

should be protected in the same way as vertebrates. ‘Degree of sentience’ is also of course relevant to Replacement of animals considered more complex with animals considered less complex. The sorts of tests that Nielsen describes could potentially provide evidence to close the complexity gap, as good only as the current knowledge available. Finally, it has been argued that asking the animal, in terms of decision-making tests, could provide the ‘gold standard’ for animal welfare (Barnard 2007), thus the standard against which criterion validation could be determined for all other welfare indicators more feasibly used in the field. Since this standard itself depends on the animal understanding the ‘question’ asked and on the validity of data interpretation, Nielsen’s text may contribute to raising the standard of animal welfare research more broadly by providing guidance on how best to ask questions and gain robust data. One final suggestion I have for future editions is that the text would lend itself nicely to an associated online resource of video-examples on ‘how to’ and ‘top tips’, particularly in view of the increasing move to blended learning strategies in higher education and following the Covid19 pandemic. Certainly, I can imagine using it extensively in my teaching. In conclusion, I would definitely recommend this text as a valuable, accessible and concise launch point for understanding and improving behavioural testing across disciplines and species.

## References

- Barnard C** 2007 Ethical regulation and animal science: why animal behaviour is special. *Animal Behaviour* 74: 5-13
- EU Directive** 2010 Directive 2010/63/EU of the European Parliament and of the Council of 22nd September 2010 on the protection of animals used for Scientific Purposes. *Official Journal of the European Union* L.276: 33-79
- Martin P and Bateson P** 2007 *Measuring Behaviour: An Introductory Guide, Third Edition*. Cambridge University Press: Cambridge, UK
- Russell WMS and Burch RL** 1959 *The Principles of Humane Experimental Technique*. Methuen: London, UK

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## Dogs: Understanding Your Very Best Friend

J Bradshaw (2021). Published by Andersen Press, 20 Vauxhall Bridge Road, London SW1V 2SA, UK. 128 pages Paperback (ISBN: 978-1839130878). Price £6.15.

It was a funny but interesting book and I loved its character. I especially liked the chapter ‘Walkies’, it was particularly fascinating and amusing. The part about smell and dogs body behaviour was good, interesting and important to know. I would definitely recommend this book to my friends at school and to other children of my age.

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## Broiler Chickens: Welfare in Practice

A Butterworth, I de Jong, J Mench, L Berg and M Raj (2021). Published by 5m Publishing, 8 Smithy Wood Drive, Sheffield S35 1QN, UK. 164 pages Paperback (ISBN: 978-1789180152). Price £14.95.

This book is one in a series of practical books on the welfare of farm animals. It sets out to inform broiler farmers, poultry vets, stockworkers, poultry smallholders, and agricultural students about the factors that affect commercially reared broiler chicken welfare. The aim is to produce a book that is useable around the world, although the book is largely based around European laws regarding housing, killing, and welfare monitoring (in part because there are laws in Europe, of course). The authors use evidence from scientific publications, but the information is written in a concise way for the ‘layperson.’ The book is laid out logically, starting with the welfare of broiler parent stock (broiler breeders), to hatching of chicks, housing and management influences, health and disease impacts, on-farm killing of broilers (from embryos to slaughter age), how to assess welfare in broilers, and future improvements to broiler welfare. The authors are all experienced research scientists who have studied broiler welfare first-hand, and are therefore well placed to write such a book. In addition, they provide their email addresses so that anyone can reach them directly, should you so wish!

The first chapter, on broiler breeder welfare, is a great introduction on what is required to produce broiler chicks, and the welfare challenges faced by the parent stock. Production period housing is described, although the section on page 7 about colony cages seems to include a lot of general information about feeding and drinking systems that apply to any type of housing system. The figures are helpful and aid understanding.

The chapter on hatchery welfare provides a good insight into risks to chick welfare at this discrete phase of their lives. Generally, the figures were useful, however their reference in the text is sometimes odd; for example, referring to eggs stored for too long references to Figure 2.8, a photo of chicks in a hatcher tray, and a sentence on food and water deprivation leading to increased mortality references to Figure 2.9, a photo of chicks. Neither of these particularly illustrates the text. The section on dealing with unwanted chicks would have benefitted from cross-referencing with the chapter on on-farm killing, as they overlap. The insights into the effects and risks of automation were eye-opening, but the section on light would have benefitted from telling the reader how providing light during incubation affects fear responses (reduces or increases?)

Chapter 3 describes how housing and management can influence broiler welfare. This is an informative section describing the different methods of broiler housing and key management factors that can influence broiler well-being, such as litter quality, air quality, and environmental enrichment. Again, the figures are useful and clearly illustrate the

housing methods and litter quality, although I challenge anyone to get a good photograph of dust! Close-ups of the various types of enrichments shown in Figure 3.7 would have been beneficial for readers, with the current photos being too small or the enrichments too far in the background.

Chapter 4 explains the main diseases of broiler chickens, whether they are due to management, growth rate, or infectious reasons. This provides essential knowledge for the reader about causes and prevention, although defining peritonitis, endocarditis and septicaemia (meanings, clinical signs) would help further. The section describing on-farm killing for some types of diseases would again benefit from cross-referencing with the chapter on on-farm killing, as they overlap (however, a bit of repetition is fine, particularly as people may read some chapters and not others...).

Chapter 5, regarding on-farm culling and emergency slaughter, describes the methods that can be used to kill broilers, with useful accompanying illustrations, although it has a Euro-centric feel due to its heavy reliance on European law, so that should be borne in mind when used as a reference elsewhere. As a text on broiler welfare, it could further guide the reader by providing a reflection on each measure's relative welfare pros and cons, such as time from application to loss of consciousness.

Chapter 6 explains the importance of welfare monitoring of broilers, not only to satisfy legislation and quality assurance schemes, but as a source of information for the farm regarding areas of improvement. It discusses three assessment methods and their pros/cons, such as time to collect the data and their reliability. Understandably, because the assessment methods require training and/or careful understanding by reading the full texts/websites that describe them, further information is required before someone could apply the methods, but this chapter will at least lead the reader towards the right sources, should someone choose to find out more.

Finally, Chapter 7 reflects on how broiler welfare can be improved in the future by focusing on three major areas (breeding/genetics, housing and feeding, and management/care), and reminds those people working directly with the birds on a day-to-day basis of the large influence they can play on broiler welfare.

Unfortunately, the Foreword by the series editor was presumably based on an earlier version of the manuscript, as the chapter references are incorrect, but this does not detract from the book overall. This, along with some other minor edits (for example, in p 7 the top two sentences talk about transport from the production farm to the rearing farm, and group sizes on the rearing farm, but this is surely the wrong way around?) can easily be incorporated into the next edition.

This is a useful book that will be a good reference for anyone working directly with commercial broiler chickens, of all types (slow and fast growing) and in all housing systems. By understanding welfare influences described there, its readers will appreciate how to drive positive welfare with the birds they come into contact with.

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### **Changing Human Behaviour to Enhance Animal Welfare**

Edited by R Sommerville (2021). Published by CABI, Nosworthy Way, Wallingford, Oxfordshire OX10 8DE, UK. 208 pages Paperback (ISBN: 9781789247237). Price £35.00, €40.00, \$US47.00.

*Changing Human Behaviour to Enhance Animal Welfare* comprises chapters from a range of different authors and organisations. Each chapter provides that author's experience and take on an animal welfare issue or situation, and provides useful, real-life case studies. The examples include a wide range of issues, from dancing bears to laboratory rats, as well as a range of contexts and locations across the globe, providing the reader with a holistic view of the animal welfare issues which arise from human-animal interactions. The contributors to the book are experts in their field and deliver a range of interesting and authoritative voices.

The book makes the point that animal welfare can only be improved through working with people, and — importantly — through understanding the context within which those people live. It is clear throughout the book that working in the field of animal welfare is really a human-centric role, and hence understanding people is key to bringing about change. Whether the change is in relation to elephant tourism, broiler welfare, or anything in between, the book clarifies that simply telling people to do things differently will not bring about change, because the animals are a component within complex and integral systems. While this is the message throughout each chapter, it is particularly well-described in Chapter 2, 'Animal welfare, the human element' which gives an overview of the importance of human behaviour change science and its application to animal welfare. Throughout, the book's authors give examples of bringing about change through a range of methods: ongoing community engagement, education, legislation, policy, and many other methods; all based on a foundation of sound research into the issue at hand. A useful table (pp 14–17) gives examples of different methods of bringing about change, and the subsequent chapters provide relevant examples.

Importantly, this book helps to bridge the gap which is often present between research around an animal welfare issue and the changes to real-life (eg campaigns or interventions) which might improve animal welfare. Given that research and campaigns are often undertaken as entirely distinct activities, this book emphasises the need to use research to understand the context and structural factors behind each issue, before using that research pragmatically to bring about change. For example, one case study (Chapter 11), described a previous failure to bring about change in recognition of equine pain in a community despite an intervention. Subsequent research identified a previously overlooked health provider to whom community members were turning for advice, and a structural issue in relation to stocking of pain relief. Once these issues were better under-