

Many regional field guides tend to exaggerate the bold colors of the bee-eaters, but in this volume Fry has come closer to their actual appearance, although some of the tones appear slightly off (especially the greens). Additionally, Fry offers interesting information on topics such as the vicissitudes of the European Bee-eater (*M. apiaster*) range contraction and expansion during historical times, parallels between bee-eaters and New World jacamars, the Carmine Bee-eater's (*M. nubicus*) use of several large birds (imagine them perching on a Secretary Bird) and mammals as "beaters" to stir up prey, the bee-eater's handling and de venomization of hymenopterans, Crick's discovery of intraspecific kleptoparasitism in *M. bullocki* at nesting colonies, aerial hawking by *M. albicollis* of oil palm nut epicarps when the scraps are discarded by arboreal squirrels, and descriptions of the kingfisher-like fishing in several bee-eater species.

The major weakness of this book is that there is insufficient integration and synthesis of the information given in the species accounts. The bee-eaters show dramatic differences in social behavior (from solitary pairs to dense coloniality and variation in the degree of cooperative behavior) and occur in a diversity of habitats ranging from barren deserts to dense tropical jungle. Perhaps it is unfair to expect both detail and an evolutionary and ecological synthesis in a book of this kind, but when reading the species accounts, I couldn't readily integrate the patterns of habitat and social system for each species and had hoped the final chapters would provide some insight. Tabular summaries would have been helpful. The chapter on bee-eater evolution and speciation seemed to be riddled with arbitrary conclusions. Curiously entitled "The origin of species" (this section does not address origins), this chapter begins with a seemingly disjunct and out-of-place discourse on evolutionary theory, Lamarckism, and creationism. A long discussion on polytypic bee-eater species and patterns of speciation in allopatry and sympatry follows. Many of the assertions in this section would probably bother many systematists, but I found it to be one of the better summarizations of pattern found in the book.

Other problems include the song descriptions. No sonograms were included and so I had a hard time telling the "dirripps" from the "dreee-dreees." The prey descriptions often seemed redundant and there were few disclaimers about potential seasonal or geographical biases of the sampling. Additionally, his infrequent estimates of total population sizes of species and use of competition to explain foraging patterns are based on weak inference. The prediction that some bee-eaters will acquire conspicuously shaped tails, as are found in motmots and drongos, can only await the test of time. But Fry's presentation of the various patterns of sympatry, coloniality, and the need for modern taxonomic revision makes it clear

that the bee-eaters are a group worthy of strong consideration for comparative studies.

Fry is to be commended for his rigorous review of bee-eater biology and his assimilation of recent information. The book is largely free of typographical or citational errors. This book will certainly be a useful reference for all universities and major museums. It should not be considered a "coffee table" book, as the species descriptions are not for the casual reader. All African ornithologists should look this book over, as should ornithologists with interests in avian biogeography and the mechanics of foraging behavior.—STEVE ZACK.

**The Cattle Egret: a Texas focus and world view.**—Raymond Clark Telfair II. 1983. College Station, Texas, The Texas Agricultural Experiment Station. 144 pp. No price given.—This commendably produced booklet was published by the Caesar Kleberg Foundation for Wildlife Conservation. Attractive makeup, color covers, a color plate, and scattered black-and-white photos add interest. The text consists of 9 chapters on distribution, migration, nesting habits, reproduction, population changes, pesticides, and management. Appendices list scientific names and 6 pages of detailed data on food habits. The literature cited includes nearly 500 references.

The title promises a Texas emphasis and a worldwide perspective, while an introductory paragraph expresses the more modest hope that the monograph will lead to a more thorough understanding of the Cattle Egret (*Bubulcus ibis*). The latter hope probably will be realized, as this work contributes to the vast data base on this species. Disappointingly, the promised world view fails to materialize. Rather, the monograph is a descriptive study (part of a 1979 doctoral thesis) on the range, nesting, and food of the Cattle Egret in Texas, similar to other studies in other places.

As a descriptive regional study it has its strengths, not the least of which is that much of the summary data are extensively tabulated and so available to others. These include food habits, laying and hatching intervals, egg loss, and growth. A detailed analysis of egg size and shape seems rather unique. Also of use is the gathering of references, mostly pre-1980, on Cattle Egret range expansion. A map of the first sight and breeding records of Cattle Egrets in North American states and provinces is interesting, as are data compiled on long-term censuses in Texas. Unanticipated is a chapter on economic and health aspects of the species, in which consumption of injurious insects, suspected contraction of ornithosis by colony workers, and the Cattle Egret's potential as a game bird are discussed.

As a scientific study, certain weaknesses are evi-

dent. Unfortunately, no fundamental ecological or evolutionary questions are asked, and no statistics are brought to bear upon the various comparisons made. Extensive quantitative data apparently were collected on such topics as nesting habitat and nutrient movement, but they seem barely evaluated. The lack of work on the most fundamental of the Cattle Egret's adaptations, its foraging behavior, is puzzling. Most disappointing is a failure to evaluate critical literature, such as Payne and Risley's (1976, Univ. Michigan Mus. Zool., Misc. Publ. 150) exciting suggestion that the Cattle Egret is an *Egretta*, Siegfried's (1978, Natl. Audubon Soc. Res. Rept. 7: 315) crucial contribution on the relation of the Cattle Egret's original habitat to its range expansion, and Byrd's (1978, Natl. Audubon Soc. Res. Rept. 7: 161) definitive review of Cattle Egret migration and dispersal—including to and from Texas.

The text is not an easy read, as it seems much over-expanded and replete with paragraph-long strings of references. One must make extensive use of the encouragingly straightforward chapter summaries, which, however, differ in emphasis from the text.

Overall it is clear that this monograph is the result of a tremendous field and library effort, from which future students of the Cattle Egret will benefit. It is certainly essential for such researchers, and the data presented could be useful to those interested in reproduction and growth. It would be of limited use to others, however. Publication of the booklet makes the information available in a better, and less expensive, format than does the thesis on which it is based. Thus, the Kleberg Foundation should be commended for making this and similar texts available, but I suggest that in the future the titles not promise more than is to be delivered.—JAMES A. KUSHLAN.

**Behavioral ecology: an evolutionary approach.**—

J. R. Krebs and N. B. Davies (Eds.). 1984. Second ed. Sunderland, Massachusetts, Sinauer Associates, Inc. 493 pp. ISBN 0-87893-132-5. \$42.00 cloth. ISBN 0-87893-133-3. \$25.00 paperback.—Behavioral ecology, as practiced by the authors of this book, is fundamentally a hypothetico-deductive discipline. From a few basic principles about how natural selection operates, it seeks to predict what an animal should do in a given environmental context. Field or laboratory tests of the prediction are then used to judge the efficacy of the prediction.

In the 6 yr since the first edition of the book appeared, there has been steady progress in the discipline. The basic theme has not changed, but there have been refinements in theory, widespread use of new analytical techniques, and many predictions tested. The editors state in the preface that the ro-

matic period for behavioral ecology is over. The discipline now faces the hard task of sifting ideas and gathering evidence. The new edition reflects this change with the addition of several chapters that address some theory and techniques that have been misunderstood and misused in the past. The addition of a chapter on learning does much to address a major criticism of the discipline, and some of the chapters on familiar topics contain critical assessments.

The book is organized into 4 sections of 15 chapters by 22 authors. Many of the authors and topics are the same as in the first edition. Section I consists of 3 chapters on concepts and methods that according to the editors have created problems in the past.

Chapter 1, by T. Clutton-Brock and P. Harvey, concerns the comparative approach to studying adaptations. The authors suggest that 6 questions be addressed in using interspecific comparisons, including (1) how broad a taxonomic array should be included, (2) how biologically relevant are the variables chosen, and (3) how appropriate is the statistical treatment. No mention is made of researcher bias, a problem that I think is of major importance in this field.

Chapter 2 is on evolutionary stable strategies (ESS) by G. Parker. The author reviews what is meant by an ESS and concludes that the development of this concept by J. Maynard Smith is the most important contribution to the discipline since W. Hamilton's explanation of altruism. Those interested in understanding the basics of ESS and the application of game theory need look no further than this excellent chapter.

In Chapter 3, A. Grafen discusses inclusive fitness and kin and group selection. He states that inclusive fitness is often misused in the literature and argues that the concept should include only the added young of relatives resulting from an animal's efforts and only the animal's young that are not the result of others' help. After reviewing the new group of group-selection models, he concludes that they are not much different from kin-selection models.

Section II of the book contains Chapters 4-7, which concern predators and prey. Chapter 4 is entitled "Optimization in behavioral ecology" and is written by J. Krebs and R. McCleary. This paper actually is a review of optimal foraging theory. At the end of the chapter, the authors ask an important question about a concept in decision theory termed "satisfaction." Might an animal settle for a satisfactory solution rather than an optimal solution? The concept seems inconsistent with the principle of optimality in natural selection. I believe it might be important, however, where natural selection has favored the flexibility of learned behaviors. This flexibility might "permit" an animal to be satisfied with something less than optimal in certain environmental contexts.

Chapter 5 is a review of group living by R. Pulliam and T. Caraco. Their game theory analysis of whether