

carer or consumer” (p 176). The first explains the idea of ‘sentient materialities,’ making animal sentience primary in the business of animal-based protein production, rather than secondary to productivity or economic value. The second discusses challenges and innovations in farm animal welfare science, particularly in the light of other priorities often seen as more important, notably sustainability. The third partly answers that by outlining the One World/One Health/One Welfare agenda, which promotes a policy framework built on commonality of interests between people, animals and the environment.

It remains true, though, that farm animal welfare has its own ethical mandate. The authors close (p 183) by emphasising that: “There is no meat or animal product for which there is no life behind... [M]aking connections with those lives and making something of those lives knowable seem, at the very least, an essential endeavour.”

### References

**Broom DM and Johnson KG** 1993 *Stress and Animal Welfare*. Chapman and Hall: London, UK. <https://doi.org/10.1007/978-94-024-0980-2>

**Farm Animal Welfare Council** 2007 *Report on stockmanship and farm animal welfare*. Farm Animal Welfare Council: London, UK

**Lund V, Coleman G, Gunnarsson S, Appleby MC and Karkinen K** 2006 Animal welfare science: working at the interface between the natural and social sciences. *Applied Animal Behaviour Science* 97: 37-49. <https://doi.org/10.1016/j.applanim.2005.11.017>

Michael C Appleby,  
University of Edinburgh, UK

### **Introduction to Laboratory Animal Science Technology and Welfare, Third Edition**

SW Barnett (2017). Published by Institute of Animal Technology, 5 South Parade, Summertown, Oxford OX2 7JL, UK. 232 pages Hardback (ISBN: 978-1-9999168-0-0). Price £20.00

This third edition of *Introduction to Laboratory Animal Science Technology and Welfare* is a compact introduction to laboratory animal science and welfare that, as suggested, should become required reading for those studying for first level IAT qualification.

This revised edition is very welcome having expanded the text, the species, illustrations, numerous informative tables and, additionally, the edition has been made available as an ebook.

There are sixteen chapters in all covering a whole gamut of topics ranging from ‘Animal health’ and ‘Modern caging and housing systems’ to chapters on hygiene, feeding and watering, breeding, substance administration and euthanasia.

The book’s final chapter is a new addition to previous editions, introducing ‘Ethics and animal welfare.’ I was particularly pleased to see this chapter included and using the theory of utilitarianism as an illustration is pitched at the perfect level for the proposed readership.

The glossary at the end of the book, again, is in keeping with the principle that the book has been written, primarily, for those people starting work in laboratory animal facilities and provides a wonderful addendum of technical terms relating to the subject of laboratory animal science welfare, which can be built upon as more experience is gained.

The structure and presentation of this edition is far superior to previous versions with notable improvements in tables and the introducing of summaries at the end of each chapter. Fish have been incorporated into a number of chapters and, for the most part, improved colour illustrations are an upgrade on the previous black and white.

If I have one small concern with the book it was with the use of some photographs taken for the second edition that have been used here, showing pieces of equipment of the day. Technological and engineering advances have seen vast improvements to the benefit of animal welfare but aren’t represented in the book. Similarly, photographs depicting what appears to be singly housed animals with little or no environmental enrichment could be updated to show cagemates and various examples of enrichment, unless of course it is explained that single-housing of these animals is essential for research purposes.

However, this minor gripe aside, The Institute of Animal Technology has produced a revised textbook which I am sure will go a long way to better inform those beginning a career in laboratory animal science of good practice which, in turn, will continue improving the welfare of animals in research.

Charles Gentry,  
Mildenhall, Suffolk, UK

### **Rethinking the Three R’s in Animal Research: Replacement, Reduction, Refinement**

J Lauwereyns (2018). Published by Springer, Tiergartenstrasse 15-17, Heidelberg, Germany. 144 pages Hardback (ISBN: 978-3319892993). Price £44.99.

Jan Lauwereyns — psychologist, neurophysiologist, ethicist, and poet — describes his recently published book, *Rethinking the Three R’s in Animal Research*, as a scholarly work based on his experiences and feelings, and insights gained working in Belgium, New Zealand, and Japan where he is currently Professor of Psychology at Kyushu University. His stated intention in writing his book is, through “an integration of ethics and science without speciesism”, to further improve the ethical conduct of animal research by providing a critical review and consequential updating of the Three Rs and how they can be better applied. The book contains what he considers to be timely, novel, realistic proposals for policy-makers and others to achieve this objective.

Having trained as a cognitive psychologist, his interest in visual attention led him to further his research interests by undertaking animal-based, invasive neurophysiology experiments on Japanese macaques. After six years of working with these animals, he underwent a Damascene conversion,