

NEWS AND REVIEWS

Flight strategies of migrating hawks by Paul Kerlinger. University of Chicago Press, Chicago, 1989. xv + 375 pp. ISBN 0-226-43166-5. Cloth, \$60.00 U.S. ISBN 0-226-43167-3. Paper, \$19.95 U.S.

Much of the literature on avian migration is based on counts of birds moving past various strategic locations where they are concentrated over relatively small areas by local geography. The focus of this monograph takes the reader away from such an approach to migratory raptors and looks instead at the mechanics of migration, emphasizing the quantification of numerous aspects of migratory flight in Falconiformes and the development of testable hypotheses. Kerlinger views his contribution as the second of a three-step process toward a better understanding of migration. The initial step, which provided the foundation for Kerlinger's work, was Heintzelman's (1975. Autumn hawk flights. the migrations in eastern North America. New Brunswick, New Jersey; Rutgers University Press) summary of the information available up to the mid 1970s. As the second major step, Kerlinger's monograph establishes a much stronger empirical basis and develops testable hypotheses for the third phase of the process which will integrate this information into a comprehensive theory on migratory flight strategies and provide insight into how natural selection affects the development and evolution of migratory behavior.

Kerlinger begins the monograph with four chapters introducing general concepts of hawk migration and its study. In Chapter 1, migration is defined in spatial and temporal terms and all Falconiformes are placed in one of four categories: nonmigratory, irruptive, partial migrants, and complete migrants. The ecology and geography of migration are briefly reviewed and hypotheses regarding the development of differential migration are presented. Chapter 2 calls into question many of the results from studies conducted at migration (trapping) stations and the interpretation which has been given to these data, particularly those studies which attempt to explain the behavior of birds based solely on counts of raptors moving past these stations. There is a detailed description of the functions and activities of hawk migration stations, and Kerlinger does an excellent job of reviewing the different methods used to study migrating hawks, as well as analyzing their validity and reliability.

Beginning in Chapter 3, and throughout the remainder of the monograph, Kerlinger uses the analogy of human flight in small aircraft to address questions of avian flight strategies. It proves to be a useful analogy which greatly enhances the reader's understanding of the constraints placed on birds through comparison with powered and unpowered flight by man. Kerlinger proposes that migratory flights must be based on a plan or strategy which molds the behavioral, morphological, and physiological adaptations of migrants through natural selection. To facilitate the examination of this process, Kerlinger produces a flow diagram dividing migratory behavior into the components of morphology, physiology, and behavior, which act in concert with geography, weather, and topography to form a migratory strategy. On this basis, he develops the hypotheses to be tested reflecting the decision-making process of migration. In the final chapter of this introductory section Kerlinger gives a detailed description of the structure of the atmosphere as it relates to soaring flight. The focus of this chapter is the extensive variability of horizontal and vertical wind conditions and the effect that this has on the flight behavior of migrants.

Chapter 5 provides an overview of present theory on flight mechanics. Types of flight utilized, flight morphology (and its components of wing span, mass, wing area, and tail area), flight energetics, gliding aerodynamics, and ecomorphology are examined. The remainder of the monograph examines these theories based on the literature with a heavy emphasis on the work carried out by Kerlinger and various associates using direct observations and radar techniques over a period of about 10 years. In Chapter 6, the characteristics of raptors which allow them to take full advantage of even the weakest updrafts are discussed, particularly in relation to flight morphology, aerodynamic performance, and the ability to take advantage of thermals through behavioral modifications of the wing span, wing area, tail area, and wing tip configuration. A weakness of this section, noted by Kerlinger, is the lack of empirical data to test these theories. Data are available for only 8 species of raptors; therefore, Kerlinger also includes data for nonraptors as well as insects, bats, motorized sailplanes, and hang gliders to assess the capabilities for gliding and soaring by a wide range of sizes and shapes.

In studying the role of navigation during migration, most theories on hawk movements suggest that individuals are subject to wind drift and unable to compensate for windy conditions during flight. The large numbers of birds seen on migration over count stations in eastern North America during westerly winds has been suggested to strongly favor such hypotheses. Kerlinger disagrees with the wind drift hypothesis. He presents a number of alternatives which focus on the use of flight direction in relation to wind direction, during both soaring and gliding bouts, to examine the

orientation abilities of migrating hawks. As an alternative, he suggests that most migratory paths are in fact curved lines, ellipses, or loop migrations with partial drift due to prevailing winds and the resulting overcompensation.

The altitude of migrating hawks was poorly known prior to the use of radar technology and sailplane studies. Chapter 8 presents information on the close correlation between the development of thermals through the day and the increase in migratory altitude from early morning to midday and early afternoon when the convective layer has developed. Because most smaller hawks are difficult to see above 400 m even with binoculars, and many appear to migrate at 500 m and above, Kerlinger suggests that noonday lulls and other such daily rhythms in migratory counts are likely biases and not good indicators of the number of hawks actually passing any specific point.

In Chapter 9, Kerlinger examines the flocking behavior of migrating hawks. He presents several hypotheses which may explain the advantages of flocking and examines the flocking tendencies among migratory species. Kerlinger also addresses the water crossing behavior of hawks during migration. He examines this behavior in relation to the ecomorphology of the species involved, relating the tendency to make longer crossings to species with long narrow wings (high aspect ratio) which lead to faster, powered flight, along with consideration of wind and visibility conditions.

The selection of flight speed in relation to maximizing the distance travelled is discussed in Chapter 11. Kerlinger addresses the hypothesis that migrating hawks adjust their flight speeds to maximize the distance travelled by measuring flight speeds of several species under different wind and lift conditions. In Chapter 12, Kerlinger models the daily flight distances of migrating raptors under conditions of flapping flight, ridge-gliding, and thermal-gliding, with wind direction and speed simulated to take into account trailing, opposing and lateral wind conditions. Little information is available from free-living birds on daily migration distances. The models presented here will be useful in testing hypotheses regarding flight strategies through the use of aircraft, radar, and telemetry to examine these hypotheses.

The final chapter summarizes the ongoing themes which permeate the monograph, the diversity and variability of flight behavior of migrating hawks within and among species. Kerlinger argues strongly that this variability should in fact be considered from the opposite viewpoint, that of behavioral plasticity which enables migrating birds to adjust to the continued variation in the media through which they are moving. Additionally, and perhaps more importantly, Kerlinger poses a series of questions for future work which have arisen from the current level of knowledge regarding behavior, physiology, morphology, and ecology. Some of the problems he raises are already beginning to be addressed, but many of the areas outlined will require long and expensive work with radiotelemetry, monitoring the movements and physiology of birds as they migrate between wintering and breeding grounds.

Although Kerlinger identifies his audience as both the scientific community and the general public, those of the latter group may have some trouble with certain technical aspects of the monograph. The use of statistical analyses and mathematical modelling may leave even the most ardent of nonscientific readers somewhat at a loss as to the meaning of the material covered in some chapters. However, this monograph is generally well organized throughout. It begins with a series of chapters which provide a basic overview of the subject and help the reader to assess the information to follow in the second section where theory and empirical data are presented. As well, Kerlinger does a creditable job of putting much of the material into perspective during his discussion of each chapter; within each chapter he also has provided a very useful section of summary and conclusions. Provided those readers less familiar with the analytical techniques used are willing to make their way through the initial theoretical development of many chapters, they will find some very informative and stimulating discussion of the strategies involved in avian migration. The level of knowledge concerning migratory behavior has risen substantially in the last decade and general principles are now beginning to be identified. Kerlinger has done a good job of bringing the reader up-to-date on the theoretical basis for studying migratory behavior in hawks.

Writing a monograph which is, at the same time, readable to an interested member of the general public and useful as a reference to scientists in the field, is a difficult task. While some parts of the text may be difficult for the amateur ornithologist, Kerlinger has succeeded in providing what should be a most useful and thought-provoking monograph for all concerned with the study of migratory behavior.—**Ian G. Warkentin**

Raptor Research Foundation, Inc. LIFE MEMBERS**THE HAMERSTROMS**

Frances and Frederick Hamerstrom are affectionately known to most *Foundation* members as Fran and Hammi (the “a” is pronounced with a Boston accent). The Hamerstroms’ infectious fascination for raptors and their convincing call for genuine understanding has spurred raptor enthusiasts, young and old. Fran and Hammi were there, and could be counted on, in 1966 when the Raptor Research Foundation, Inc. hatched. Fran and Hammi became life members in 1988. They have attended all of the Foundation’s Annual Meetings to date. Fran has served as Central Director; Frederick has served as a major ref-

eree for many years, helped edit the seminal raptor management techniques manual “Management of Raptors” and drew up the Foundation’s resolutions at almost every meeting.

The Hamerstroms’ devotion to raptor biology was and is positively exemplary. They conducted most of their work on raptors using personal funds in off-hours from their regular positions. Their first major paper, “The Great Horned Owl and its prey in north-central United States” by Paul L. Errington, Frances Hamerstrom and Frederick Hamerstrom, was written when Frederick was a graduate

student and Fran an undergraduate at Iowa State College. This paper won the Wildlife Society Award in 1940.

As to early interests, Frederick writes, "I remember when I was a kid imitating soaring red-tails calling. None ever came down to me." Fran feels that her lifelong practice of falconry has heightened her skill as a raptor researcher. She took her first quarry with a kestrel in 1919.

Fran and Hammi diligently kept on top of ornithological literature. Their bookshelves bend under the weight of volumes of European and North American journals. Despite a fervent interest in what others wrote, the Hamerstroms turned to the birds themselves for inspiration and ideas.

Catching and marking raptors has always been of passionate interest to the Hamerstroms. Their methods have been described in technical papers—and with far more detail and flavor in "Birding with a purpose: of raptors, gaboons and other creatures." This book won the Council for Wisconsin Writers Award in 1984. Fran and Hammi have published 69 technical papers, a number of popular accounts, 1 poem on raptors, and the following books written by Fran and edited by Frederick:

Birding with a purpose: of raptors, gaboons and other creatures. Iowa State University Press.

Harrier, hawk of the marshes: the hawk that is ruled by a mouse. Smithsonian Institution Press.

Birds of prey of Wisconsin. Wisconsin Department of Natural Resources.

Eagles, hawks, falcons and owls of America. Roberts Rinehart.

An Eagle to the Sky. Lyons and Burford.

Soon to re-appear is: **Adventure of the stone man**, a children's book; Lyons and Burford. **Bird trapping and bird banding**, by Bub, Hamerstrom and Wuertz-Schaefer, is in press; Cornell University Press.

Fran markets her own books and all proceeds go to research on birds of prey (Rt. 1, Box 448, Plainfield, WI 54966). Fran also writes books with messages other than raptor biology. Her latest, "**Is she coming too?—Memoirs of a lady hunter**," recently took first place for the best non-fiction book in 1989, presented by the Council for Wisconsin Writers.

The Hamerstrom's international household is most remarkable. Their daughter, Elva, and son, Alan, have been exchanged with the kids of notable German biologists, among them Nobel laureate Konrad Lorenz. Fran and Frederick live in a stately old house modestly equipped with modern conveniences. Fran's pies are legendary; on these a few gaboons have had their table manners polished. The house was always open to their many friends, not just those interested in raptors, but those with a genuine interest in music, life and humanity.

IN MEMORIAM

FREDERICK N. HAMERSTROM

1909–1990

Frederick Hamerstrom, known to most people as “Hammi,” died in March in a log cabin overlooking coniferous forests and the rushing waters of Oregon’s North Umpqua River—a scene symbolic of the beauty and the wild landscape that he loved all his life.

With Fran, his wife and teammate for 60 years, he pioneered in the field of wildlife research, delving into the ecology, life history, and management of prairie chickens, sharp-tailed grouse, pheasants, bobwhite quail, great horned owls, hawks, ospreys, sandhill cranes, white-tailed deer, and furbearers. He was one of the world’s foremost authorities on grouse, and is best known for his landmark research on prairie chickens and the development of a habitat management plan involving preserving a scatter pattern of grassland areas to provide essential life support—a strategy that saved the disappearing prairie chicken in Wisconsin and one that is used now in the management of other critical species and habitats elsewhere in the country and in the world.

After graduating from Harvard with a degree in English Literature, he turned to his love of wildlife, and with Fran embarked on a career of wildlife research and management long before such a field was formally established. He earned an M.S. under Paul Errington at Iowa State University, and a Ph.D. under Aldo Leopold at the University of Wisconsin. His field studies took him to Necedah, Wisconsin as a project game manager for the Resettlement Administration, to the Edwin S. George Reserve of the University of Michigan as a field biologist, and to Portage County in central Wisconsin where he led the prairie grouse research for the Wisconsin Conservation Department and its successor the Wisconsin Department of Natural Resources for 23 years.

His studies, speaking engagements, and participation in international meetings have taken him throughout the United States and Canada, Mexico, Europe, Russia, and Australia.

Hammi worked closely with Fran in raptor research and helped form the Raptor Research Foundation. Besides working with eagles and a variety of hawks and owls in Wisconsin, they spent the last 17 winters trapping and banding Harris hawks in Texas, and carrying out nesting studies on ospreys in Mexico.

He was not only a researcher, but an author (authored or coauthored with Fran 69 technical papers, and reviewed some 40 others) and a meticulous editor of countless writing efforts of students and peers alike. He was also an outstanding teacher, not in the classroom, but as he worked with students and colleagues in the field and patiently instructed thousands of volunteer observers about to enter the prairie chicken blinds. Many honors came to Hammi and Fran, among them the Wildlife Conservation Award of the National Wildlife Federation (1970), two Wildlife Society Publication Awards in 1940 and 1957, the Wisconsin Department of Natural Resources Bureau of Research Award (1973), and the United Peregrine Society Award (1980). Since 1972 both Hamerstroms have served as adjunct professors in the College of Natural Resources at the University of Wisconsin-Stevens Point.

The name Frederick Hamerstrom will forever be in the annals of natural science. He was world-renowned, but he preferred to continue his simple life, without a lot of modern amenities, in tune with the land. His keen mind continually kept track of new research developments, helped young wildlife ecologists write in clear concise language, encouraged Fran (he was her best critic and editor) in capturing their life and times in her books. In unselfishly offering his help to so many others he often deferred his own personal agenda. There was an elegance about this soft-spoken gentle man, and a deep conviction about the integrity of the natural land community, with wildlife an integral part—for the role it played in the community, and for the thrill it provided in the hunt.

His devotion to accurate wildlife research is shown in this anecdote that Fran tells. They had trapped and banded 1200 Harris hawks in Texas and examined 70 feathers on each one. “Darling, don’t you think we have enough?” “I don’t think so,” Hammi answered, “but we’re mighty close.”—**Ruth L. Hine, Wisconsin Department of Natural Resources (retired), 3609 Nakoma Rd., Madison, WI 53711.**

1989 LESLIE BROWN MEMORIAL GRANT RECIPIENTS



Gerard Malan

Gerard Malan was awarded financial support from the Leslie Brown Memorial Grant to extend his study of the "Incidence and abundance of polyandry in the Pale Chanting Goshawk" in South Africa. The aim of this work is to elucidate the relative importance of potential selective factors in the evolution of polyandry in this species. Gerard Malan will compare the performance of trios with the performance of pairs, examining nest attendance, breeding success and hawk survival. In particular, he will be focusing on the role of habitat structure and prey availability as proximal causes of polyandry.

Gerard Malan was born in 1959 in Cape Town. After finishing high school and military service, he enrolled at the University of Stellenbosch where he received a B.Sc. degree in Agriculture in 1984 and an honors degree in Nature Conservation in 1986. His honors research project dealt with the behavioral ecology of the Greywing Partridge. In 1986-1987 he worked as a research manager for a pharmaceutical company. In 1988, he began his graduate research on the Pale Chanting Goshawk at the Percy FitzPatrick Institute of African Ornithology, University of Cape Town. During his first year studying this southern African endemic raptor, he discovered that some of the "pairs" he was observing in the Little Karoo were actually cooperative, polyandrous trios.

Anthony J. van Zyl was awarded support for his work on "Habitat utilization of the Red-breasted Sparrowhawk" along a 31 km stretch of the Tarka River in the Tarkastad District of South Africa. He has plans to continue his work for many years, hoping to elucidate the influence of habitat quality on philopatry, reproductive success and survival in this species.

Anthony J. van Zyl became interested in birds at an early age. When the family moved to a rural sheep-farming area, he began studying and breeding racing pigeons. He also developed an interest in birds of prey and found Leslie Brown's "Eagles of the world" and "Birds of prey, their biology and ecology" a great source of inspiration. He plotted Black Eagle nests in the district and checked the nests during school vacations. He was further stimulated by the ornithologist at the East London Museum, Carl Vernon, who took him on several field trips and encouraged his interest in birds of prey.

When the family moved to the city of Pretoria, he began observing suburban birds such as the Crested Barbet. He also helped to protect a colony of Cape Vultures by going on patrol with the Vulture Study Group. With Alan Kemp of the Transvaal Museum, he started one of two Lanner Falcon breeding units in the country at that time and successfully raised Lanner Falcons.

Anthony J. van Zyl obtained his B.Sc. at the University of Pretoria and completed his honors course at Rhodes University. He hopes to enroll for his M.Sc. degree at the University of Cape Town in 1990. At present he is involved in projects on Elephant-shrews, the Cape Sugarbirds, the Crested Barbet and the Red-breasted Sparrowhawk. He is a member of the Northern Transvaal Ornithological Society and the Zoological Society of South Africa.

The Hawk Mountain Sanctuary Association jointly awarded the 1990 **Hawk Mountain-Zeiss Raptor Research Award** to Eduardo E. Iñigo Elias at the University of Florida and Karen L. Wiebe at the University of Saskatchewan. Iñigo's project was entitled "Effects of forest fragmentation on a tropical raptor community in the biosphere reserve of Montes Azules in the Lacandona region of Chiapas, Mexico" and Wiebe was studying "The effect of food supply on reproductive decisions and success in the American Kestrel."

The Hawk Mountain Sanctuary Association is now accepting applications for its fourteenth annual award to support student research on birds of prey. Support for this award is provided by Carl Zeiss Optical, Inc. Up to \$2000 in funds are available and will be awarded to one or two recipients. To apply, a student applicant should submit a brief description of his or her research program (five pages maximum), a *curriculum vitae*, a budget summary including other funding anticipated, and two letters of recommendation to **James C. Bednarz, Hawk Mountain Sanctuary Association, Route 2, Kempton, PA 19529, USA**. The deadline for applications is 15 November 1990. The Association's board of directors will make a final decision in February 1991. Only undergraduate and graduate students in degree-granting institutions are eligible to apply. The awards will be granted on the basis of the project's potential to improve understanding of raptor biology and its ultimate relevance to the conservation of raptor populations. Applications from anywhere in the world will be considered.

The **National Wildlife Rehabilitators Association** announces its small grants program. This program makes available two \$1000 research grants in the field of wildlife rehabilitation. Each may be applied to one large project or several smaller research projects totaling less than \$1000. Applicants must demonstrate financial need and submit a typewritten proposal that includes: name(s) and résumé of personnel involved, objectives of the project, a brief description of how the project will be carried out, a brief literature review and an itemized budget.

An annual report on progress is required. It is expected that those receiving NWRA support will present the results of their projects at an NWRA national meeting within 2 years of receipt of the grant.

The deadline for submitting proposals for research grants is *December 15* of each year. Recipients will be announced at the NWRA annual meeting in February and in writing.

Proposals should be submitted to: **Mark Pokras, Tufts University School of Veterinary Medicine, Wildlife Clinic, 200 Westboro Road, North Grafton, MA 01536**.

Opportunity exists for Graduate Study for two highly qualified students to begin a M.Sc. or Ph.D. program in the Department of Biology at the University of Saskatchewan. Successful applicants would be continuing long-term population studies of Merlins or Peregrine Falcons. Write **L.W. Oliphant, Department of Veterinary Anatomy, University of Saskatchewan, Saskatoon, SK, CANADA S7N 0W0**.

Literature on falcons wanted! For the past 5 years I have been collecting literature on the Peregrine Falcon (*Falco peregrinus*) and related species (*pelegrinoides*, *deiroleucus*, *fasciunucha* and *hypoleucos*) along the lines of the "Working Bibliography of the Peregrine Falcon" which appeared in 1987. Presently, my collection comprises over 3000 titles. The aim is to assemble all available references on that subject worldwide, and build a central literature collection, which will be the basis for a planned monograph on the Peregrine Falcons of the world. Herein, all knowledge about this group of falcons will be summarized in a handbook-like fashion, similar to the work by Cramp & Simmons, "Birds of the Western Palearctic." In order to complete this collection and keep it updated, I would be grateful for your support by sending me lists of publications, personal reprints (originals if possible), and papers from authors which are no longer needed. For those interested, the perusal of my collection is possible, and copies from publications can be obtained. —**Dieter Schmid, Peregrine Bibliography, D-8130 Seewiesen, FRG**.

Fran and Frederick Hamerstrom Award. In honor and recognition of Drs. Fran and Frederick Hamerstrom, the Raptor Research Foundation, Inc., has established an annual award to recognize significant contributions in raptor natural history and ecology. The Hamerstroms have contributed significantly to the understanding of raptor ecology and natural history through their long term ecological studies. Beginning in 1990, one award will be made annually.

There are no restrictions to eligibility for this award, although active membership in the Raptor Research Foundation, Inc., is encouraged. To be considered for this award, candidates must be nominated by a member of the Raptor Research Foundation, Inc. Nominations should include: 1) the name, title, and address of both nominee and nominator, 2) the names of 3 persons qualified to evaluate the nominee's scientific contribution to the study of raptor ecology and natural history, and 3) a brief summary of the scientific contribution of the nominee. Nominations will be evaluated on the basis of scientific contribution and productivity. An individual may not receive this award more than once. The award will consist of an engraved plaque to be presented at the Annual Meeting of the Raptor Research Foundation, Inc. Nominations must be submitted by 15 August of the year in which they are to be considered and sent to **David E. Andersen, Chair, Fran and Frederick Hamerstrom Award, Minnesota Cooperative Fish and Wildlife Research Unit, 1980 Folwell Avenue, St. Paul, MN 55108 U.S.A.**

Leslie Brown Memorial Grant. In memory of one of the most inspired and productive raptor biologists, the Raptor Research Foundation, Inc., announces the availability of a grant, for up to \$1,000. This grant is to provide financial assistance for research and/or the dissemination of information on birds of prey.

Applicants must send a résumé, specific study objectives, an account of how funds will be spent, and a statement indicating how the proposed work relates to other work by the applicant and to other sources of funds. Proposals concerning African raptors will receive highest priority between proposals of otherwise equal merit. A complete application must be received by September 15, 1991. Proposals, donations and inquiries about tax exempt contributions to the fund should be sent to **Jeffrey L. Lincer, Chair, RRF Leslie Brown Memorial Fund, 4718 Dunn Drive, Sarasota, FL 34233 U.S.A.**