Return of the Falcons

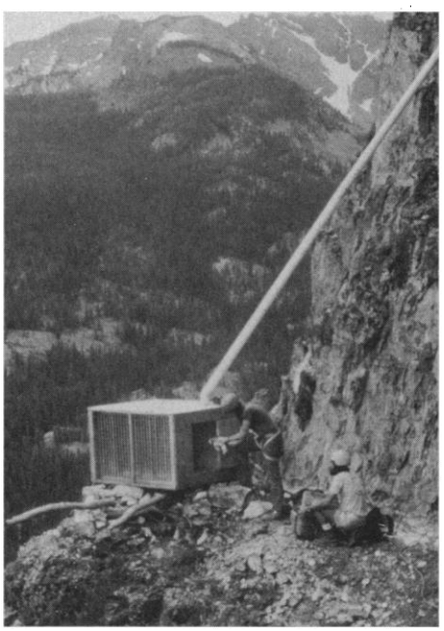
Peregrine Falcon Populations. Their Management and Recovery. TOM J. CADE, JAMES H. ENDERSON, CARL G. THELANDER, and CLAYTON M. WHITE, Eds. The Peregrine Fund, Boise, ID, 1988. xviii, 949 pp., illus., + plates. $45. From a conference, Sacramento, CA, Nov. 1985.

In 1965 a unique conference was organized by Joseph J. Hickey to discuss possible causes for reported declines in populations of peregrine falcons. Although a myriad of possible factors responsible for the declines were considered at that conference, organochlorine pesticides emerged as the primary suspect. This revelation triggered a worldwide effort by environmental scientists, falcon enthusiasts, and ornithologists to marshall support for the pesticide hypothesis and to abate impending extirpations of many avian species.

Peregrine Falcon Populations is the proceedings of a symposium organized to commemorate the 20th anniversary of the 1965 gathering and includes summary reports of many of the research and conservation efforts spawned by it. These proceedings are packaged in a handsome binding and jacket containing 81 papers presented at the conference and nine subsequently added chapters intended to clarify or resolve issues that were highlighted during the meeting. The sponsors and organizers of the conference consisted largely of practitioners of captive-breeding and release projects intended to restore falcons to vacant habitat or to supplement struggling natural populations. This theme dominates the book.

The presentation consists of three keynote addresses, followed by groups of reports on the status of peregrines in North America, Europe, and elsewhere; DDT and other chemical problems; migration and banding studies; captive propagation, reintroduction, and management; dynamics and ecology of populations; geographic variation in populations; and "humanity and the peregrine." Prefatory essays, which are mostly a tribute to the peregrine and several of its long-time human conservators, are contributed by Roger T. Peterson and the editors, and Ian C. T. Nisbet provides a brief finale challenging some of the conventional wisdom regarding captive propagation and augmentation management conducted in the United States. In a concluding statement, the editors in effect sidestep the questions posed by Nisbet.

The status sections clearly document that recovery of the peregrine is occurring on a global scale. The individual reports vary immensely in quality; many provide little background on the techniques employed or their associated assumptions and biases. Reading more than a few status reports is tedious, but they furnish useful information for local biologists. General themes can most efficiently be gleaned from the commentaries by Lloyd F. Kiff (North America) and Ian Newton (Europe). Of 29 regional status reports and one commentary, 22 papers indicate that populations were probably either healthy or recovering. Captive-breeding and restoration attempts may have played a role in five of the recoveries described, but population increases are also reported in 17 regions where reintroduction of captive-reared falcons was not a factor. The population trends were unknown in six areas. Enderson and coauthors report no improvement in a depressed population in the Rocky Mountain region, and Simon Thomsett believes, though lacking supporting data, that the population in Kenya is declining. David H. Ellis presents an optimistic picture of recovery in Arizona and suggests that sizable natural populations in the southwestern United States may be sufficient to repopulate naturally much of the Rocky Mountain region. The editors dispute this possibility, and Enderson *et al.* predict that restoration in Colorado and other western states will not occur for many years without supplementation by release of falcons bred in captivity. An addendum describes a doubling of the Rocky Mountain region population by 1987, refuting the slow-growth prediction and seemingly corroborating Ellis's thesis.

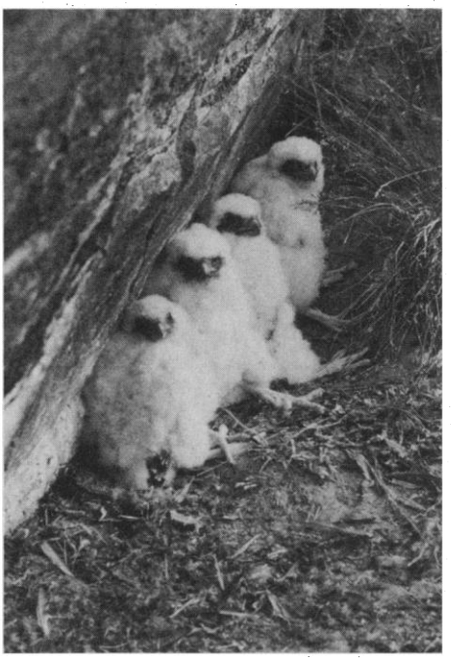


"Climbers place young Peregrines in a hack box in Grand Teton National Park, Wyoming. The pipe structure facilitates food delivery to the box from an easily accessible location." [G. Stewart; from *Peregrine Falcon Populations*]

Several papers in the section on chemical problems review previously published evidence firmly linking organochlorine residues to eggshell thinning and depressed reproductive success in predatory birds and provide an excellent synthesis of the "DDT syndrome." Several European biologists instigate a mild controversy by asserting that direct mortality caused by cyclodiene compounds such as dieldrin was a more important causal factor in documented peregrine population declines than previously thought in both Europe and the United States. Opposing this viewpoint, American authors, particularly Robert W. Risebrough and David B. Peakall, produce cogent support for the explanation that DDT compounds were the primary agents inducing decline in the United States. The relative importance of these classes of insecticides in causing the collapse of European populations of peregrines, however, is not clearly resolved.

The migration and banding papers advance new information on the heretofore little-known migratory phase of the species. Grainger Hunt and F. Prescott Ward's discussion of the vulnerability and possible importance of such staging areas as Padre Island may portend important conservation problems for the species.

The success of captive propagation and release programs was inculcated throughout the section on management, and for that matter throughout the volume. Yet data presented on how much captive-reared falcons actually contributed to recovering populations are generally imprecise, inconsistent, and difficult to follow. Perhaps the most impressive reestablishment of a peregrine population resulting from human-cultured falcons is that reputed to have occurred in East Germany. Helmut Brucher and Peter Wegner, however, caution that wild nestlings were marked in the same manner as captive-bred birds in Germany and the two could not be reliably distinguished. The figures of 25 and 40 reestablished (presumably captive-produced) pairs in 1985 are variously reported in different parts of the book as an indication of the success of the eastern United States restoration project. Although there is no question



"Four nestlings banded in Greenland. The male in the foreground was sighted at sea in October of the same year perched on a Russian ship. Seven years later, he was trapped as a breeding adult in Greenland." [C. Anderson; from *Peregrine Falcon Populations*]

that the captive propagation and release techniques are an important contribution, this section could have profitably incorporated objective parley about the successes and limitations of this management tool. Richard Fyfe's recommendation that follow-up study is essential before the success of captive-breeding programs can be evaluated should be heeded.

I found the papers on dynamics and ecology the most informative and stimulating part of the book. Debate between Hunt and Newton concerning the role of density-dependent population regulation in peregrines provides worthwhile reading. Jean-Marc Thiollay contributes some intriguing information on prey availability and foraging by peregrines in Tunisia. Although the data are limited, R. Wayne Nelson explores the possibility that large broods may be maladaptive in terms of parental survival. This question has important ramifications for management programs that strive to provide falcons with large or "optimum" broods. Newton concludes this section with some penetrating conjecture, including a suggestion that large cliffs preferred by peregrines may be more important for facilitating hunting and territory defense than for preventing the predation of nestlings as traditionally presumed.

The contributors to the short section on geographic variation in peregrine populations point out several potential applications of modern genetic analyses to both basic research and management programs. With the exception of Derek Ratcliffe's essay, I found that the series of papers dealing with humanity and the peregrine added little.

Overall, the volume represents a monumental effort in amassing knowledge of the peregrine falcon. Except for a few minor lapses, it is well edited. Its most distracting shortcoming is the certitude with which many of the principal contributors view the release of captive-bred falcons as successful without critical evaluation. Most important, the book provides an informational foundation for fostering advancement in several areas of conservation biology. A framework for future inquiry is elegantly embodied in the four "irreverent questions" posed by Nisbet: What caused the population crashes? What is known about the population dynamics of peregrines? What is being learned about the biology of the peregrine from captive breeding programs? and Where have all the captive-reared birds gone?

JAMES C. BEDNARZ
Hawk Mountain Sanctuary Association, Kempton, PA 19529

An Environmental Problem

The Acid Rain Controversy. JAMES L. REGENS and ROBERT W. RYCROFT. University of Pittsburgh Press, Pittsburgh, PA, 1988. xviii, 228 pp., illus. $24.95; paper, $12.95. Pitt Series in Policy and Institutional Studies.

This is a useful update on the acid rain debate during the Reagan years. The book draws heavily on studies by the Environmental Protection Agency (Regens was an EPA staff member in the early 1980s). It also presents interesting information about state initiatives designed to monitor and curb emissions. The book begins with a historical overview of air pollution controls in the United States. Chapter 2 deals with scientific evidence regarding acid rain and with relevant federal research support. This chapter leaves out new findings on acid rain in the American West and is weak on forest damage. Chapter 3 summarizes a wealth of technical information on acid rain control technologies, and chapter 4 does the same with respect to the cost of and financing options for control. The last two chapters review the many variations on the Reagan theme of "research yes, action no" and the unsuccessful attempts of the Congress to enact new legislation for reducing SO_2 emissions. The regional divisions between "polluters" (the Midwest and high-sulfur coal states) and "victims" (primarily the Northeast and Canada) are clearly articulated.

The authors do not take positions on the policy issues. They, like others, seem to be torn between two considerations. On the one hand, the complexities of the scientific and economic sides of the issue are increasing. Therefore, the Reagan approach may have had a point. On the other hand, waiting for a strong political consensus in support of control just does not seem enough. This is where the book falls short of what we now need in the growing literature on acid rain. I would have liked the authors to link their report to some broader questions: Have recent scientific findings changed the nature of the debate? Why is the search for new controls so much focused on reducing SO_2, with relatively little attention to the role of NO_x? What does it take to achieve a national consensus in favor of action? After all, acid rain has been on the policy agenda for two decades. Why are controls in this case more elusive than for conventional forms of air and water pollution, or pesticides, toxic substances, and industrial wastes? In those instances we may still be far from satisfactory solutions, but at least we have decided to act. We have not done so in the case of acid rain, at least not in the United States. Actions on the part of Europe and Canada are noted with approval. Though these countries have agreed on reductions in SO_2 emissions (but not NO_x), it remains unclear whether their actions will move them ahead of the United States, whose regulations were previously imposed under the Clean Air Act. The agreed-upon reductions, after all, are from current levels, giving a country with a lenient baseline a longer way to go before it will match standards that were imposed elsewhere during the 1970s.

Let me suggest three possible scenarios that might provide a strong enough incentive for the enactment of legislation: (i) evidence of direct health threats from acid deposition, such as toxic substances in drinking water; (ii) widespread economic damage, such as loss of crops, forests, or historic buildings; and (iii) linkage between acid rain and other problems of pollution, such as global warming. The first two justifications for controlling acid rain are considered by Regens and Rycroft, the third is not. Arguments 1 and 2 have received more attention in Europe than in North America. Effects of acid rain on health remain unclear. The damage to crops is limited, and the decline of forests is now seen as the result of many factors, including SO_2, NO_x, ozone, pests, climate, and management practices. Damage to historic buildings is well documented and massive. The argument that sustainable development will be