

BOOK REVIEWS

EDITED BY JEFFREY S. MARKS

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The Vultures of Africa. By Peter Mundy, Duncan Butchart, John Ledger, and Steven Piper. 1992. Academic Press, London, U.K. 460 pp., 23 color plates, 100 color photographs, 33 black-and-white photographs, 31 figures, 47 tables, numerous line drawings, 25 maps. ISBN 0-12-510585-1. Cloth, \$118.50.—Crammed with information, this splendidly illustrated and massive volume will be the standard reference on the vultures of Africa (and to a lesser extent, of all those of the Old World) for the foreseeable future. All four of the authors are experts in their subject. Dr. Mundy published an earlier volume on some of the species, whereas Mr. Butchart, a talented artist, has provided a full-page plate of each species and many text figures of the vultures and associated plants and animals. An outstanding series of color photographs is very fully labeled to emphasize details that might otherwise be overlooked; the section on conservation and management has numerous black-and-white photographs. The text is very extensive, with double-column format and rather fine print. The authors' enthusiasm results in a style that is at times rather colloquial; for example, "It must have been something . . ." (for this vulture to have carried in its beak such a large branch to its nest).

The first four chapters give an overall view of Old World vultures, their characteristics, and what is known of their evolution, including comparisons with the cathartid vultures of the New World, which evolved independently. (As an aside, I must mention that in the much discussed recent classification of living birds based on DNA analysis by C.G. Sibley and J.E. Ahlquist, both groups of vultures are to be found in the order Ciconiiformes. This "order" is a fantastic hodgepodge including, among other groups, the loons, grebes, shorebirds, storks, and penguins! If this is a true clade, its origin must lie far back in avian evolution. Thus, it is a subclass, not an order.) These chapters and others are buttressed by no fewer than 47 tables on everything from parasites to plumage patterns. The relevant literature has been ran-

sacked for information and is listed in a lengthy bibliography.

Species accounts comprise about 40 percent of the text. That for the hooded vulture (*Necrosyrtes monachus*), by no means the longest, takes 12 pages, with color plates, range map, a table of measurements, five text figures, and in all perhaps seven or eight thousand words of text. Also included are the bearded vulture (*Gypaetus barbatus*) and the palmnut vulture (*Gypohierax angolensis*), though neither may belong phylogenetically with the other species. The Eurasian griffon (*Gyps fulvus*) and the cinereous vulture (*Aegypius monachus*), which formerly bred in North Africa but are now extirpated there or nearly so, receive shorter treatment (the griffon migrates to northern Africa in some numbers). In total, 11 of the 15 species of Old World vultures are treated. The remaining four species are Asiatic and closely related to the African ones.

The next two chapters, drawing upon data in the species accounts and much additional research, analyze feeding and nesting dynamics. Although many of the species are centered about a common food base, each has its own requirements and preferences. The same is true for their reproductive behavior. Thus, they are a guild of associated species but not an interdependent community.

Finally, it is emphasized that even in Africa, vultures over vast areas are dependent upon livestock, not the once vast (and now decimated) herds of game. As a result, the birds are suffering from many vicissitudes, including random poisoning of predatory mammals, food shortages, and electrocution by power lines. The Vulture Study Group, with its own publication, and ably supported by the authors of this treatise and other conservationists worldwide, is striving to ensure the future of this remarkable group of birds.—**Dean Amadon, Department of Ornithology, American Museum of Natural History, Central Park West at 79th Street, New York, NY 10024 U.S.A.**

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Trends in Geographic Variation of Cooper's Hawk and Northern Goshawk in North America: A Multivariate Analysis. By Wayne H. Whaley and Clayton M. White. 1994. Proceedings of the Western Foundation of Vertebrate Zoology, Vol. 5, No. 3. 49 pp., frontispiece, 22 figures, 7 tables. ISSN 0511-7550. Paper, \$8.00.—Geographic variation was a much simpler subject to understand when researchers studied species that supported Bergmann's, Allen's, or Gloger's ecogeographic rules. After Frances James suggested that aspects of geographic variation in morphology might be environmentally determined and not genetically programmed, the field became very complex. Today, most studies of geographic variation of birds include measures of genetic differentiation among groups and end with a recommendation to the American Ornithologists' Union Check-list Committee for a name change.

This paper provides a return to the simpler days when the primary purpose of the work was documentation. Ten anatomical characters were measured on skins of 781 Cooper's hawks (*Accipiter cooperii*) and 464 northern goshawks (*A. gentilis*) obtained from museums across North America. Adults taken primarily in the breeding season were used. Data analyses were multivariate with the initial cut at geographic variation being explored by principal components analysis (PCA) derived from correlation matrices. Contour maps of PC scores were generated through trend-surface analysis. Finally, multivariate correlations between morphological and environmental data sets were examined using canonical correlations analysis (CANCORR).

General trends noted by the authors include large individuals of both species in the extreme southwest and small individuals in the Pacific Northwest. There was general concordance in trends of geographic variation shown by both species. Wing loading (defined by PC II) was lower for eastern populations of Cooper's hawks, which are more migratory than their western counterparts. Explanations for toe length variation were based on dietary considerations. Considerable discussion is provided on the correspondence between subspecific designation and morphological variation, particularly in the polytypic northern goshawk.

The monograph has numerous strengths and

weaknesses. One strength is the large sample of birds examined by the authors. A weakness is the small sample of birds for western and northern Canada, which could have been augmented had the authors approached museums such as the Provincial Museum of Alberta for specimens (21 Cooper's hawk and 27 northern goshawk skins). Museums in British Columbia could have provided even more specimens. I can empathize with the authors in their efforts to obtain as many individuals as possible, but with better use of faxes, e-mail, and even the *Ornithological Newsletter*, this thorough study could have been definitive. As a sidebar, the authors noted what everyone who has used museum specimens to study geographic variation knows—no species is represented adequately in North American museums. Of course, those opposed to collecting can point to the thousands of individuals of some species in museum drawers. However, when these specimens are grouped by subspecies, gender, age, and collecting locality, the number in each category drops precipitously.

Although this is not a theoretical monograph about size and its measurements, some of the assumptions made about size and shape would be disputed by others who study morphometrics. For example, the authors used museum skins rather than skeletons to explore geographic variation. Furthermore, they assumed, without testing, that PC I scores constitute a size axis for both species and that PC II scores constitute a wing-loading axis (Cooper's hawks) and wing shape/tail length factor (northern goshawks). Because of the seeming relative equality of PCs II, III, and IV, their individual interpretations should be considered tentative pending a sphericity test. The weakest interpretation, in my mind, is the conclusion that an axis contrasting feather measures with bill measures can be presumed to reflect wing loading. To the authors' credit, they acknowledged and discussed most of the weaknesses in their data.

There is an apparent error in the interpretation of the standardized canonical coefficients (Table 9). The authors refer to these coefficients as if they are correlation coefficients (page 188). Standardized canonical coefficients are used to produce canonical variables with unit variance. Unfortunately, the size of a standardized coefficient for a variable does not always correspond to the strength of the correlation between that variable and the canonical axis.

This monograph is useful as a review of both the value and the trap of multivariate statistics. It is

valuable to know major sources of variation in our data (PCA) and to explore correlations between independent data sets (CANCORR). It is especially valuable, when PC axes have unequivocal biological interpretations, to explore their variation relative to other biotic or physical factors. The trap, as in this case, is to acknowledge that PC axes only approximate biological factors and then proceed to use these approximations in further analyses. If researchers wish to explore variables such as size, wing loading, or wing shape, then axes can be constructed to measure these directly. There is no obligation to use a PC axis just because it hints at the factors of interest. There is too much noise in the interpretation of these axes to feel comfortable about anything except extremely strong relationships.

This monograph includes some interesting results that will be useful in subsequent syntheses of raptor morphological evolution. The concordance of geographic size variation in these two species, and the general similarity to patterns in other species (e.g., peregrine falcon [*Falco peregrinus*] and great horned owl [*Bubo virginianus*]), suggest that there is another ecogeographic rule in need of a name. It would be interesting to know if the absence of the Cooper's hawk from the northern range of the northern goshawk is evidenced in the morphology of the latter. More discussion on geographic variation of reversed size dimorphism (RSD) would have been nice.

In terms of style and presentation, this is basically a lengthy journal article. Some of the maps are a bit primitive by current standards, but they are reasonably clear and readable. Perhaps the monograph could have been condensed into a journal article, but the increased length allows for useful discussion. In summary, this monograph is clearly valuable to students of *Accipiter* biology and of geographic variation in raptors. The authors' consideration of a variety of factors affecting hawk size relates to studies of reversed sexual dimorphism and makes for interesting reading. Regardless of my concerns with the multivariate analyses, the authors' presentation of "size" data, which is really the core of the monograph, is sound. I would have liked to have seen these data achieve wider distribution through publication in a journal. For a price of \$8.00, however, they will be reasonably accessible.—**W. Bruce McGillivray, Provincial Museum of Alberta, Edmonton, AB T5N 0M6 Canada.**

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City Peregrines: A Ten-Year Saga of New York City Falcons. By Saul Frank. 1994. Hancock House Publishers, Blaine, WA. 313 pp., 34 color photographs, 6 figures, 24 tables. ISBN 0-88839-330-X. Cloth, \$29.95.—This is an intensive account of the colonization of the New York City area by peregrine falcons (*Falco peregrinus*) in the last decade that resulted from The Peregrine Fund's release of hundreds of birds in the eastern United States. The author and his wife, Dolores, learned of one of the early nesting attempts from a television news short; their apartment was in full view of the 1983 Throgs Bridge site. The Franks became compulsive observers. The book relates this passion and the compassion the Franks developed for these birds. If you must have your peregrines on massive cliffs in wilderness, then this book may not at first seem attractive. But Frank matures rapidly as an observer and relates year by year, site by site, a wealth of detailed observations on nesting successes and failures and the hunting flights that underscore the enormous versatility of this falcon.

Prey availability is almost limitless, and the maximum nesting density these birds may reach is unpredictable in view of the great supply of buildings and bridges for nesting. Prey were caught from stoops, rushes, or by being forced to the water and then plucked from the surface. One adult male was actually seen to fall into the water, return to the surface, and regain flight. Several times fledgling peregrines swam to save themselves, or were rescued from drowning by their human caretakers. Frank came to accept the loss of individual birds and the broader view of natality and mortality as population phenomena.

In the New York City area, peregrines were nesting on bridges by 1983; the New York Hospital nest in 1988 was the first on a building. Both bridges and buildings were equipped with nest boxes to enhance the nesting substrate. My calculations from data in Appendix B show that about 58% of the eggs counted on bridges from 1983 to 1992 produced fledged young, versus about 55% for eggs laid on buildings (excluding clutches removed for captive incubation and nesting attempts interrupted by maintenance workers). However, only 36% of the bridge eggs resulted in young reaching independence compared with 49% for buildings. On bridges, young

are seemingly at greater risk after they first leave the nest box. Even at that, nests on bridges produced an average of about 1.2 dispersed young per attempt ($N = 22$), a value surely on par with many non-urban populations. Nesting attempts on buildings ($N = 12$) averaged about 2.0 dispersed young per pair. Collectively, these are very strong production values that no doubt were due in part to great effort by human caretakers such as the Franks, J. Aronian, M. Gilroy, J. Weaver, K. O'Brien, and J. Barkley.

Sometimes the daily diary-like accounts seem repetitious, and the subjective explanations of peregrine behavior may be distracting to some readers. Chapter and section heading titles are not always helpful in alerting the reader as to what follows (e.g., one chapter is entitled "Oops"). Appendix F, a histogram, includes year headings that are badly misplaced. Most of the color photographs are of good quality

and are appropriate. However, the use of inserted photos, such as on the dust cover, is excessive. An insert ruins what would have been a spectacular photograph of the Hudson Palisades. These problems are easily overlooked in view of the vast, tireless work underlying this report.

Overall, the book is significant in revealing how peregrines function in cities, a "habitat" used across North America. I predict that this volume will be enjoyed by a wide spectrum of people interested in natural history. Frank laments the vacant (through 1993) historical cliff sites on the Hudson Palisades not far from where bridges and buildings draw nesting pairs. He must indeed have been delighted to learn that in 1994, peregrines once again nested on the Palisades.—**James H. Enderson, Department of Biology, Colorado College, Colorado Springs, CO 80903 U.S.A.**