Books

The Colorado River Through Grand Canyon: Natural History and Human Change. Steven W. Carothers and Bryan T. Brown. 1991. University of Arizona Press, Tucson. 235 pp. Hardcover $45, paperback $17.95.

Ornithologists have dreamed of building huge aviaries in which to run manipulative experiments on bird populations. In some ways the riparian habitat in the bottom of the Grand Canyon is a gigantic aviary, since the surrounding desert prevents birds dependent on riverside vegetation from moving easily to other suitable areas.

Building of Glen Canyon Dam and its subsequent operation to generate electric power at times of peak demand constitutes a major, though unplanned, manipulative experiment on the riparian community of the Grand Canyon. Carothers and Brown describe the effects of this experiment on its many aspects, hydrological, botanical and zoological, as the river changed from a warm, silt-laden stream with widely varying flows to a cold, clear stream fluctuating within a narrower range on a daily cycle.

Many of the changes, although unexpected by dam planners, are understandable. Cliff Swallows disappeared with the loss of mud for their nests. Wintering and migrating Bald Eagles gather at a side creek to feast on spawning rainbow trout, denizens of the now cold river. Willow Flycatchers, endangered in Arizona, breed in the tamarisk, an introduced species, in the stabilized and expanded riparian zone.

The authors spin an interesting tale based on their extensive experience, documenting the changes which have occurred both naturally and because of the dam. They also raise questions about the future of this newly expanded riparian area, which may be destroyed by the same dam that created it. High water releases as in 1983 can erode the beaches, no longer replenished by silt in the river. Political decisions will decide the future of this habitat.

Although birds are only a minor part of the book, it is a fascinating story of a major ecological experiment, more easily understood than most underway at present.

Robert C. Tweit

Distribution and Taxonomy of Birds of the World. Charles G. Sibley and Burt L. Monroe, Jr. 1990. Yale University Press, New Haven, CT. 1109 pp. Hardcover $125.

This book is the most important single volume review and modification of avian taxonomy of this century, making all existing field guides and checklists obsolete and alerting ornithologists and birdwatchers to further changes, particularly at the species level.

Avian taxonomy has been grounded in morphological similarities and differences, ranging from the obvious, such as plumage colors and patterns, bill shapes and foot structures to more subtle differences, such as feather tracts and muscle shapes. Morphology is obviously most useful in grouping similar species which have evolved from common ancestors in relatively recent times. Relationships have been refined further in recent years by including vocalization and behavioral observations.

Morphology and behavioral studies are of less use in defining relationships accurately among higher level taxa (families, orders, classes) which separated in the long distant past. Convergent evolution has produced groups of birds on different continents with similar appearances and lifestyles, blurring evolutionary pathways. Relationships among higher taxa have been more tenuous and unstable.

In 1975, Charles Sibley and Jon Ahlquist brought biochemical techniques to the study of evolutionary relationships of bird species using measurements of hybridization of DNA (deoxyribonucleic acids, the polymeric strands of genes) from different species. Since then, they and others have compared about 1700 species of the 9672 recognized in this volume.

The hybridization technique brings early evolutionary history into focus and establishes relationships among higher taxa, defined as subclasses, infraclasses, parvclasses, superorders, orders, suborders, infraorders, parvorders, superfamilies, families, subfamilies and tribes. The many changes are too numerous to summarize; but to give one example, the parvorder CORVIDA now includes (besides jays, crows, and magpies) shrikes, vireos and most Australian land birds. The changes here in higher orders will probably have the most permanence of all those suggested by Sibley and Monroe, because they are best defined by the biochemical work already done.

At the species level, evolution is occurring more rapidly and biochemical work is actively underway. Ornithology needs more exact definitions of species and related taxa. Current debate centers on the older "Biological Species Concept," which emphasizes reproductive isolation, and the "Phylogenetic Species Concept," which groups individuals with common recent ancestry. Many avian taxonomists seen to favor the latter concept, influenced by recent biochemical research. Expect further changes at

the species level, including more splits in the passerine species. For instance, a very recent paper suggests that Painted Buntings are two phylogenetic species with allopatric breeding and wintering ranges and different migration and molt strategies.

Probably most species changes to come will be splits rather than lumps, as further use of a variety of biochemical techniques increases our understanding. Adoption of the phylogenetic concept might reverse many of the lumps of the past few years as well as splitting most distinguishable subspecies.

"Eastern and Western" House Finches raise interesting questions. The only apparent evolutionary change which has occurred in their 50-year separation is the ability of the eastern population to disperse. When the populations meet and presumably interbreed, will this trait spread through the presently sedentary western population? Have any detectable biochemical differences occurred in 50 years? Introduced populations such as this offer many opportunities for study of groups which started from a small gene pool, as well as providing a comparison with much older allopatric populations, such as Baltimore and Bullock's Orioles, which have recently had an opportunity to interbreed.

Distribution and Taxonomy is in style a "condensed" version of the AOU checklist format, which is not surprising since Monroe was a major contributor to that also. Each species is listed by scientific name with an English name, AOU-type number, habitat, range, and any notes on relationships to other species. The extensive table of contents and indices to names and world numbers are complemented by references, maps, and a gazetteer. The only thing missing for banders is a set of four-letter codes!

Monroe's ability to produce this massive project in a very timely fashion with many 1989 and 1990 references is impressive. A systematic method of updating the book would further enhance its usefulness and desirability.

The taxonomic changes in Distribution and Taxonomy suggest many potential study projects for banders. In-hand methods need to be determined to distinguish newly separated species and winter ranges of such species as Brewer's Sparrow and its new sibling the Timberline Sparrow.

The book is recommended highly to all serious students of ornithology. Serious listers will be delighted by the new species as well as a definitive order for their lists. If you can't afford your own copy, talk your local library into acquiring it.

Robert C. Tweit

Recent Literature

BANDING HISTORY AND BIOGRAPHY

A man for all birding seasons/Roger Jones aids raptors any time, any how [sic]. D.L. Kraha. 1990. *Eyas* 13(1):26-27. -c/o Natl. Wildl. Fed., 1400 16th St. NW, Washington, DC 20006-2266 -(Profile of raptor bander of VA and Washington, DC.) MKM

BANDING EQUIPMENT AND TECHNIQUES

Development and evaluation of a technique for individually marking egrets. M. Maddock. 1989. *Corella* 13:133-142. -Faculty of Education, Univ. of Newcastle, NSW 2308, Australia -(A system of 7 color bands used to mark 4 species of egrets in Australia so that non-expert field observers could participate in determining egret movements proved inadequate, as bands were often obscured or became muddy. An alternative system using a mixture of numbers and colors on patagial tags is described in detail, including photographs and application methods. Observations in captivity and in the wild showed minimal loss of tags up to three years and no evidence of effects on survival of Cattle Egrets. Too few Intermediate Egrets have been sighted to date to provide an evaluation, and too few of the other two species have been tagged. Tagged Cattle Egrets have been seen as far away as New Zealand.) MKM

Rapid band wear in Eared Grebes and other saline lake birds. J.R. Jehl, Jr. 1900. *J. Field Ornithol.* 61:108-110. -Sea World Research Inst., 1700 South Shore Rd., San Diego, CA 92109 -(Band loss may begin in 3-4 years and become severe in 5-6 years. Stainless steel bands are unavailable.) RCT

Total body electroconductivity (TOBEC) to estimate total body fat of free-living birds. G. Castro, B.A. Wunder, and F.L. Knopf. 1990. *Condor* 92:496-499. -Natl. Ecol. Res. Center, USFWS, Fort Collins, CO 80525-1400. -(TOBEC is accurate, does not hurt birds, and is not affected by metal bands.) RCT

Fat scoring: sources of variability. D.G. Krementz and G.W. Pendleton. 1990. *Condor* 92:500-507. -USFWS,