

succeeds brilliantly in doing so. However, when the discussion turns to chicken behaviour and to welfare, it becomes clear that the author is in her own comfort zone, and she starts taking some knowledge for granted in her readers. Throughout the book, I came across unexplained terminology that to an outsider might not be clear. Sometimes these terms would be explained later in the book (eg the term ‘pullets’ is finally explained at the start of Chapter 9), but sometimes the author just assumed that the readers would know what she was talking about. For example, I still don’t know what ‘beak clapping’ is (although I can take a guess). And if I had not been trained in ethology myself, I would not have known what a ‘displacement behaviour’ is. The book is also quite UK-centric. It of course makes sense that the author is most familiar with the UK poultry situation, and that she will use examples from that knowledge to illustrate her points. But then at times, UK-based acronyms (eg RSPCA) are used that may not be familiar to readers from other countries. Despite little details like that, however, the book remains easy-to-read and provides plenty of very useful and interesting information about chicken behaviour and welfare.

So who would I recommend this book to? It is clearly written with the promotion of chicken welfare in mind. I will therefore be sure to lend it to all my poultry welfare PhD students, as it is a great introduction not only to chickens as a species, but also to current practices in animal welfare science, and in chicken husbandry, something few people outside the industry itself know much about. I believe it will also be very useful for policy-makers, policy influencers, and the poultry industry itself, as it sets out different ways forward toward improving chicken welfare further in the future, while also taking into account chicken productivity. All in all, I really enjoyed reading this book and I’ve come out knowing much more about poultry than I did before. It should be on the shelf of every poultry welfare researcher and practitioner, worldwide.

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### **Nutrition and the Welfare of Farm Animals**

Edited by CJC Phillips (2016). Published by Springer, Tiergartenstrasse 17, 69121 Heidelberg, Germany. 247 pages Hardback (ISBN 978-3-319-27354-9). Price €66.99.

In 2011, the FAO held a meeting on the role of animal nutrition in the welfare of farm animals (FAO 2012). The following statement appeared in the subsequent report: “There is a need to educate nutritionists to understand animal welfare, including both physiological and psychological aspects, and to educate animal welfare scientists to better understand nutritional physiology, nutrient partitioning and the metabolic states underlying hunger.” This book tries to meet those needs, and it succeeds in giving animal welfare scientists a better appreciation of animal nutrition in the context of farming systems.

In particular, the strengths of the book are the overviews on: dairy cow nutrition, including feeding behaviour by de Vries; sub-acute ruminal acidosis; the impacts of chronic underfeeding in extensive farming systems by Hogan and Phillips; the effects of the environment on rangeland ruminants by Villalba *et al*; the description of pig welfare indicators by Widowski; and the review by von Keyserlingk *et al* on water intake and water quality. Tolcamp and D’Eath provide a novel commentary on hunger in broiler breeders and dry sows. They question whether feed restriction (to control body fatness, reduced fertility and the risk of prolapse) is any worse than providing larger amounts of a feed which has low digestibility. They do not come to any firm conclusions on this issue and perhaps the way ahead is to use mathematical modelling of the likelihood of satiety based on the effects of energy and protein intake on feeding motivation, while applying corrections for variations in gut fill and body size. Bertoni *et al* also made a notable contribution in describing the beneficial effects of dietary protein on immune responses during chronic endoparasitic infestation. This was followed by an account of the nutritional factors leading to metabolic and mineral disorders in dairy cattle. They offer some observations on the effects of plant secondary compounds such as saponins, caffeine, digoxin, polyphenols and condensed tannins on immune responses. Condensed tannins are thought to exert an anthelmintic effect by complexing with dietary protein, and this protects the protein from microbial degradation in the rumen. Instead, the protein passes relatively unchanged to the small intestine and subsequently contributes to immune responses. In a later chapter, Villalba *et al* identify four mechanisms that can explain the anthelmintic effect of condensed tannins, and the reader may be left confused about which is the main mode of action.

This is intended as an advanced book for researchers, teachers, government officials, international organisation officers, donors, extension workers, veterinarians and farmers, and so perhaps the early parts of the book could have given less space to stating the obvious. Putting this to one side, the main weakness of the book is the way that it leads into animal welfare features that could be linked to nutrition. The reader is relied upon to assume that the effects that are described have a bearing on animal welfare, and the welfare conclusions are by implication rather than explicit reasoning. In many cases the animal welfare implications are a raised risk of suffering from some of the consequences of incorrect feeding, and this was not explained where it was relevant. Perhaps there should also have been a section devoted to the forms of suffering that can occur when there is incorrect feeding. In broad terms, there may be some conditions, including some disease states (such as mild hypocalcaemia in dairy cows), where suffering is only marginal or is a risk if the disease becomes advanced or is accompanied by particular circumstances. This leads to the question, what do we include in the term ‘welfare’? Phillips deals with this in the opening chapter and his focus on the derivation and use of the word is helpful. Bienestar, bien-être, bemestar and wohlfahrt are used in various languages

as alternatives, and in English they mean wellness rather than welfare. The distinction is not semantic. Any disorder or slight deviation from ‘normality’ can be considered a clash with wellness or well-being. Whereas, ‘poor welfare’ is aligned with suffering or anhedonia. It is not surprising that some veterinarians consider that poor wellness embraces all disease states and conditions irrespective of their severity or the likelihood of suffering, whereas in other nations when the term welfare is used the focus is on conditions recognised as directly causing or reflecting suffering.

In the concluding chapter, Phillips examines the interactions between nutrition and welfare in a more explicit way in the context of parasitism, and this is exactly what is needed. He also presents a novel argument: “Freedom from malnutrition would more effectively describe the possible welfare challenges associated with nutrition, than would Freedom from hunger and thirst, or a requirement to provide food and water.” The conclusion here is that malnutrition is more relevant than undernutrition and thirst in terms of animal suffering.

This is a large subject but the book has only 247 pages. A comparable book in the same subject area has 786 pages (Worden, Sellers and Tribe 1963). There is a strong case for producing larger books, as a greater selection of chapters would suit the market trend for downloading individual sections and chapters. Some of the topics that could have been added or covered in more depth are: the point at which normal appetite for feed changes into a welfare compromise, such as unrewarded hunger; nutritional wisdom in animals when given feed choice; feed monotony and feed neophobia; the ways in which animals can suffer when experiencing undue competition for feed; the components in palatability that influence feed selection and voluntary feed intake; pica as a sign of welfare compromise; the consequences of overstocking; farming systems that rely on compensatory growth following predictable periods of nutritional deprivation; transhumance and welfare when farming marginal land; weaning methods in cattle; regulating feed intake as a way of controlling disorders (such as leg disorders in broilers and metabolic disorders in ruminants); the influence of lighting patterns on behaviour and feeding frequency in poultry; the role of feed processing and milling in contributing to gastric disorders; emaciation in end-of-lactation, grass-only fed dairy cows; and the welfare of feedlot cattle.

In summary, the book makes a good contribution but there could have been broader coverage of topics and the implications for animal welfare could have been developed further.

## References

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## ***The End of Animal Life: A Start for Ethical Debate. Ethical and Social Considerations on Killing Animals***

Edited by FLB Meijboom and EN Stassen (2016). Published by Wageningen Academic Publishers, PO Box 220, NL-6700, AE Wageningen, The Netherlands. 272 pages Hardback (ISBN 978-90-8686-260-3). Price €70.00.

This collection of essays has its origin in a series of research projects funded by the Netherlands Organisation for Scientific Research, on the ethics of killing animals. It is a more coherent collection than many such endeavours, and one that may be well received by its target audience — that is, by readers of this journal and other supporters of UFAW. On the other hand, its origin in a relatively closed circle means that contentious questions are too often silenced by ‘shared intuitions’ about good practice or the real nature of ‘animals’. The works of Peter Singer and Tom Regan are given more weight, as advocates of ‘animal liberation’, than are alternative, non-analytic and non-Western, models for that revolution. English is not the mother tongue of most of the contributors, and the style of many papers is unidiomatic, or more seriously flawed. All the essays, however, are worth reading, and their collective moral is perhaps the best that can be expected, though it will satisfy neither those committed to the ideals of *ahimsa* (ie the Hindu, Buddhist, and Jainist tradition of respect for all living things and avoidance of violence towards others) nor those with a more triumphalist conception of ‘humanity’.

The editors have divided the papers into four sections: on ethical theory; on ‘societal debates’ concerning the killing of animals; on farm-animals, subjects of experiment, and ‘companion’ animals; and finally on ‘wild’ animals (chiefly fishes). The last three sections address ‘real-life situations’: badger culling, the killing of surplus male chicks or calves, killing experimental subjects once the experiment is over, or the practice of ‘catch and release’ in recreational fishing. What should be done to ‘police’ the interactions of non-domesticated, ‘free’ animals is not addressed. The ‘rights’ that some essayists are happy to grant to animals are rights *against us*: the obverse of our presumed duties toward them — which arguably do not include protecting antelopes from lions, or the like. No-one discusses recreational hunting, bull-fighting or other lethal games — perhaps persuaded that no readers would consider supporting such practices. *Hurting* animals (except for exceptionally good reasons) is a bad thing: whether *killing* them is similarly wrong is moot — and the principal focus of both theoretical and more immediately ‘practical’ essays. These assumptions, and the corresponding lack of historical depth in the essayists’ analyses, will leave some readers unsatisfied, but they may serve a useful purpose.

The section on ethical theory leaves much unexamined. On the one hand, it is not clear what sort of truth or fiction a moral or ethical rule might be. Are ethicists seeking to identify a *truth* about what to do, independent of human