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## The Origin of the Kirtland's Warbler.

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Just as a non-essential character in an organic being often forms a better clue to its true affinities and lines of descent than more fundamental structures; so, the study of a rare and economically unimportant species may be more productive of results than that of wide spreading, dominant forms. In the latter case the very multiplicity of data may be confusing and render it difficult to separate the pertinent from the impertinent, the local phenomena from the general. In following out and determining exact migration routes this is particularly true, and when we attempt to reconstruct the past history of a race the more narrowly we confine our attention, the more promise we have of arriving at approximately correct conclusions. Dr. Conan Doyle has made his hero, Sherlock Holmes, say words to this effect, that the more outre and uncommon the conditions are surrounding a discovered crime, the more easily should the sleuth find out the committer of the deed. This, if the reasoning is sound, should apply as well to scientific as to criminal investigation. In this light it appears that Kirtland's Warbler (*Dendroica kirtlandi*), affords peculiar opportunities for investigation and perhaps a little speculation along these lines may be of some value, even if the only result that comes therefrom is vigorous attack and final denial. A questionable, or even false, theory, honestly advanced, may be of benefit, for the subsequent discussion and final refutation it may bring forth, if for nothing more.

The records of Kirtland's Warbler are few and mostly far between. The first specimen was likely taken about 1840, though it was not finally described until 1852, from another bird taken by Mr. Chas. Pease, near Cleveland, Ohio, the year before. From time to time various specimens have been taken up and down the Mississippi Valley, and at isolated points in the East, including one record from Toronto, Ont. The winter habitat was found in the Bahama Islands, where it proves to be fairly common, but though Ohio and Michigan were the States accredited with the greatest number of records, it was not until 1903 that its breeding grounds were found by Mr. Norman A. Wood (Bull. Mich. Ornith. Club, Vol. V., pp. 1-13), in Crawford and Oscoda Counties, Mich., where it seems to be a not uncommon summer resident. In the same issue Mr. Adams traced out the probable migration route of the species and followed it from the time it left the island home in the southern seas until

it reached its northern breeding area in the Jack Pine plains of Michigan. Some of the theories Mr. Adams founded his argument upon have been challenged by no less an authority than Prof. W. W. Cooke (An Untenable Theory of Migration), but the conclusions of the present route which he mapped out has not been questioned. According to this the bird under discussion crosses to the West Florida coast and passes on to the valley of the Mississippi by way of the Pine Barrens of the South. Thence up that great highway. The Michigan individuals branch off from this and enter Michigan along the Ohio River and its branches and reach the breeding grounds by journeying up the eastern side of the State. There may be other breeding grounds not yet discovered, and there probably are such, but this is the sum total of our knowledge of the species at present. The birds do not seem to be a weak race, for at either end of their range they are fairly common and seem to hold their own successfully with the competing forms about them. The extreme localness of their distribution demands explanation and incidentally raises other questions. All life tends towards increase and will do so until some destructive influence prevails to counteract the natural prolificacy of the race. There are always adaptations and influences working both for and against each species. As the population increases the harmful ones increase in greater proportion than the other, until the time comes when the two antagonistic powers are in equilibrium, when for the time being we have a stationary population. The abundance of a bird can be regarded as represented by the sum of a long sequence of plus and minus quantities of unknown value.

As far as our knowledge goes there is no bar to the increase of Kirtland's Warbler at the northern end of its range. It is common in certain restricted localities and we can see no reason why it should not be equally common in like situations, of which there are many, elsewhere. That it is not so shows either that we do not understand the required conditions, which is probable, or else that the check comes at some other point of its range, which is more probable still.

Up and down the migration route our knowledge of the bird and its needs is too fragmentary to afford us any clue, nor is it likely that in its transitory stops at various points it would meet any enemy that would seriously affect its numbers. In the Bahamas, however, the case is different, and we see from the very nature of the situation that the size of its range is very limited. In any certain area but a limited number of individuals of a species can exist. The food supply alone would be sufficient to support but a certain definite number. Add to this other hostile elements of the environment which inevitably occur

