water becoming an increasingly scarce resource, cultivating fish and edible aquatic plants using this abundant source of nutrients will produce food and create employment while providing a more ecologically and financially sustainable method for treating urban waste water. This can be considered by some as utopian in its outlook, but the authors argue that in many cases the technological and engineering solutions are already available to us, as can be seen from the East Kolkata wetlands, India. From a personal point of view, the publication would have benefited from more inputs from Asian, African and South American authors drawing on their views and aspirations on the past and future of urban aquaculture in their own regional contexts.

One of the main constraints within the urban planning process is re-iterated by many of the authors as being the lack of multi-sectoral dialogue and information exchange between the urban planners involved as well as the necessity for the inclusion of a wider, more multi-disciplinary stakeholder base to be actively consulted within the planning process. Increasingly, as is illustrated in China, the deterioration in quality of urban domestic waste water, attributable to mixing with industrial effluents, is also cited as leading to decreases in fish and aquatic plant production levels while also fuelling health concerns of the increasingly health conscious urban consumer. If urban aquaculture is to survive and develop then city planners have to find practical, cost-effective solutions within existing urban infrastructures to separate their industrial and domestic wastes, while actively reassuring the wider audience that the fish and plants produced are safe for human consumption.

In terms of case studies, the book illustrates the relatively divergent approaches between the research, development and promotion of urban aquaculture in Europe and North America compared with the developing cities of Asia, Africa and South America. In Europe and North America, urban aquaculture is presently being developed and promoted on a more localised, commercial basis often using discrete, smaller scale recirculation systems within existing buildings to produce high value species. In contrast, in developing countries there has been a traditional culture of using waste water in larger, more extensive systems to grow fish and aquatic plants, primarily for the consumption of lower income citizens, which are now coming under threat from urban expansion, pressure on land and pollution. It is important that lessons can be learnt and incorporated from both approaches so that safe, attractive and cost-effective models for the promotion of urban aquaculture are made available, not only to senior level planners but also through education and the media to the wider urban populations themselves so that informed and constructive debate and dialogue can commence.

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Pig Environment Problems

P Smith and H Crabtree (2005). Published by Nottingham University Press, Manor Farm, Main Street, Thrumpton, Nottingham NG11 0AX, UK. 174 pp Hardback (ISBN 1 897676 18 2). Price £40.00.

In 2001 Paul Smith had published a rather fine pig husbandry text entitled *Practical Pig Keeping* (see review in *Animal Welfare* [2002] *11*: 262-263). Paul Smith has now joined-up in authorship with Hugh Crabtree and together they have produced a volume which is, in some ways, a development from that original publication. It concentrates on the problems, and the possible solutions to the problems, associated with the housed pig's environment.

The animal welfare background to this book is relatively simple: comfortable, relaxed, well-fed, disease-free agricultural animals are generally in a good state of health and well-being, ie of high welfare status. These animals are also usually productive (gaining weight etc) and therefore profitable to the farmer. One of the main aims of the good pig keeper is the provision of comfortable, ie problem-free, surroundings for his charges. This concept appears to be the driving force behind this book; in the last line of the acknowledgements section the authors express their thanks to their families "...for tolerating our inexplicable obsession with the comfort of pigs".

The book opens with a chapter that outlines, in general terms, the concept of environmental problems and the factors that may influence their development, nature and possible solution and/or prevention. Among the subjects covered are ethics and consumer demands, farm assurance schemes, bio-security, rational use of antibiotics, disease control and risk assessment. This is followed by a chapter on the biological needs of pigs, their behaviour and the social environment. The contents of the next two chapters are clearly defined by their titles: *The impact of noxious gases* and *Dust — a problem for pigs and people*. There is then a chapter on ventilation rates and the maintenance of a comfortable thermal environment. The last chapter is a substantial and useful piece on using air movements to improve the pigs' surroundings. However, this ending, of what might be called the written part of the book, is a bit abrupt. It's a pity that the authors did not finish with a piece on obtaining further information, on where the expertise lies, on the cost-economics of making improvements, and on finding and dealing with experts and consultants. Admittedly, there is a short note inserted at the end which states that "A future publication is planned which will focus on case-study work and the scope for cost-effectively improving pig environment". There is, finally, a list of some 65 references — this list, however, would have benefited from firm editing/proofreading — and a simple but effective 6 page index.

Overall, the book is well-written, reasonably referenced and set at a level such that the practising pig farmer or manager should be able to start to understand some of the factors which may underlying his current particular

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problem. This understanding could help him towards solving the problem himself, and it will certainly assist him if he has to make decisions regarding the advice he is getting from his experts and consultants. In the opinion of the reviewer, of course, there are things that should have been included and places where further details should have been given. One can, however, only too readily provide so much material that the underlying principles are lost from sight. One of the strengths of the present authors is that they usually know where to draw the line regarding excess detail. Reading of this volume usually leads to the acquisition of understanding more than just the accumulation of knowledge. Twice during the reading of this book I was struck with the sudden thought — "I once tried something like that and I now think I begin to understand why I failed to get it to work!"

This book is important, useful, and somewhat expensive but much needed and should find its place in the personal libraries of pig farmers, managers and field advisors, and in the institute libraries of all agricultural and veterinary teaching and research establishments.

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Pain Management in Ruminants

Wildlife Information Network (2005). Issued by Wildpro© Multimedia, Wildlife Information Network (WIN), East Midland Zoological Society, Twycross, Warwickshire CV9 3PX, UK. Pain Management in Ruminants is available to members of WIN on CD–Rom and via the Web-based encyclopaedia. For further information contact info@wildlifeinformation.org

The current scope of the 'encyclopaedia', of which this is a new volume, is dependent upon the interests of the editors/sponsors, the availability of data and of up-to-date reviews. It has, at this stage in its development, a heavy emphasis on emerging diseases, birds, hedgehogs and, with this new volume, ruminants. It is a comprehensive encyclopaedia and database; however, many 'searchers' may not find what they want easily or quickly.

For this particular volume the editors use a clear, evidence-based theme with careful and accurate presentation of the supporting material. They show an awareness of the need for understanding the fundamentals of animal biology, which amounts to more than is found in undergraduate veterinary degree courses. It includes particular emphasis on behaviour, management, neurobiology, pharmacology, physiology and surgery. The few illustrations are helpful.

It provides a useful starting point and reference source for Continuing Professional Development and postgraduate studies of animal pain and pain management in ruminants. The table of contents advises users to follow its 'flow-chart' structure, but this structure is not easily appreciated.

This volume includes extensive coverage of the following aspects of ruminant pain.

Understanding animal pain

Neurophysiology of pain

Receptors; ascending pathways; control and sensitisation; other physiological responses to pain; chronic pain; visceral pain.

Reasons for pain relief

Disadvantages of pain to the animal; possible advantages and caveats; practical and economic advantages of pain relief; advantages of pain relief to the animal.

Reasons for failure of pain relief

Attitudes towards pain in animals; tradition; failure to recognise pain and its importance; minor pain; stress and risks of providing pain relief; requirements for diagnosis of the cause of pain; lack of information; concern over removal of protective effects of pain; toxicity and side-effects of analgesics; safety and legislative control; economic and practical considerations.

Pain assessment

Responses to pain; general assessment and background information; factors affecting behaviour and signs of pain; behavioural assessment of the individual's pain; lameness classification systems; assessment of the anatomical location of the pain in animals; physiological evidence of pain; response to analgesics; assessment of analgesia; difficulties in the development of methods for assessment of animal pain.

Painful diseases/conditions

Foot and joint lesions in sheep, goats and cattle; mastitis; gastrointestinal disease; dystocia and peri-parturient diseases; respiratory diseases; traumatic injuries/lesions; urolithiasis.

Descriptions of each of these painful diseases/conditions include information under the following headings: Introduction; Signs/evidence of pain; Negative effects of pain; Why treat the pain? Methods of pain alleviation; Why adequate pain relief is not provided.

Painful procedures

Antler velvet removal; dehorning/disbudding of cattle, sheep and goats; castration and tail docking of calves and lambs; branding of cattle; caesarean section; teat surgery; foot surgery.

The information available is similar to that included for *Painful diseases/conditions*.

Prevention of pain from painful procedures

Choice of age; avoidance of procedure; choice of method; correct application of chosen procedure; use of local/regional anaesthesia; general anaesthesia; non-steroidal anti-inflammatory drugs (NSAIDS); electro-immobilisation; stress induced analgesia; benefits of pre-emptive analgesia; combined approaches; prevention of pain associated with individual painful procedures.

Alleviation of pain

Prompt diagnosis and treatment of the cause of pain; physical relief and supportive therapy; use of analgesics and

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