The Implication of Present-Day Bird Movements In The Evolution Of Bird Migration

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During 1985 I established a fund with the Inland Bird Banding Association from which, it was stipulated, the income yielded was to be used in support of research on bird movements as they relate to the evolution of bird migration. My goal was to generate research testing my proposal on the evolution of bird migration published in North American Bird Bander (Stewart 1980) and to develop an improvement in understanding of present-day bird movements, particularly as these relate to the development and operation of migratory behavior.

The inappropriateness and scarcity of applications received suggest applicants and potential applicants are poorly informed on the nature of the research desired and do not understand how valuable a small bit of information can be. This suspicion is reinforced by McNicholl (1986) in his review of a book by McClure (1984) which failed even to mention my proposal when discussing use of banding data in study of bird movements. McNicholl stated that "While the role of banding in helping to define present migration routes seems obvious, the relevance of geological history to banding studies may not be so readily apparent. Reference to papers such as that of Stewart (1980) would have added substantially to the chapter."

To recapitulate on my explanation for the development of migratory behavior in birds (Stewart 1980) and to reduce the explanation to its simplest form, migratory birds are believed to inherit a tendency to disperse into all compass directions from their breeding and hatching places soon after the reproductive season, termed radial dispersal. Among the southern nesting "white herons" radial dispersal is now seen as northward movement after the nesting season; among northern nesting wood warblers and radial dispersal is now seen as southward migration. In some species, for example, Wood Ducks (*Aix sponsa*), radial dispersal and southward migration now occur as two distinct movements (Stewart 1979). Individual birds may be involved in both dispersal and migratory movements if the dispersal takes them into regions with unsuitable winter habitats. They may remain to spend the winter if the dispersal movement takes them into a suitable habitat.

My belief that radial dispersal of birds is importantly related to the evolution of their migratory behavior arose from my analysis of banding data when researching movements of Wood Ducks (Stewart 1957). I became convinced that both radial dispersal and southward migration occur during the autumn among Wood Ducks (Stewart 1979) and that radial dispersal may be a widespread phenomenon among birds. It soon became apparent that the movement patterns of various species needed to be examined for the possibility that radial dispersal and southward migration may be separate movements in some species and the same movement in others.

A full understanding of the pattern birds follow in movements from breeding to wintering grounds, their behavior on their wintering grounds, and patterns of return to their breeding grounds is needed for a full understanding of the evolution and development of migratory behavior. Research showing that Palm Warblers (*Dendroica palmarum*) have a fixation on specific sites on their wintering grounds soon after arrival there (Stewart and Connor 1980) was particularly helpful in motivating research showing that hatching-year wood warblers migrate from their breeding to their wintering grounds without following after-hatching-year birds (Stewart 1983). This, in turn, motivated further research showing a higher mortality rate of after-hatching-year than hatching-year wood warblers in their over-ocean flights from breeding grounds to coastal Virginia (Stewart 1986).

Radial dispersal, associated with population pressure, takes the birds away from their hatching and breeding places, but return to the breeding grounds and contact with others of the same species is essential if species are to be perpetuated. Thus, with onset of the reproductive season, the homing instinct is aroused, with the birds returning to their breeding grounds. A good example of the importance of homing in the development of migratory behavior is available in the case of an incubating Screech Owl (*Otus asio*) remaining where it was released 6.5 km from its nest (Stewart 1969). Screech Owls, of course, are nonmigratory and do not need the same homing ability as long-distance migrants.

I have concluded that the best method for conveying information on the type of research being sought and to be supported is to present a list of my personal publications on the subject. A study of this list and the papers involved will reveal the general scope of research I consider relevant.

Literature Cited And List Of Relevant Personal Publications

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McNicholl, M.K. 1986. Review. N. Am. Bird Bander 11:138-139.

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____. 1982. Migration of Blue Jays in eastern North America. N. Am. Bird Bander 7:107-112.

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