Both books would have been enriched with additional treatment of the British Broadcasting Corporation's Natural History Unit (brought to a pinnacle by David Attenborough) and the extraordinary role it has played in the medium (worldwide and in the United States). Mitman criticizes some of the films he discusses for showing nature absent human interaction, and he worries that this approach can encourage a sense that we are apart from nature. Bousé goes further and asserts that the medium has had little effect on raising public consciousness and concern about conservation. As the "founder" of the Public Broadcasting System's *Nature* series, I can attest to numerous examples of people whose lives have been motivated by the medium. Interestingly, what we had initially conceived as a hard-hitting series about the real state of nature remained no more than an idea through lack of funding; we concluded later that such a grim recipe would have lasted little more than a year. *Nature* is now in its 19th year.

Nonetheless, serious research on what best motivates audiences of natural history films is an important priority. As professionals, makers of nature films are greatly concerned about the precarious state of the natural world and how their medium can redress the situation. It is fitting, though quite sad, that ARKive (an institution created by the BBC's great producer Christopher Parsons) is assembling at Bristol many of the wonderful film images, so that future generations can at least vicariously experience endangered and extinct species and threatened habitats.

BOOKS: EVOLUTION

Games Cichlids Play

Amy McCune

The explosive diversification of cichlid fishes in the three Great Lakes of East Africa is an extraordinary evolutionary phenomenon. In species richness, phenotypic diversity, endemism, and rates of speciation, African cichlids undeniably dwarf more famous radiations, such as Hawaiian *Drosophila* and Darwin's finches. (I have often thought it lucky that Darwin faced only 14 finches in the Galapagos Islands rather than the 1400 cichlids in the African rift lakes.) These remarkable and captivating animals are the subject of George Barlow's new book, *The Cichlid Fishes*.

Despite the book's general title, Barlow strongly emphasizes reproductive behavior and parental care over many other fascinating topics in cichlid biology. After a general introduction to cichlids (from Africa and elsewhere) and a brief review of jaw mechanics and feeding, there are nine chapters devoted almost entirely to various aspects of the fishes' reproductive behavior. Two final chapters concern speciation and conservation.

The Cichlid Fishes
Nature's Grand Experiment in Evolution
by George W. Barlow

Perseus, Cambridge, MA, 2000. 351 pp. $28, C$42.50. ISBN 0-7382-0376-9.

At first glance, the book may appear to be intended for the aquarium enthusiast. The text is engaging and easy to read, and it is supplemented with handsome color plates. Anyone who has kept fish will be fascinated by the interpreted tales of aggression, communication, mating, and parental care in cichlids. The chapter titles are sometimes more jazzy than informative: Mate recognition is treated in "Mating Gets Personal," and if you want to know about sexual selection and mate choice, check out "Beauty Is Only Fin Deep." Most chapters begin with an anecdote (often of human behavior) to introduce a concept pertinent to cichlid biology. And Barlow generally does a good job explaining relevant behavioral theory for a lay audience.

But professional biologists should not be fooled; there is plenty to interest them. The book's real strength lies in the numerous, often first-hand accounts of cichlid behavior and natural history. Many of these originate with Barlow himself, or with his graduate students and postdoctoral associates. The author's lifelong enthusiasm for cichlid watching, both in the field and in the laboratory, is amply conveyed and contagious. Aquarists have long enjoyed the complexities of cichlid behavior, and now they and nonichthyological biologists will share the opportunity to appreciate these behaviors in an evolutionary context. For example, some biologists may be surprised to learn of the extent to which cichlids care for their young. Some substrate spawners provide biparental care; in other species, one parent protectively broods eggs and fry in their mouths. One might think the latter habit would effectively deter hungry predators, but the field observation of a mouth-brooding female being rammed and forced to expel her fry is a vivid reminder of the trophic resourcefulness so characteristic of these fish.

Particularly valuable is Barlow's emphasis on answering questions through experiment, as exemplified by his discussion of egg dummies on the fins of males. In some mouth brooders, the female will spawn and then turn to pick up the eggs in her mouth even before the male has had a chance to fertilize them. The pigmented spots, which match eggs in color and size, on the anal fins of males in some species were first interpreted as a ploy to trick females into mouthing the male's anal fin, whereby eggs in her mouth are fertilized. Experiments by Eva Hert, however, suggest that egg spots are not necessary for fertilization; rather they attract females and stimulate egg production. After considering these results and the relevant comparative natural history, Barlow dissects additional explanations of egg spot functions and then leaves the reader with many questions to ponder. Do females associate more with males having more egg spots? Does having more egg spots increase the number of offspring a male fathers? In this case and many others, the abundance of uncertainties and questions leaves a stimulating trail of ideas for future research.

In the chapter on speciation, "Cichlid Factories," Barlow seems much more certain of the answers. Elsewhere, research questions bubble to the surface as he reviews empirical evidence; here he doggedly fits data into a traditional scenario for cichlid evolution based on a Mayrian view of allopatric speciation. Speciation is seen only as a by-product of divergence between populations living in different microhabitats; the scenario thus differs little from that promulgated by Fryer and Iles in their classic *The Cichlid Fishes of the Great Lakes of Africa* (Oliver and Boyd, Edinburgh, 1972). However, the last decade has witnessed increasing theoretical and empirical support for the efficacy of sympatric speciation (sometimes involving sexual selection), in fishes (including cichlids) as well as other animals. Given this burgeoning literature, the question of the mechanism or, more likely, the mechanisms of speciation responsible for the spectacular African cichlid radiations remains wide open.

Faux eggs. Many colorful reef-dwelling mbuna of Lake Malawi, such as this *Metriaclima zebra*, possess egg spots on the anal fin.

Overall, *The Cichlid Fishes* is a lively read in natural history for general readers and professionals alike. Behaviorists, ichthyologists, and evolutionary biologists will find, for different reasons, Barlow's book a stimulating and controversial work that deserves discussion and scrutiny.

CREDIT: AD KONINGS/FROM *THE CICHLID FISHES*, COURTESY G.W. BARLOW

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