

organization of information would have reduced the frequent and rather irritating repetition. However, if this serves to hammer home the important messages contained in this volume, then so be it.

In summary, this book has fulfilled a valuable function by presenting an extremely convincing case for the importance of good stockmanship and its appreciation. It will serve as a useful source of reference material which I expect to dip into frequently. It should be required reading not only for animal scientists, psychologists, veterinarians and animal welfare professionals but also for farm managers, other senior industry personnel and governmental policy makers.

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***The Expression of the Emotions in Man and Animals, 3rd edition***

Charles Darwin (with an introduction, afterword and commentaries by Paul Ekman and appendices on the history of the illustrations by Phillip Prodger) (1998). HarperCollins: London. 473pp. Hardback. Obtainable from the publishers, 77–85 Fulham Palace Road, London W6 8JB, UK (ISBN 0002558661). Price £16.99.

Darwin never fails to impress by the depth of his knowledge, his insights and the sheer readability of his style. This book demonstrates his right to be considered the father of modern animal ethological science. However, although *The Expression of the Emotions in Man and Animals* sold well when first published, Ekman points out that it is not one of Darwin's best known publications among the general public – and I suspect that this holds true even among ethologists. Ekman lists a number of reasons for this in his foreword, the most telling of which is that, while Darwin addresses the causation, ontogeny and phylogeny of expressive displays, he does not address their function in terms of communicatory value or ability. This is, of course, an aspect of communication that particularly fascinates modern ethologists. I suspect that another reason is because a large proportion of the book is devoted to the study of human facial expressions, and ethologists tend to leave this area to the psychologists and anthropologists.

Nevertheless, there is plenty of material here for those interested in mammalian ethology. For example, Darwin draws attention to facts such as the retraction of ears in aggressive displays being limited to those species which fight with their teeth. There are wonderful etchings of cat and dog behaviour, and he discusses (but fails to come to a conclusion over) why cats rub against humans more than dogs. Now of course we would consider allomarking explanations. Darwin also considers primate expressions, and reports the case of a macaque brought up with humans which apparently cried when sad. Ekman here quotes a modern authority that sobbing is not likely to occur in monkeys, but it remains an interesting observation which may shed a little light on the ability of some species to mimic human expressions. Certain people have suggested, for example, that some dogs can smile.

In his work on human expressions, Darwin broke new ground by using the new photographic technology of the day to record real or acted expressions and he also recorded people's responses to the plates. The book therefore becomes interactive as the reader can compare his or her own responses to those recorded by Darwin. Darwin was also fortunate in being given access to photographs provided by Duchenne of a man's face being stimulated by electrical probes. (This procedure was apparently less painful for the subject than one would first think as he suffered from a rare disease which partially anaesthetized his face.) In

addition, Darwin carried out an extensive epistolary survey of contacts throughout the world to determine which human expressions are common across races. He was thus able to approach the question as to which expressions were innate and which were learned.

In some cases there is an element of coffee-table rationalization in Darwin's explanations of the origin of certain expressions. There are times when he is just plain wrong, but it is remarkable just how often Darwin has been proved right. As Konrad Lorenz noted in an earlier edition of *The Expression of the Emotions in Man and Animals*, Darwin knew much more than he thought he did, and this allowed him to deduce correct consequences from facts more suspected than known. Darwin's evolutionary theories linked man irrevocably with the rest of the animal kingdom and it is interesting to note that by this stage of his career he was able to write on page 335: 'The belief that blushing was specially designed by the Creator is opposed to the general theory of evolution, which is now so largely accepted'. Nevertheless, the book draws many parallels between human and other mammalian expressions, and clearly makes his case that the expression of emotions can be explained for humans as well as other animals by the same basic principles. These principles explain emotional expressions in terms of the mechanics that would probably have led to their production in the first place (ie the building blocks of evolution). For example, his principle of antithesis declares that states of mind can lead to certain actions which are of service, and when an opposite state of mind is induced there will be a tendency towards movements of a directly opposite nature. However, Darwin does not take the next step and consider, as a Neo-Darwinist would, why they would have been maintained and evolved in a population

It would be wrong to restrict this review to Darwin's work alone. Ekman justifies the publication of a new definitive edition by the fact that the second edition, edited by Darwin's son Francis, is not only hard to obtain but also missed out some of Darwin's wishes and included notes by Francis himself. Ekman has endeavoured to include Darwin's changes while excluding Francis's additions, and has included several figures that Darwin mentioned but did not include, perhaps on the grounds of cost. He has also occasionally included the original photographs from which the engraver drew up his plates. This allows the reader to judge to what extent the engraving process allowed the author to manipulate the image to suit his didactic aims. Ekman has attempted to bring the text up to date by providing occasional comments within the text. His qualifications in human behaviour allow him to comment on the chapters on human expressions, and provide an admirable summary of the scientific arguments on the universality of human expressions. Here, and in his commentaries, he is fair in pointing out instances where others in the research community are not of his persuasion. He also quotes other sources in areas outside his own field of expertise (for example Mason for primate behaviour and Klinghammer for canids). Unfortunately, he is occasionally too ready to quote his own, or others, opinions without adequate references. This may be a concession to the lay reader but it can be frustrating and reduces the authority of some of the comments.

This is, however, a small quibble; Ekman has undoubtedly produced a definitive edition which will last the test of time. However, Darwin's efforts are those which impress most. For those interested in animal welfare, Darwin explicitly made the link between emotions in man and animals, and thus paved the way towards a humane approach to animal suffering. He used his data to support the theory of the common origin of the different races of man and even indicated which displays would have been shown by early man. He showed prescience in his awareness of the difficulties of using terms such as consciousness and intentionality. *The Expression of the Emotions in Man and Animals* is the book to go to if you want to know why people shrug their shoulders, blush, or stick out their tongues as an insult; or whether

kissing is an innate or learned behaviour. If you have not already read the book and are interested in human and animal behaviour you should buy it and find out.

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### ***Comparative Avian Nutrition***

Kirk C Klasing (1998). CAB International: Wallingford. 352pp. Hardback. Obtainable from the publishers, Wallingford, Oxfordshire OX10 8DE, UK; or for North American orders from, 198 Madison Ave, New York, NY10016-4314, USA (ISBN 0851992196). Price £55.00 or US\$95.00.

The last few decades of the 20th century have been an exciting time for those nutritionists whose interests extend beyond traditional farm animals, laboratory animals, dogs, cats and humans. Increasing numbers of nutrition professionals are discovering how useful a comparative approach can be as they search for ways of improving the nutrition and dietary husbandry of captive animals. Many individuals and numerous publications have encouraged this perspective, and of the latter, *The Ruminant Stomach* by R R Hofman (1973), *Wildlife Nutrition* by Charles T Robbins (1983; 1993), *The Mammalian Herbivore Stomach* by Peter Langer (1988), and *Comparative Physiology of the Vertebrate Digestive System* by C Edward Stevens and Ian D Hurne (1988; 1995) have been particularly useful. However, *Comparative Avian Nutrition* by Klasing is the first book to give major attention to birds other than poultry.

It is obvious that our body of knowledge is inadequate to give each of over 9000 species of birds equal attention, but in those instances where natural dietary habits are known Klasing has grouped species into logical categories, related to the foods they consume, where they feed, and the morphology and function of their digestive systems. For example, food categories may include green plant material, seeds, fruit, nectar, insects, terrestrial vertebrates, fish, or carrion. Feeding sites may include in the air, under tree bark, in weeds and shrubs, on the ground, in mud flats, or under water. Digestive systems may be simple, as in nectar eaters, complex as in herbivores, or intermediate as in omnivores and insectivores. These subjects occupy the first four chapters and 124 pages of Klasing's book. The fifth chapter discusses nutrient requirements, how those requirements are expressed, and the likelihood of deficiencies or excesses in birds in different categories. Chapters 6 to 11 are organized traditionally and present discussions of amino acids, lipids, carbohydrates, energy, minerals and vitamins. As one would expect, much of the information on nutrient metabolism is drawn from research on the chicken, but due consideration is given to the special circumstances experienced by other species. Examples appropriate to those circumstances are skilfully blended into the text, and relevant illustrative tables and figures are also commonly used. Statements in the text are carefully referenced, and the bibliography is extensive. The appendix contains the common English names and the corresponding genus and species names of the 216 species mentioned in the text.

This book is written for use by advanced undergraduate students, graduate students, research ornithologists and practising nutritionists. It does not contain diet recipes, and their absence is appropriate. What it does contain is thoughtfully assembled background information providing a basis for development of diets to be fed in captivity and likely to be successful. Formal preparation in anatomy, biochemistry, physiology, behaviour and ecology would be helpful to the potential user. Some preparation in nutrition would also be advisable,