

and at slaughter, improving pig welfare through positive pig-human interactions, the opportunities and challenges in breeding for improved pig welfare, positive pig welfare and what it brings to the debate on animal welfare and the welfare of pigs when used as laboratory animals.

Supporting understanding for a broad readership, part one opens with an introductory chapter giving an overview of the typical pig production cycle in commercial operations and the accompanying welfare challenges, written in the context of EU welfare regulations. This valuable chapter helps to ensure that even the naïve reader has a level of understanding before the book progresses into more detail.

Each chapter discusses the science and what can be concluded from the current body of evidence, containing colour pictures and schematic diagrams — helping the reader to appreciate what is being discussed and to visualise relationships. Importantly, what hinders progress towards the end goals — changes to practices and the management of pigs, the knowledge gaps for future research and suggestions for solutions to long standing areas of gridlock resulting in a lack of progress in the adoption of the science — is also discussed.

This book is a much-needed resource. There have been significant advancements in the understanding of swine welfare and the challenges to adoption over the last several decades, and the pace of research output continues to grow. It is a major challenge for busy professionals who are stakeholders in this field to stay abreast of the information on these evolving topics. This is made all the more challenging when dealing with the especially complex and multifaceted nature that some of these welfare challenges present, such as tail-biting. This book breaks down the most important information and delivers it in an easily digestible format — providing conclusions on the body of science, along with discussion on adoption and navigating the barriers.

Particularly helpful is the detailed yet concise dissection of the factors that contribute to, and therefore should be considered, when wanting to develop long-term solutions to a particular welfare issue. Reading through, the reader is able to understand the interlinking relationships between the major challenges in pig welfare. To illustrate this, a noteworthy example is chapter two, covering sow welfare in the farrowing crate and alternative farrowing house designs. This chapter covers not only the basic welfare requirements for the sow, the challenges in the traditional farrowing crate, and the pros and cons of the alternatives when considering the ‘triangle of needs’ — those of the sow, her piglets and the farmer. The chapter also presents the reader with the other elements that should be considered for a truly comprehensive understanding of the situation when evaluating the welfare of the farrowing sow, and how these factors might interact with the housing system. This includes a review of the biology (behaviour and physiology) of the domestic sow at farrowing in relation to her wild counterparts, how genetic improvement for increased productivity has implications for sow welfare at farrowing; and how the management of the sow (human-animal relationship, the use of

cross-fostering and nurse sows, feeding strategies and weaning age) in any system can influence her welfare. Together, these factors must be considered for the success of systems and the balance of improving sow welfare.

This detailed breaking down of the factors is repeated throughout the book and is done to a high standard. This makes it a very useful book for the reader to truly appreciate the range of considerations that must be given if long-term solutions to these welfare challenges are to be developed. This information provides impetus for areas of new research and for stakeholders to work together on solutions.

The topics covered in part one are those to which there has historically been more research attention to date. The chapters in part two cover several areas that are overall less well researched but are presently receiving more research attention and the progress, at least for some areas, is evolving with some pace. Chapters within part two consider some areas that are greatly in need of research attention, in particular the chapters on pain in pigs and laboratory pig welfare underscore how little is known about porcine pain and how little attention has been given to the needs of pigs in a laboratory research setting despite much research already existing on the needs of pigs as a farmed species. Whilst the chapters on positive pig welfare, human-animal interaction and monitoring animal welfare open up discussion for promising new areas for improving pig welfare.

Advances in Pig Welfare is a comprehensive book that would be a valuable addition to the library of those with an interest in the welfare of pigs, be they a veterinarian, academic, student, industry personnel, an animal welfare charity representative, government body or policy-maker. I hope that future editions of this book are published to deliver updates as the knowledge and understanding evolves to help readers stay abreast of the information for the betterment and advancement pig welfare. As the editor, Marek Špinko, writes in the Introduction, I too wish that this book serves as a useful resource and inspiration in the effort to improve pig welfare worldwide.

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Mental Health and Well-being in Animals, Second Edition

Edited by FD McMillan (2019). Published by CABI, Nosworthy Way, Wallingford, Oxon OX10 8DE, UK. 384 pages Hardback (ISBN: 9781786393401). Price £67.50, €90.00, \$US112.50.

The spirit and heart behind this ambitious book are admirable. It aims to cover all aspects of animal well-being, from happiness to PTSD and suicide, in diverse species and contexts (from people’s homes to biomedical research labs), with the aim of motivating treatment and better animal care. If all the authors were to meet up in some fantastic workshop or retreat (what a lovely vision that is, in this dreary pandemic world!), it’s hard not to imagine that their

discussions and exchanges of ideas would mobilise some wonderful forces for good, and truly benefit animals.

Yet, as a book, and one with 25 chapters, the effect instead is babel-like. For one, the different authors, with their diverse areas of expertise and application (from animal rescue to the academic study of animal emotion), seem to be writing for completely different audiences — typically audiences like themselves (and sometimes even for audiences only in their own country, especially some of the US authors). This disconnectedness is made worse by the complete lack of cross-referencing between chapters. As one example, Chapters 1 and 19 both independently use the Brambell Committee's 'Five Freedoms', yet without referencing the criticisms of this scheme presented in Chapter 5, where Mellor and Beausoleil advance their replacement 'Five Domains' view. As another, Chapter 2 has a 'methods of measurement' section, and Chapter 4 has a 'biomarkers' section, yet neither refers to the other, nor to Mendl and Paul's Chapter 23, the *entire focus of which* is the objective assessment of animals' emotions and moods (yet oddly squeezed in at the very end of the book). And, as a third example, Overall (in Chapter 13) and Seibert (in Chapter 20) both discuss animal OCDs (obsessive compulsive disorders), and yet again, neither refers to the other; and nor do they refer to the abnormal repetitive behaviours described for zoo animals in Chapter 21.

To us as academics, we also found some claims and statements rather naïve: corticosteroids are presented as stress hormones (when, of course, they are far more than that), and animals are boldly said to have neuroses and obsessions — with little evidence (nor any reference to authorities like the *APA Diagnostic and Statistical Manuals*), nor any acknowledgement of the impossibility of truly knowing what

animals feel. This is not to say that animals do not have OCDs and neuroses: perhaps they do (and furthermore, while we do not know this, perhaps *assuming* that they do may lead to better animal care). But the brashness of these assertions was, to us, unnerving: to our tastes, it left no room for proper doubt, humility or empiricism.

The book also has some other odd gaps. Fish, amphibians and reptiles are essentially absent, for instance. And many chapter titles sounded grand and comprehensive, only to have narrow contents, focusing only on some animals or some conditions (and with no explanation or context). As one example, the one chapter focusing on birds is actually only about parrots (and does not even mention chickens: the most abundant animal kept by humans on the planet).

As a result, it's a little hard to know what or who this book is for. It's not a book one can read from cover-to-cover, or teach a course around (because there is no narrative consistency: the chapters do not build on each other). And that the chapters are pitched at such different levels makes it even harder to use as a teaching text. It's also not a book one could turn to as an authoritative reference, not only because of its gappiness and lack of cross-referencing, but also because its index is rather imperfect. If a revised edition is ever published, we'd suggest that each lead author is given a clearer brief about the target audience, plus at least three chapters by others to read (ideally lead authored by people from different fields), that they are asked to integrate with their own. The book's breadth and inter-disciplinarity might then become a strength instead of the weakness it is now.

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