

Book Reviews

Animal-centric Care and Management, First Edition

Edited by DB Sørensen, S Cloutier and BN Gaskill (2021). Published by CRC Press, Boca Raton, FL, USA. 190 pages Hardback/Paperback (ISBN: 978-0367181024). Price £85.78 (hardback), £31.99 (paperback).

The essence of this book is to go beyond the notion of the 3Rs principles as originally described by Russell and Burch (1959), viewing these as a collection of ethical ideals not only to be adhered to, but to be further developed in all circumstances where animals are at risk of suffering. It advises on the application of the 3Rs in the modern laboratory environment. It provides a comprehensive species-specific guide to the currently believed welfare requirements of a wide variety of different animals that are commonly used in biomedical research based on their physical and emotional needs.

In the opening chapter, Megan LaFolette summarises the importance of developing a strong human-animal bond to prevent fear and distress in animals but, also, she stresses the importance that this bond also has in preventing stress in the humans that inevitably must engage in procedures that cause some degree of suffering. It describes how, by achieving such a bond based on respecting animals as individuals, all concerned can have a more rewarding experience and function more effectively. The chapter provides a clear description of how the co-occurrence of a human and animal can be sub-divided into those encounters that are likely to be positive or negative. Given Megan's research background she rightly cites rat tickling as an example of a way to create a positive human-animal bond and thereby promote positive welfare. As a cautionary note, however, one needs to be mindful of the possibility that while developing these bonds animals may exhibit signs we might improperly interpret as pleasure, when in fact they are not. For example, a human may respond to tickling with laughter which the tickler interprets as pleasure, when in fact many people find tickling unpleasant. Chapter 3 is pertinent to this point in describing animal moods and emotions, and how they may sometimes be misinterpreted.

Chapter 4 summarises current knowledge about different types of abnormal behaviours and the circumstances that can elicit them. The critical point is to remember that welfare issues that result in abnormal behaviour can affect animals throughout their whole experimental life despite the removal of the factor that initially perpetrated the problem. This can lead to animals performing poorly or in a manner that obfuscates research findings. A great example is the one given regarding the somersaulting mouse, whereby the abnormality is one caused by frustrating conditions during early life that altered neural function, and not by any current lack of ideal housing. Overall, this chapter provides an excellent description of the various circumstances that can lead to the

occurrence of abnormal behaviour in many different species and what mitigating interventions can be utilised.

I was particularly pleased to read the chapter on learning which would be especially helpful to any researcher or animal carer struggling to understand other sometimes-complicated descriptions of the processes at large. Such a clear and concise account of learning theory is rare in that it places the processes in the context of day-to-day laboratory procedures. It provides numerous context-relevant examples that help to clarify what is meant by animal conditioning, and how it can be applied to enhance the quality of an animal's research experience. The logical extension of this appears in Chapter 6 where the theories are further explained in a way that helps the reader to understand the importance of animal training to enhance welfare. Although it focuses on larger animals, the general principles should be relevant to any animal and are nicely summarised. The chapter would have been even better had it included more practical descriptions of how training should be implemented.

As a researcher exclusively using mammals, I was unaware of the wealth of knowledge that exists about the welfare of fish, so the zebrafish chapter was especially enlightening. It gives a very comprehensive review of the potential needs of zebrafish that no doubt extends to all other captive fish species. It is well-balanced as it additionally highlights the great deal of information that is currently lacking that could potentially help us improve fish welfare. It is therefore a very valuable resource for any researcher wishing to begin research using fish.

For obvious reasons there is a huge volume of research literature involving laboratory mice. However, much of this information is model-specific. Rarely does one find such a condensed and handy source of material on the general care and welfare of mice as is found in Chapter 8. It gives an informed account of the methods currently available to enrich the lives of mice and the methods available to determine whether those enrichments have been effective. Akin to Chapter 7, it also recognises gaps in current knowledge regarding the assessment of the emotional lives of mice. As such, it provides a platform for future evidence-based research into how laboratory housing and experimentation likely 'affect' mice and compromise their welfare. Further, it provides a comprehensive summary of the emerging evidence that non-aversive handling of mice can improve the validity of research findings and helps to dispel the myth that these newer handling methods are incompatible with the large-scale use of mice in terms of husbandry commitments. The issue of whether standardisation, rather than heterogenisation, is the culprit in what many have called the current 'reproducibility crisis' in biomedical research is also addressed.

In Chapter 9, Joanna Makowska presents a detailed description of the natural history of the second most utilised laboratory mammal, the rat, and how this knowledge can help us

to improve their captive experience. It continues the general theme that animals that are treated optimally provide better, more translationally relevant findings. It again provides a condensed and easy-to-read source of material to consider when animal carers attempt to provide an optimal laboratory experience for rats.

The final chapters concern lesser-used animals in terms of total numbers, rabbits, dogs, primates, and pigs. As biomedical researchers, veterinarians and carers, many of us probably feel we already appreciate how complex the behaviour of these species can be. However, I found I was unaware of many of the potential husbandry issues affecting laboratory-housed rabbits; so this chapter was particularly informative; for example, how dominance hierarchy in rabbits can impact upon their welfare. I learned that so long as subordinates have the opportunity to escape it is perfectly acceptable to permit rabbits to display dominance behaviours, and that human intervention in this scenario is more, rather than less, likely to induce aggression and wounding.

Although relatively few biomedical scientists and animal carers will encounter dogs as part of their working lives, no doubt a very great many will have dogs as pets. Chapter 11 focuses on the importance of treating dogs as individuals and how interactions with dogs can provide a unique opportunity to create an especially strong human-animal bond. It explains how this bond can be utilised to enrich both the dog's life as well as their handlers, and so ensure the largest possible numbers can eventually be successfully re-homed. It provides an invaluable source of information about the optimal way to treat dogs whether that be in the laboratory or the home.

Even fewer of us will have experience of research using non-human primates, but in Chapter 12 we find a comprehensive insight into the natural history of various NHPs and an informative description of different primate methods of communication, both with humans and conspecifics. The section describing how to find the perfect partner for a macaque was particularly fascinating. Overall, it continues the theme of welfare refinement by limiting stress exposure, providing the animals with means of controlling their own exposure to it. For example, by providing access to friends as well as the ability to avoid any dominant or unfriendly individuals. It was also excellent to read not only about the many forms of enrichment that act as effective refinements, but also those that do not. The description of how to implement training was precisely what I had hoped to find in Chapter 6; providing a series of real-world step-by-step instructions on how training should proceed.

In Chapter 13 we hear about how social a species pigs are, and how failure to appreciate this can have a very large influence on their behaviour and physiology, thereby impacting on their welfare and the quality of research findings. A detailed description of the ideal housing arrangements for laboratory pigs is provided. The importance of having rigorous habituation and training protocols is reiterated, and a nice clear description is provided about how a training protocol can be developed.

In summary, *Animal-centric Care and Management* is a book that generally strikes an excellent balance between the provision of detailed recommendations concerning methods of welfare enhancement without relying too heavily on the readers' prior knowledge of the basic concepts.

Reference

Russell WMS and Burch RL 1959 *The Principles of Humane Experimental Technique*. Methuen: London, UK

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Asking Animals: An Introduction to Animal Behaviour Testing

BL Nielsen (2020) Published by CABI Publishing, Nosworthy Way, Wallingford, Oxfordshire OX10 8DE, UK. 192 pages Hardback/Paperback (ISBN: 978-1789240610). Price £82.74 (hardback), £32.25 (paperback).

The stated aim in the Preface of this neat little textbook is "...to inspire the animal experimenter to think about what a given behavioural test can be used for and how the results can be interpreted." As such, its focus is on the practicalities of conducting behavioural tests and upon general considerations in experimental design, providing much needed closing of a gap in texts on practice in behavioural testing. The format of Nielsen's book emulates the classic ethologist's 'Bible' on recording behaviour (Martin & Bateson 2007), being purposefully short, digestible and focused in recognition that her audience have limited time, even where intentions are best.

The brief first chapter clearly states the scope of the book, so the reader is very clear what they are getting. Nielsen explains that the text is not intended to be a comprehensive reference for all possible behavioural tests, rather a 'taster menu' with specifically selected examples. She makes no apologies for this, nor the general exclusion of insects to focus on sentient vertebrate species managed by humans in relation to legislated welfare protection. Understandably, given the text's aim, neither does the book cover statistical analysis. Chapter 2 provides background by introducing a sketch of non-test observations of behaviour, covering normal changes in behaviour with time and situation, and some examples associated with locomotor and feeding behaviour. These are all factors which may alter responses during tests if not controlled for and revisited in later chapters as appropriate. In this respect, brief additional mention of spacing, and expansion on social behaviour could also have been valuable here, although these are addressed in later chapters. Chapter 3 focuses broadly on principles affecting test selection, highlighting the advantages and disadvantages of testing compared to non-test observation, the importance of mapping experimental design and test validity to desired goals and constraints that might limit test-use in terms of practicalities, costs and presumably even habit. Chapters 4 to 10 subsequently address a selection of themes of investigation, including