

emotion because their thesis opens up the possibility that many non-human animals may never consciously experience emotional states, despite behaving in emotionally appropriate ways. Their experimental work, however, was on humans. By showing very brief, subliminal presentations of smiling or angry faces, they found that they could affect 'liking' (as measured, for example, by the amount of a novel fruit drink that was consumed), without changing reported, consciously felt emotional states. This is a striking finding, and one that requires replication and further investigation before any firm conclusions can be drawn. But Berridge and Winkielman's paper was certainly intriguing, and one that stood out from all the others in this issue in its adventurousness and theoretical depth. In conclusion, there are some gems in 'Pleasure', but this is also quite an assortment of papers, many of which have little or no relevance to a broader readership, particularly those interested in animal emotion.

Elizabeth Paul

Department of Clinical Veterinary Science

University of Bristol, UK

Precision Livestock Farming

Edited by S Cox (2003). Published by Wageningen Academic Publishers, PO Box 220, NL-6700 AE, Wageningen, The Netherlands; <http://www.WageningenAcademic.com>. 184 pp. Paperback (ISBN 9076998221). Price €40.00; US\$53.00.

This book is the proceedings of a small International Conference on Precision Livestock Farming and contains 26 short papers. Precision livestock farming — otherwise known as integrated management systems for livestock — is a new technology that has yet to deliver on its promise, which is both simple and appealing. Its proponents argue that livestock production is a process (just like any other 'industrial' process and really a set of main processes and sub-processes) that can be treated using the principles of process engineering. Thus, inputs, such as feed and the environment, are 'processed' by the farm animal into outputs. These include valuable outputs such as milk, eggs, meat and fibre, and unwanted, valueless outputs, eg excreta and gaseous pollutants. The relationships between inputs and outputs can be explained in terms of mechanistic and empirical models: the derivation of the models via experiments also produces useful scientific understanding. If the outputs are monitored in real-time and targets are set, then the inputs can be adjusted — also in real time — to ensure that the process is on track. Controlled growth of broiler chickens along a prescribed trajectory via daily automatic monitoring of bird weight and manipulation of the quantity and protein content of the ration is the best example of precision livestock farming and is used commercially.

Now bioengineers and other technologically minded folk will clearly relish this topic but is this book of any interest to mainstream readers of *Animal Welfare*? Put another way, can precision livestock farming offer any realistic prospect of improving the welfare of livestock, or laboratory animals for

that matter since the same principles apply? No to the first question and yes to the second; but this book does not provide convincing evidence that will sway the technophobe. Only two of the papers actually address precision livestock farming in a principled way, and these are by the most active European researchers (Daniel Berckmans from Leuven and Andy Frost from Silsoe). Most of the others deal with sensing systems, which are an essential component of the technology, but in limited detail. The major criticism of this book is that the quality of the research is patchy. Furthermore, it is primarily concerned with issues of livestock production not welfare. Even those papers that do include welfare in their research aim only provide cursory justification for the physiological and behavioural responses that were monitored. If only the bioengineers would join forces with competent animal scientists, then useful research could be done. This would then avoid the over-simplistic criticism that here is a tool looking for some work whereas the converse is true. Welfare scientists, just like other animal scientists, need monitoring systems, models of causal relationships and means to effect improvements, and the bioengineers could undoubtedly help with their new technology.

Dear reader, if you believe that precision livestock farming can help improve animal welfare, then you'll be disappointed by this book. The technology is in its embryonic stage. Much needs to be done if its promise is to be realised — and the bioengineers need your involvement.

Christopher M Wathes

Silsoe Research Institute

Bedford, UK

From Guinea Pig to Computer Mouse: Alternative Methods for a Progressive, Humane Education, 2nd Edition

N Jukes and M Chiuia (2003). Published by the International Network for Humane Education (InterNICHE), 19 Brookhouse Avenue, Leicester LE2 0JE, UK; <http://www.interniche.org>. 520 pp. Paperback (ISBN 1 904422 00 4). Price £8.00.

This revised and greatly expanded edition, in 520 pages of well-organised and interesting text on teaching alternatives for education, provides a single printed resource from which teachers can now identify and acquire alternatives for teaching the biological sciences without the harmful use of animals. The authors' central goal is to replace the harmful use of animals in education. The book presents arguments and resources for ending the consumptive use of animals in teaching. Written by Nick Jukes and Mihnea Chiuia, the book is produced by the International Network for Humane Education (InterNICHE), an organisation founded in the United Kingdom in the late 1980s, originally as EuroNICHE. The organisation's policy on the use of animals and alternatives in education sets the framework for the book and is presented as an appendix in the book. Lists pertaining to a series of recommended policies specify the conditions for ethical sources of animal cadavers and