The Evolution of Avian Breeding Systems.—J. David Ligon. 1999. Oxford University Press, New York. xxi + 504 pp., 1 black-and-white plate, 62 figures, 9 tables, 1 appendix. ISBN 0-19-854913-X. Cloth, $98.00.—The mating behaviors of animals have always fascinated scientists and the public alike. In the last decade a suite of new genetic, physiological, theoretical, and phylogenetic methods has advanced our understanding of mate choice, sexual selection, and parental behavior. For example, just a decade ago most researchers got on well with simple laboratory and field devices, whereas now students of mating behavior routinely use techniques of molecular genetics and immunology, develop advanced mathematical models, and use sophisticated statistical tools. Avian research was, and is, at the cutting edge of these studies.

Ligon has taken up the challenge of reviewing most of the key topics in avian mating behavior. The literature is vast, as reflected by the nearly 1,000 references included in this volume. Ligon summarizes much research about mate choice, including the topical issues of good genes, parasites, and fluctuating asymmetry, and he also deals with sexual selection and speciation and investigates how various mating systems might have come about. In contrast to most current books on sexual selection and mating systems, Ligon’s treatise stands out by having a broad, primarily historical (phylogenetic) perspective and by focusing on a popular group of animals, the birds. The ideas are expressed beautifully, although at times at great length.

The book can be divided into five parts: introduction (Chapter 1); sexual selection and mate choice (Chapters 2 to 6); issues related to mate choice that include speciation, female-female competition, and the evolution of parental care (Chapters 7 to 10); mating systems (Chapters 11 to 16); and conclusions (Chapter 17). Each chapter ends with a substantial summary. The Introduction defines the key tenets of the book. First, Ligon investigates how mate choice, mating systems, and parental care might influence each other. These relationships are familiar to most avian biologists, although specific examples would have provided a better grasp of the feedback among the three subjects. Incidentally, I found no definition of “breeding system” and wonder whether Ligon’s definition is different from that of Reynolds (1996). Second, whereas most current work emphasizes the role of ecology in influencing mating systems, Ligon emphasizes the significance of phylogenetic constraints. The phylogenetic approach clearly is timely because reconstructions of phylogenies (largely based upon molecular data) and analyses using comparative methods have advanced considerably in recent years.

Chapters 2 to 6 deal with mate choice. Ligon proposes that traditional ethological concepts (e.g. sign stimuli, innate releasing mechanisms, fixed action patterns) are useful in understanding mate choice. I must admit that I am skeptical about reviving these concepts for this purpose because I don’t see what would be gained from using them over standard proximate (e.g. neurobiology and neuroendocrinology) and ultimate (e.g. behavioral ecology and sociobiology) analyses of mating behaviors. Ligon also presents a wealth of information on the diversity of ornaments such as plumage, wattles, and spurs and argues that some of them actually are not used in mate choice. This leaves the reader wondering whether the lack of such relationships is genuine or perhaps the consequence of low statistical power and/or unrealistic experimental manipulations. I particularly enjoyed the chapter that deals with case studies of major hypotheses; Ligon presents balanced arguments and does not hesitate to add his views on several controversial topics.

Chapters 7 to 10 are a bit of a potpourri. One of these chapters is devoted to sexual selection and speciation, and I am sure that this treatment will inspire much research in coming years. I particularly welcomed the chapter on mate choice by males and female-female competition, because these topics are somewhat the reverse of what many researchers