

problems). Whilst agreeing with many of the general ideas and the potential of humane ecotourism, I was not convinced that it could be exclusive – some hunting and harvesting will inevitably continue and the ethics of killing will always be an issue of grave importance. There is an abundance of published material on the sustainable use of wildlife and anyone wanting a more balanced view of the subject needs to integrate the ideas contained in this literature, with the strong arguments put forward in John Hoyt's book.

Victoria Taylor

UFAW

Potters Bar

References

Geist V 1994 Wildlife conservation as wealth. *Nature* 368: 491-492

Goodwin H 1995 Tourism and the environment. *Biologist* 42: 129-133

Ludwig D, Hilborn R and Walters C 1993 Uncertainty, resource exploitation, and conservation: lessons from history. *Science* 260: 17 & 36

Robinson J G 1993 The limits to caring: sustainable living and the loss of biodiversity. *Conservation Biology* 7: 20-28

Health and Welfare of Captive Reptiles

Edited by Clifford Warwick, Fredric L Frye and James B Murphy (1995). Chapman & Hall: London. 299pp. Hardback. Obtainable from the publishers, 18 Anley Road, London W14 0BY, UK (ISBN 1 873580 16 9). Price £45.

This recently published book of some 300 pages is a most important step forward in the cataloguing of existing knowledge on the subject of the title. Indeed, some indication of the wealth of information it contains can be gauged by the fact that the index – beautifully presented and collated – extends to 16 pages.

Chapman & Hall are to be congratulated for producing a well set out book on excellent paper and with very readable print. It costs £45 which is reasonable, however, considering the enormity of subject material – much of which, it is believed, has been put together for the first time. The book has many excellent publishing and printing devices, and one of the most attractive is the way heavy case is used to highlight important words or phrases.

The triple editorship is shared between Worcester (UK), Davis (California) and Dallas Zoo (Texas). The evenness of the text, together with its admirable planning, gives great credit to the editors, who must have worked very hard indeed collating and organizing the work of the 20 authors – three of whom are themselves!

This volume is essential reading for all workers in the field of captive reptiles, whether they be in research, or a zoological environment. To review such a packed volume is difficult indeed, in order to give the correct credence to its excellence. Throughout the publication, each of the chapters carries with it a superb reference list sometimes running to nearly 200 names and papers.

There are 11 major chapters each of which is organized around several sub-chapters.

Chapter 1 Physiology and functional anatomy

Lillywhite and Gatten discuss body temperature, energetics and ectothermy, light and photoreception, water exchange and humidity, digestive physiology and nutrition, respiration

and circulation, pain and stress, together with their concluding remarks, acknowledgements and references.

Chapter 2 Biology of stress: interactions with reproduction, immunology and intermediary metabolism

The three authors of this chapter Guillette Jr, Cree and Rooney cover reproduction, immunity, corticosteroids, intermediary metabolism and growth and implications for captive husbandry of reptiles and future research. This latter part of the chapter has enormous importance for those looking for useful and interesting areas to investigate.

Chapter 3 Nutritional considerations

The author – Frye – discusses water supply, food, apprehension of prey and gathering of fodder, initial processing, assimilation, elimination with miscellaneous factors and their effects on nutrition. Most helpfully he gives a long list of references and further reading.

Chapter 4 Veterinary perspectives and techniques in husbandry and research

Although the input of this chapter is important, it has to be said that it does not form a major part of the book's title. Cooper and Williams have given an excellent description of the basic requirements of sedation, handling, anaesthesia and surgical procedures. Again, their references and recommended reading are invaluable.

Chapter 5 Naturalistic versus clinical environments in husbandry and research

Warwick and Steedman underline the appreciated, but little understood differences under this title between wild-living reptiles and those in captivity. They subdivide their chapter into welfare and husbandry, research, terminology for wild and captive reptile environments and naturalistic versus clinical environments. Their conclusions and recommendations are backed up by a substantial reference list.

Chapter 6 Normal behaviour

It is refreshing to find such a detailed chapter covering this important subject. The author, Gillingham, discusses maintenance behaviours, distance-reducing behaviour and agonistic behaviour – again with important conclusions and references.

Chapter 7 The effects of ontogenetic processes and rearing conditions

Burghardt and Layne give us a revealing discussion on the prenatal period and parental care, handling and novel environments, cage size and structure, social arrangements, feeding, defensive behaviour and long-term influence of captive regimes. Their conclusions and their references are invaluable.

Chapter 8 Behavioural consequences of husbandry manipulations: indicators or arousal, quiescence and environmental awareness

Five authors – Chiszar, Tomlinson, Smith, Murphy and Radcliffe have tackled this daunting subject extremely well, discussing cage cleaning and exploratory behaviour, use of familiar artificial chemical cues, chemical recognition of self, sensitivity of spatial considerations, followed by a general discussion with more than adequate references.

Chapter 9 Psychological and behavioural principles and problems

Warwick deals here with wild living and captive reptiles recognizing and interpreting signs of psychological and ethological problems, with general considerations and conclusions.

These difficult and hitherto not well-documented matters are extremely well handled, and Warwick certainly brought a list of important material into the public domain.

Chapter 10 Ethologically informed design in husbandry and research

Greenberg discusses ethologically informed design, quoting case studies: with ethologically integrated designs, and recommendations and conclusions. Research workers will learn much from this chapter.

Chapter 11 Miscellaneous factors affecting health and welfare

Arena and Warwick take us through stress, pain and sensitivity, thermal factors, thermoregulation and light, growth, electromagnetism in the artificial environment, re-introductions to nature, euthanasia and killing, with conclusions and references.

Your reviewer felt it essential that the contents list should be described in full, because with such a densely packed volume it is impossible to skim through it and give a general overview.

The editors give substantial credit to all those who freely donated (often a great deal of) their time and energy to review manuscripts for this project. In the acknowledgements at the front of the book there follow 15 names of senior people throughout the world who have assisted the editors. This reviewer would like to pay tribute to them as well, since it is a result of their work that this most valuable volume has been produced.

Much of the information is conveyed by the authors from their own areas of expertise, but they have been wise enough to give numerous references to other authorities and suggestions for extra reading.

One criticism: why, oh why, cannot colour photography be used more liberally – it would add so much, particularly perhaps for the photomicrographs on pages 34/35 but also throughout the volume.

To quote from the editor's introduction to the volume: 'Reptiles have proved to be a frequent source of surprises, but largely only because they were previously thought to occupy a niche inferior to many mammals and birds. The perception of reptiles as being primitive, insensitive, stoic and perceptually weak must be rethought. For the future, it may be only through holistic comparative assessments that do not diverge from an organism's context in the natural world that we will appreciate more fully 'reptile equality', and perhaps even the similarities between them and other animals and, indeed, ourselves.'

This volume is dedicated to the development of that theme and it succeeds admirably. Heartfelt congratulations to the editors, and also to the contributors and other people who have been involved, in the production of such a gem of a work. It will stand the test of time for many years to come. At last, the welfare of reptiles is being scientifically studied, and this volume heavily underlines the critical need to understand and activate all the implications that are so dramatically highlighted.

Oliver Graham-Jones
Veterinary Surgeon
Selsey