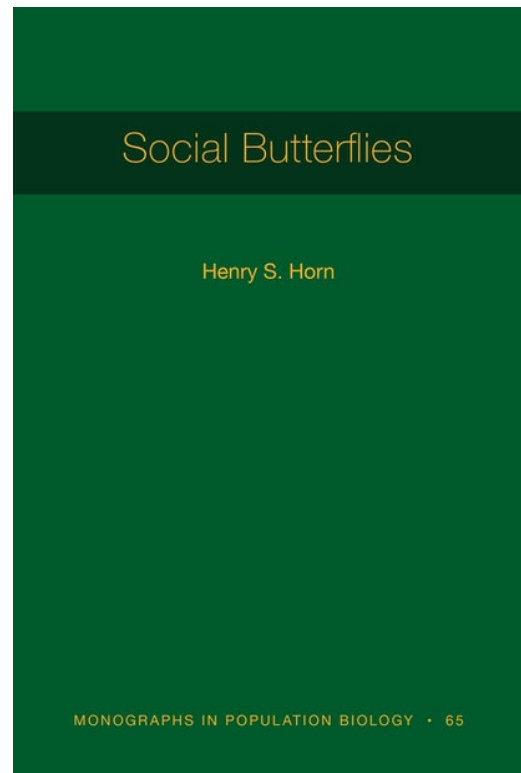
By Henry S. Horn

Princeton University Press. 2021. xviii + 272p.  
ISBN: 9780691206301

**Book review/Memorial  
Henry Horn (1941-2019)  
and his final book 'Social Butterflies'**

'Social Butterflies' is the newest book in 2021 to appear in Princeton's respected 'Monographs in Population Biology' series. This wonderful book was published posthumously. The author, Henry Horn, sadly passed away in 2019, having handed in the full draft of this book shortly before his death. Horn was an immensely creative scientist. Fifty years ago, he contributed another monograph—his first book 'The Adaptive Geometry of Trees' (Horn 1971)—to this same Princeton series. Few biologists publish book-length treatments on plant ecology as well as on the social lives of animals, which speaks to Horn's wide ranging curiosity and intellectual gifts spanning behavior, ecology, and evolution. For over half a century, Horn was a professor in the Department of Ecology and Evolutionary Biology at Princeton University, serving as wise mentor to countless students. On a personal note, I was especially pleased by the opportunity to carefully read and review Horn's final scientific contribution. Over a decade ago, Horn was my PhD advisor at Princeton and he will always be a scientist and human being I deeply admire. Here I expand on a prior, shorter review of his book, which was capped at ~500 words (Laidre 2021). I use the extra space allotted here within the *ISBE Newsletter* to elaborate on some of the most interesting elements of this book and to fondly remember the author.

'Social Butterflies' is based on empirical studies as well as theoretical modeling, which the author undertook over decades. The ten chapters within the book center around five sympatric butterfly species in upstate NY. Each species offers an empirical test case, which the author uses to understand the deep links extending from sensory ecology to social behavior up to population biology. This work is a nice reminder that some of the most fascinating discoveries may lie right in one's own backyard, and that the tools needed to elucidate these discoveries can be creatively 'MacGyver-ed' from what one might find at a local hardware store. Throughout the book, Horn's mastery of each butterfly species' natural history is evident. Indeed, the care he puts into resolving these species' natural history dates back to a childhood of collecting butterflies "in prodigious numbers at the edges of evaporating mud puddles" (p. ix). Horn employs many ingenious experimental designs to disentangle the simple cues and decisions rules that butterflies use when interacting in the wild. Beyond elegant experimentation and meticulous natural history, the



major aim of this book is conceptual unification. The book succeeds admirably in this respect, revealing the mechanistic 'hows' and the ultimate 'whys' for a suite of different social and life-history strategies, which each species uses to navigate its ecological and social environment.

Perhaps one of the most important discoveries of this book is that many of the complex emergent patterns found in nature are underpinned by relatively simple mechanisms and behavioral rules. Furthermore, these simple mechanisms ultimately generate many important consequences at the population scale. For example, Horn's experiments and models show that basic movement patterns associated with vagrancy versus territory defense can scale up to radically different population dynamics for each species. Interwoven within these broader insights are notably creative methods, including artificially engineered horizons in the field and a medley of agent-based computer models. One particularly memorable empirical approach is the author's design and construction of simulated compound eye-glasses (p. 225), involving a novel ommatidial-like lens apparatus to help see what butterflies might see. This imaginative approach preceded many more recent endeavors—involving visors, goggles, and other contraptions—intended to capture the visual and sensory perspectives of other species, ranging from insects to primates. This book thus abounds with experimental, natural history, and theoretical insights.

The path from original observation to incipient hypotheses to simple conceptual models to experimental tests to full-blown theory is long and winding. Yet ultimately, continued persistence down this fascinating intellectual path is what builds the foundations of our scientific knowledge about animal behavior. Examples of this path are invaluable, for



they convey the essence of the scientific approach, especially to those just beginning in science or starting new projects. Indeed, many beginning PhD students often wonder: where do I start and how do I get a foothold? Horn's book offers a lovely example, for it not only conveys the many profound discoveries and successes at the endpoint, but also the dead ends and experimental failures, which represent vital intermediate steps leading up to these endpoints. Furthermore, many of the 'endpoints' themselves raise countless more questions, which indeed is the essence of science. As Horn expresses it: "Finally, and most fervently, I hope that a wide range of students early in their scientific careers will see that first-rate science can be pursued with joyous passion, even with limited resources, ... because outright natural history always provides novel observations that stimulate and respond to conceptual thought" (p. xv). Horn's book could thus serve as a helpful entry point for many beginning graduate students, as well as a reminder to those of us in later career stages of the multitude of empirical and theoretical approaches, all of which may collectively be necessary to rigorously and successfully tackle new projects and questions.

One of the beauties of masterful writing is that it can live on long beyond a writer's passing. Horn's scientific explorations and discoveries will no doubt prove valuable to many, and not just those studying butterflies or social animals, but indeed anyone seeking to unlock the behavioral, ecological, and evolutionary mysteries of intra- and inter-specific interaction, sensory physiology, life history, and behavioral and population ecology. In Horn's own elegant words: "I get great joy from discovering the

facts of natural history, but my most profound satisfaction comes when those facts are organized conceptually. That conceptual organization is at first less a formal testing of theory against fact than an interplay between fact and fancy until the fancy becomes refined into theory, and the theory can then be tested with further facts" (p. 1). This book will surely fuel further conceptual unification, as well as natural history hunting, by inspiring future generations of scientists. Indeed, after reading this lovely book, I gifted copies to my own PhD students, the intellectual grandchildren of this remarkably curious scientist, so that they may continue the scientific journey. For me personally, getting to read this book brought back many fond memories of the countless admirable elements of Henry Horn's personal and scientific style. I feel privileged to have known him. And I hope others, who might never have had the chance to know him, can now still get to, by reading his final book.

### **Acknowledgements**

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## Spider Webs Behavior, Function, and Evolution

By William Eberhard

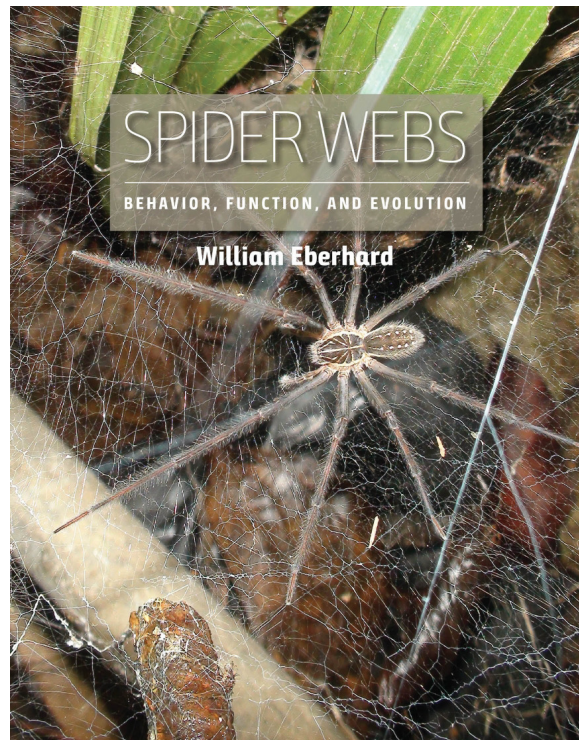
University of Chicago Press. 2020, 657p  
ISBN: 978-0226534602

Perhaps our long relationship with spiders and their webs is best encapsulated in the African legend that has the world created – web-like - by the great Spider Grandmother. Who could fault the logic: a tangible structure made exclusively from materials originating mysteriously in the maker’s very own body. No outside help whatsoever required. And once completed, the orb forms a living space as well as a working platform for the creator and her little mates - and occasionally also her offspring. This is Phenotype Extension at its most powerful hence also most befitting for a mythical miracle worker. Like the creator of a world.

Looking at it this way it is not surprising that spiders and their webs have long fascinated humans. How can such a small and seemingly fragile animal create something so spectacular as an orb web? A structure that is expansive in relation to the builder’s body and therefore requires construction skills that imply all sorts of expertise not normally associated with an insignificant invertebrate. For the professional biologist, ancient and modern, of great interest is both the web’s architecture and its engineering, which relies so much on the spider’s range of silks all falling under the class of smart materials. All in all, the evolution, presence and operation of both silks and webs give spiders a special status among the Arthropods.

For the Behavioural Ecologist of special interest is the spider’s web as a tangible manifestation of a foraging search path laid out in its entirety, not in reaction but in anticipation of prey. Seen from this perspective, the web is a silken search path where the feedback loops embody the result of millennia of selection rather than from any immediate feedback of prey captured and consumed. This, if nothing else, elevates (in my humble opinion) the spider’s web to its own class of extended phenotype - and as such provides us with an outstanding paradigm for deep probes into the fundamental mechanisms of animal foraging.

Yet a web is not ‘only’ frozen foraging behaviour. The very behaviour of web-construction falls under the more generic topic of animal movement and decision making. After all, each node in a web is the result of an algorithm that though largely inherited can be modified in the expression of some fine details by some form of learning. Because the building of an orb web is open to all sorts of experimentation, the rules of construction i.e. decisions on thread placements can be very easily studied in exceptional detail. This allows the unravelling of a specific spider’s path-finder rules and the rigorous testing of hypothesized rules in model analogues. I know of no other animal that offers this



range of possibilities to drill down into the fine details of behaviour patterns. And as it turns out, while the emergent structure is seemingly complex, the rules creating it are surprisingly simple.

I hope that this brief introduction has whetted your appetite and set you on a search to know more about spiders and their powerful structures. And this brings me to *Spider Webs, Behavior, Function and Evolution* by William Eberhard, known by all as Bill. This book, in its 600+ A4 pages generously illustrated with well over a thousand instructive images, provides both neophytes and experts with a true treasure trove of information. *Spider Webs* is extremely well written, and comprehensively referenced. Clearly, this book is a classic that belongs on every spider friend’s bookshelf sitting in ready reach, ideally next to a comfortable chair. Because, once opened it is not easily put down. In addition, the book will also sit very comfortably on the shelves of the non-arachnologist (or the not-yet arachnologist) Behavioural Ecologist because of its value as the most comprehensive overview and re-view of spider behavior that you will ever find. In this spirit, let us have a quick look at what - and how - Eberhard covers of this enormous subject,

The first chapter (C1) introduces in general terms the spider’s world and outlines the history of our so far rather flimsy connection to that secretive haptic world. This leads seamlessly to the next chapter (C2), which explores the hard-ware required of a spider to make its web i.e. the silk filaments that make up the web-lines and the legs that connect these threads, including the nimble spinnerets which are modified legs, and not forgetting the brain that controls the action. Now, that we have learned what is required to make a web we are introduced (C3) to the orb web, which is often seen as the pinnacle of web evolution, although there are discussions around that concept, as Eberhard outlines carefully.

This discussion leads us in the next chapter (C4) to a discussion of the core issues (and questions) of orb-web design, which draws deeply on Eberhard's extraordinary insights as an evolutionary biologist with unmatched experience in the field. The topic of trade-offs and co-evolved features are explored and discussed as is, importantly, the life-dinner arms race between the spider predator and its insect prey. These features are relatively easily studied and hypothesis-tested in the orb-web, with an emphasis on 'relatively' even for the expert arachnologist. They are far more in-tangible in the much more puzzling world of the non-orb weavers, which after all are the majority of spiders both in taxa and numbers, as chapter 5 outlines and explains. Great scope for novel research.

The next chapter (C6) returns us to the by now well familiar orb-weavers and provides a detailed analysis of their building behaviour including a most instructive section on the comparison of the different ways of creating an orb web. This is followed by a chapter (C7) that digs deeply into web construction and reviews in detail the potential cues that might direct this signature behaviour. Importantly, here we also learn and explore the ways that a spider's web building behaviour can be used for the study of specific hypothesis common to many other studies of animal path finding and decision making. Each one of the key stages of web-construction, i.e, positioning the frame, filling it with radiating spokes, scaffolding this radial platform with a temporary (auxiliary) spiral, and completing this nascent web with the fill-in of the super-soft threads of the capture spiral, provide us with access to the spider's road (map) to the final product, with ample opportunities for experimental interference.

Moving on from building behaviour, the book's focus shifts in Chapter 8 to spider life history and the importance of also studying the relationship between a web's ultimate structure and its function. Webs provide unique options for unusual ecological niches. Importantly, a web represents considerable commitments in materials (silk proteins) and construction time (ca 1 hr) as well as, crucially, a huge commitment (measured in days) of residence time. Here Eberhard's extraordinary insights into spider ecology bring new life to this topic of the spider-web relationship, which lies at the very basis of spider evolution. And indeed, the next chapter (C9) addresses the fundamentals of spider-web evolution. How did it come about that this super-ancient ancestral trait of silken lines - woven into a huge diversity of patterns - today provides such a cornucopia of structures and modes of operation? The short answer is: spider webs are adaptive radiation personified. Here, again, the reader benefits greatly from Eberhard's deep knowledge of spiders and their webs in the fields of both taxonomy and behavioural ecology.

In the last chapter (C10) Eberhard closes the circle and returns to the fundamental as well as the (many) open questions in our understanding of the spider's web. How did the diversity we see today start, what were the early webs like, how did they evolve into later webs and these into today's webs? Can we trace that evolution through both the structures and the

underlying behaviour? Many of the open questions circle around the issue of parallel strands of evolution and convergence of traits because of a good (hesitating to call it optimal) balance between costs and benefits. The orb web is a perfect case in point for a deep analysis of a topic of fundamental importance for many Behavioural Ecologists, i.e. that of tracking a defining behaviour trait through its phylogenetic history by unravelling the details of specific patterns.

So, in summary, what does one get by buying the book? Spider silk is often compared to steel, weight by weight and materially speaking this book is excellent value for money at just under 2 kg weight and just under 10 cents per A4 page. Intellectually speaking, Bill Eberhard's book not only provides the reader with an exceptionally comprehensive, generous and intuitive text supported by well explained illustrations that lighten the text and overall aided by an outstanding index that allows for flitting between subjects and chapters. As importantly, there is plenty of intellectual stimulation for both spider and non-spider expert. And the honest discussion of the many open questions will provide generations of students interested in behavioural ecology with topics for research.

I hope that Bill Eberhard's book will be a key stepping stone in establishing spiders and their webs as important subjects of studies in behaviour and ecology. Concerning behaviour; consider (a) the web to be a foraging path and then consider (b) the accessibility of web-construction in a laboratory setting for rigorous hypothesis testing by experimental manipulation. This covers not only probing the effects of drugs or age or learning but also extends to unravelling behaviour genetics and studying the concept of embedded intelligence. Concerning web ecology; consider how easy it is (a) to monitor webs in the field in order to study fundamental questions of foraging economics as well as (b) probe the adaptive radiation of behaviour traits in response to environmental change. Last but not least, consider that a spider's web may be more than simply a builder's platform of operations. Some webs may provide entire ecosystems. For example, the cosmopolitan clade of *Nephila* orb-weavers can host a range of species of the non-orb *Argyrodes* clade that sneakily pilfer caught prey or simply co-habit. Even more unexpected for spiders are the highly social *Anelosimus eximius*, which build communal webs that can reach the size of a small bungalow and house hundreds of thousands of relatives as well as a diversity of insect and arachnid guests and parasites. Getting interested in spiders and their webs? Buy the book and find out more!

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*PS The editor and team of Press of the University of Chicago must be congratulated not only for publishing this true labour of love but also for the superb production nowadays so rare for an academic book of this topic and scope.*



## The Biology of Moul in Birds

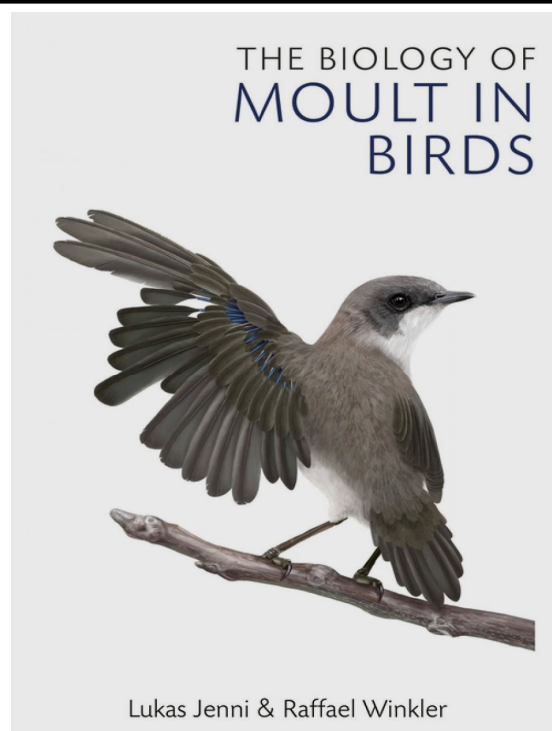
By Lukas Jenni and Raffael Winkler

Bloomsbury Publishing, 2020, xii + 306p  
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A key insight of Behavioural Ecology is that maximising fitness requires trade-offs, perhaps most fundamentally between current and future reproduction. Birds, as a taxon, offer unique insights because they carry out two distinct annual processes that align with this trade-off: most species reproduce at least once per year, but they also renew their body surface by at least one annual moult of their progressively abraded plumage. During moult birds replace wing feathers that are required for flight, body plumage that thermo-regulates and protects, and ornamental feathers that affect mating success. Hence, moult, as a process, captures investment in future reproduction. Both reproduction and moult are highly demanding for birds, so that major overlap is often avoided. Yet both processes are relatively easy to study. It would thus seem that understanding the ways birds balance breeding and moult holds huge potential for Behavioural Ecology. But unfortunately, there have been major obstacles: moult has been notoriously under-investigated, its study is burdened by complicated and inconsistent terminologies, and, perhaps most damagingly, there has to date not been an overarching review of this process. Major publications so far have focused on taxonomy (Stresemann & Stresemann, 1966) or given regional or taxon-specific overviews, often with extensive species records (e.g., Howell, 2010; Johnson & Wolfe, 2017; Jenni & Winkler, 2020) – not the kind of books most Behavioural Ecologists would pick for reading. Now fortunately, a new book, entitled *The Biology of Moul in Birds*, clears previous barriers and places avian moult soundly, with great attention to detail, in the framework of Behavioural Ecology.

This new monograph focusses on avian moult, defined as 'both the natural, periodic, scheduled shedding and replacement of feathers, which include part of, or the entire, plumage'. It is a unique process amongst vertebrates as it involves replacing 20-35% lean dry body-mass. This book has the ambition to open the "black box" of the process of moult, shedding light on the mechanisms that shape it, and the wider consequences of its outcome. This is achieved by a) attempting to look at moult globally (still, with an obvious Central European bias); b) expanding taxonomically, including at least some information on most extant taxa (still, with an obvious passerine bias); and c) employing a cross-disciplinary approach, considering behaviour, ecology, physiology and phenology.

The book is organised in 5 chapters that describe and discuss many aspects of moult with astonishing depth. The first chapter, entitled '*Functions of the plumage*', gives a detailed overview of the anatomy and terminology surrounding bird plumage, and then



provides a comprehensive list of all the different functions of plumage, put in the context of trade-offs between each other (e.g., endurance flight feathers vs ornamental feathers, water repellence vs water resistance). The second chapter, '*Plumage maintenance and the need for plumage renewal*', essentially justifies why moult is necessary. It gives a detailed review of how feathers wear, what are the consequences of wear, and other reasons why changing plumage might be beneficial (e.g., changing from cryptic plumage to breeding plumage). Chapter 3, '*The processes of moult*', is the longest chapter in the book, and explains in much technical detail how feathers grow, what factors limit feather growth, the physiological and behavioural adjustments experienced during moult, the energetics of the process, and how moult is regulated. The fourth chapter, '*The effects of environmental conditions during moult on plumage quality and their consequences*', goes through a list of factors that can affect moult, such as nutrition, stress and habitat. Then it looks at the consequences of variations in feather quality (e.g., modified signalling, reduced reproductive success). Finally, chapter 5, '*Fitting moult into the annual cycle*', gives a very comprehensive overview (with many examples) of different strategies birds follow to fit moult into their annual schedule. It also covers the overlap between moult and other activities (e.g., breeding, migration).

In this book, Jenni & Winkler clearly place the process of moult in the context of Behavioural Ecology. The foundation for this is laid out in the first chapter where the authors discuss the multiple functions of plumage, including flight, thermoregulation, signalling, camouflage, etc. This wide range of functions presented allows the reader to acknowledge the major importance successful moult holds for current and long-term fitness. An example provided in the book is the Ruff (*Calidris pugnax*), a wader species that moults three times per year to accomplish different functions according to the season; maximising flight capacity for

migration, increasing crypsis during winter, and displaying plumage for breeding during spring/summer. Additionally, the Ruff's breeding plumage provides information on breeding strategy, with males displaying elaborate ruff and tufts of varying colour according to territoriality and dominance: a non-white ruff indicates resident, territorial males on the lek, whilst so-called satellite males have white ruffs and achieve copulations by encroaching in territorial males' leks. An additional small fraction of males do not have a ruff or tufts and appear similar to females – these birds 'steal' copulations when the females crouch to solicit mating with other males. The survival and complex mating behaviour (and consequent reproductive success) of Ruffs clearly depend on successfully moulting their feathers at the appropriate time of the year.

Having given the reader a detailed picture of the different functions of moult, Jenni & Winkler then broaden our view by introducing the effects of the environment on birds' moult. This discussion, which constitutes most of chapter 4, brings together the more physiological topics of the initial chapters (e.g., the chemical components of feather colouring) with an ecological perspective (e.g., the diet necessary to create these chemical components). Again, the link to current and long-term fitness is significant; sub-optimal environmental conditions constrain moult, resulting in low quality plumage that cannot perform its multiple functions as effectively. Though a lot of the evidence is correlational, the book compiles a range of studies that point towards a link between environmental conditions and moult 'success'. For example, House Sparrows (*Passer domesticus*) on low protein diets took longer to complete moult and grew shorter and lighter feathers compared with controls, and White-crowned Sparrows (*Zonotrichia leucophrys*) experiencing stress during moult had reduced feather growth-rates.

The consequences of moult 'going wrong' (taking longer, producing lower quality plumage, etc) are significant and diverse, from reduced flight performance to reduced insulation, poorer predator avoidance and modified signalling (e.g., to conspecifics). For instance, Jenni & Winkler compile evidence to show that Common Starlings (*Sturnus vulgaris*) fly more efficiently, have reduced take-off speed and better manoeuvrability just after moult (with fresh plumage) compared to before moult (with worn plumage). Presumably, a bird that is not able to perform moult properly would face similar disadvantages even after moulting. When moult is time-constrained (e.g., because of young fledging late), it can result in a smaller fraction of feathers being replaced. The consequences of these variations in moult are also far-reaching; an interesting example in the book is that of the European Siskin (*Spinus spinus*), where young birds who replace more of their feathers (and consequently look more like adults) receive more aggression from conspecific adult males, likely due to them being perceived as more of a threat, resulting in lower body mass compared with more juvenile-looking individuals. Though the authors point out that there is still limited evidence linking poor feather quality directly to reduced survival, there is extensive evidence that poor quality plumage reduces

reproductive success and thus fitness. Therefore, the future reproduction of birds is dependent on inhabiting an environment which supports the arguably expensive process of moult. This conclusion is as interesting as it is scary, given our current trajectory of land-use and climate change.

This book truly goes a long way, but by its synthesis, also shows the limits of our understanding, one main limit being geographical. Though the authors have clearly done an extremely thorough job of reviewing the literature, the reference list shows a strong tendency towards temperate species. This results in a mis-representation of the global variation in moult, because there are many more bird species in the tropics, and these tropical species show a wide range of life-history strategies often not found in temperate areas. For example, tropical bird species vary in their timing of breeding, include a variety of breeding strategies (e.g., cooperative breeding, lekking, etc) and inhabit an environment with different seasonal patterns. These differences in habitat and life-history strategies will likely affect moult, resulting in variations in its timing, extent, duration and other characteristics. All these factors mean that understanding moult in tropical birds could give us considerable new information and deeper insights into the position of moult in birds' life-histories.

Overall, *The Biology of Molt in Birds* is an outstanding book that fills a necessary gap in our current understanding of this essential and far-reaching process. The book is written for an academic audience, but should make interesting reading to anyone keen to learn about avian ecology, behaviour or physiology. An exciting theme within this book is the opportunities for future research directions. Concerning Behavioural Ecology, there are many unanswered questions regarding trade-offs faced during moult, especially by wild birds. Fundamentally, we have still not unravelled what Jenni & Winkler aptly name 'the paradox of the true cost of moult'; the fact that feather growth as a process does not appear to be extremely energetically demanding, and yet, as discussed above, moult has far-reaching fitness implications. This paradox is just one of the examples that demonstrates how much we still have to learn about moult in birds. From our point of view, as three readers with different backgrounds and experience, we found the book novel, necessary, and inspiring, and we are excited to see the developments it will trigger.

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## ACADEMIC POSITION

### Assistant Professor – Behavioral Ecologist



The Department of Biological Sciences at the University of Texas at El Paso (UTEP) invites applications for a tenure-track assistant professor position for a **Behavioral Ecologist**.

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## FUNDING OPPORTUNITY



# Cultural Evolution Society Transformation Fund

The Cultural Evolution Society is running a funding scheme called **Transforming the Field of Cultural Evolution and its Application to Global Human Futures**, thanks to a grant from the John Templeton Foundation.

The scheme aims to transform the important, yet underfunded, field of cultural evolution. How our cultures evolve (including how information is transmitted, how people make decisions, and the interaction of culture with our biology) is a pressing issue in a world in which our cultural activities are causing rapid, and drastic, social and physical changes. Through the scheme, the Cultural Evolution Society aims to tackle several issues:

- 1) The ever-increasing obstacles to success that early career academics face – this will be redressed through funding, mentoring and training opportunities.
- 2) Western-centrism, i.e. the tendency of research to focus far too much on the West and for only Western researchers to receive funding – researchers from countries outside of Northern America and Western Europe are especially encouraged to apply to this scheme.
- 3) Disciplinary divides (for example between psychologists and anthropologists or physicists and historians) that hamper research progress.
- 4) The gap between scientists and public policy makers – dedicated support is available to help communicate research activities to relevant contacts, in order to enable society as a whole to benefit from research in

cultural evolution. Policy makers could more often draw on an explicit scientific theory of cultural change, and the sciences often investigate what needs to be changed but invest less in how this may be achieved.

The funding competition will fund **16 Research Projects** in four broad areas:

1. Variation in creativity and imagination
2. Cultural influences on access to 'reality' (or our rationality).
3. The impact of globalization on cultures.
4. Applying cultural evolution to enhance human futures.

There is more detail regarding these themes here: [https://culturalevolutionsociety.org/story/Templeton\\_Grant\\_2021\\_Calls](https://culturalevolutionsociety.org/story/Templeton_Grant_2021_Calls)

Alongside the funding of the research grants, there is also a competition to fund **5 Applied Working Groups**. These will be designed by the applicants, to implement cultural evolution with real impact on, for example, policy (e.g. public health, education), politics, business, climate change, conservation and welfare. The application deadline is 5th January 2022, and there will be a pre-application workshop in early November 2021.

Details of the scheme are available here: [https://culturalevolutionsociety.org/story/Templeton\\_Grant\\_2021\\_Home](https://culturalevolutionsociety.org/story/Templeton_Grant_2021_Home)

## BOOKS FOR REVIEW

If you are interested in receiving **and** reviewing any of these books, **or some other book** suitable for this Newsletter, please email the newsletter editor: andreas.svensson@lnu.se. Please include your postal address. The due date for review in the next edition of the Newsletter is Feb 28, 2022.

### Available from Oxford University Press

#### Book title

The Science of Animal Welfare - Understanding What Animals Want (2021)  
Beavers - Ecology, Behaviour, Conservation, and Management (2021)  
Vagueness and the Evolution of Consciousness - Through the Looking Glass (2021)  
Evolutionary Parasitology - Infections, Immunology, Ecology, & Genetics 2<sup>nd</sup> ed (2021)  
Male Choice, Female Competition, and Female Ornaments in Sexual Selection (2021)  
Adaptation and the Brain (2021)  
Amphibians: A Very Short Introduction (2021)  
Secret Worlds - The extraordinary senses of animals (2021)  
Evolution - What Everyone Needs to Know (2020)  
Urban Evolutionary Biology (2020)  
Animal Physiology: an environmental perspective (2020)  
The Natural History of the Crustacea: Reproductive Biology, Volume VI  
The Rules of the Flock: Self-Organization & Swarm Structure in Animal Societies (2020)

#### by

Stamp Dawkins  
Rosell & Campbell-Palmer  
Tye  
Schmid-Hempel  
Schlupp  
Healy  
Kemp  
Stevens  
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Satz

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Chimpanzee- Lessons from our Sister Species (2020)  
Monkeys on the Edge - Ecology and Management of Long-Tailed Macaques (2020)  
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Taborsky *et al.*  
Dixson  
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Roulin  
Penteriani & Melletti  
Costantini & Dell'Omo  
Hunt  
Gumert *et al.*  
Huffman & Chapman  
Nakamura  
ten Cate

### Available from CRC Press

Songbird Behavior and Conservation in the Anthropocene (2022), Edited by Proppe

### Available from Steady State Press

Uncommon Sense: Shortcomings of the Human Mind for Handling Big-Picture, Long-Term Challenges (2020), by Seidel

### Available from Chicago University Press

Yellowstone Wolves - Science and discovery in the world's first national park (2020) by Smith, Stahler & McNulty

### Available from Royal Society publishing

-Fifty years of the Price equation (2020) Eds: Lehtonen *et al.*  
-Synchrony and rhythm interaction: from the brain to behavioural ecology. (2021) Eds Greenfield *et al.*  
-Vocal learning in animals and humans (2021). Eds Vernes *et al.*  
-Linking behaviour to dynamics of populations and communities: application of novel approaches in behavioural ecology to conservation. (2019) Eds Bro-Jørgensen *et al.*