

BIRDS AT THE EXTREMITIES OF THEIR RANGES

BY MAURICE BROOKS

FOR the biologist a peculiar interest attaches to plants and animals at the extremities of their geographical ranges. These are the pioneers pushing out to conquer new lands, or the remnants of a retreating army fighting a rear-guard action against adverse factors. The ecologist will always speculate as to the limiting factor in the environment, seeking to find and explain the circumstances which permit existence up to, but not beyond, a certain line. The twin dramas of dispersal and occupancy seem very real in such critical situations.

I happen to work in a region where a considerable number of birds are approaching or actually reaching their northern, or their southern, limits. A few species are at their longitudinal limits within the area, but these are not so conspicuous as are those which are at their latitudinal boundaries. Within West Virginia such northern birds as Wilson's Snipe, Saw-whet Owl, Hermit Thrush, Olive-backed Thrush, Nashville Warbler, Northern Water-thrush, Mourning Warbler, Bobolink, Purple Finch, Savannah Sparrow, and Swamp Sparrow reach their known southern limits, while Alder Flycatcher, Olive-sided Flycatcher, Tree Swallow, Red-breasted Nuthatch, Brown Creeper, Winter Wren, Short-billed Marsh Wren, Golden-crowned Kinglet, Henslow's Sparrow, and a number of warblers are approaching such limits. The Black Vulture and Swainson's Warbler are not known to breed farther north, while Bewick's Wren, Carolina Wren, Acadian Flycatcher, Carolina Chickadee, Mockingbird, Blue-gray Gnatcatcher, White-eyed Vireo, Sycamore Warbler, Kentucky Warbler, Summer Tanager, and Bachman's Sparrow are nearing their northern limits. West Virginia, therefore, offers excellent opportunities for observation on the pioneers or the retreating remnants among many bird populations.

After some study of the pertinent ornithological literature I have been impressed by two things; first, that descriptions of bird behavior made at points away from centers of abundance and near the range limits of the species, are often misleading as regards the species as a whole; second, that observations made at these range extremities may, as time goes on, have a peculiar value in tracing the origin and evolution of new races.

Ornithology owes a tremendous debt of gratitude to the scholarship and the literary talents of scientists and bird students in north-eastern North America. New England biologists have been fired with enthusiasm and blessed with the gift of words, beyond the rest of us; consequently they have portrayed the bird life around them in such a manner as to make other sections (the near-South, for example) seem ornithologically illiterate. The compiler of a manual turns naturally to those descriptions of a species which seem best to combine scholarship and literary excellence; consequently, and somewhat unfortunately,

many standard works use descriptions of certain species which relate to individuals away from the centers of their abundance. Hence they often misrepresent, or fail to present adequately, the species as a whole.

As a classic example of such descriptions one might take the bulk of the literature relating to the Yellow-breasted Chat (*Icteria virens*). I used to read of (and marvel at) this shy and unapproachable bird, difficult to see, almost impossible to photograph at the nest, the very essence of the elusive. Well, this just wasn't the Chat that I knew down on a bushy West Virginia farm at all. My birds lived in thickets it's true, but when I was picking blackberries the males would often sing in the locust trees above my head, easily observed and not at all shy. The pair that nested just below our house visited our yard regularly, and the male had a favorite singing perch in an apple tree in plain sight from the kitchen window. We found nests rather frequently, and I recall that my father photographed a Chat at its nest before he ever discovered the difficulty of the task. Here, obviously, was a matter which needed explanation.

In recent years I have had opportunities to observe Chats in more northern regions, southern Michigan and central Pennsylvania. To my surprise I have found them in these localities exactly as they are depicted in classic literature, wild and elusive. The explanation is of course that northern observers have judged Chats by the few birds which reach these range extremities, whereas West Virginia, lying much nearer the center of abundance for the species, has a population behaving in more typical fashion. George A. Petrides (*Wilson Bulletin*, 50, 1938:184-189), writing of Chats in and near the District of Columbia, has pointed out the relative tameness of birds which he has observed and photographed, and I do not find the emphasis on shyness in the writings of other southern observers. New England, New York, and Michigan birds, outposts of the species, have apparently overshot the mark, and seem nervous and unapproachable, but these individuals do not typify the species.

Let us imagine a description of the Robin written by one who had seen it only in the Shickshock mountains of the Gaspé. It might read somewhat as follows:

"A resident of the densest fir and spruce forests, where it breeds with Bicknell's and Olive-backed Thrushes. It is excessively nervous and difficult to approach, and can be observed only by the most careful stalking, and the greatest patience on the part of the bird student." Such a description might be absolutely true-to-life for the region, yet it would scarcely apply to the birds of our dooryards and orchards.

It is respectfully suggested to future authors and compilers of manuals that they make an effort to secure descriptions of the behavior of birds at or near the centers of abundance for the species, even though the words in which these descriptions are couched lack something of literary grace, and even though the authors of the words may be rela-

tively obscure local observers. Science, rather than literature, will be served by such efforts, but the results will certainly come closer to picturing the birds as they are.

It will be unfortunate if, in making the observations and drawing the conclusions above, I leave the impression of having regarded these behavior descriptions made at extremes of range as of little value. Quite the contrary is true.

Without attempting to delve into the tremendously interesting, and tremendously involved, question of the origin of races within a species, or even of speciation itself, it may properly be pointed out, even though it be trite to do so, that isolation of a given segment of the population from the main body seems to be of prime importance in racial separation. When birds (as other organisms) are found at the limits of their ranges the populations often occur in enclaves, disjunct from the remainder of the species' range. A mountain system may form the barrier between populations, bodies of water may intervene, or there may be a broad expanse of land which lacks suitable vegetative cover for a given species. In any event, we have in such situations conditions which seem ideal for the initiation of race separation.

Our ideas of the time required for racial separation are about as hazy as are our concepts of the criteria by which populations may justifiably be separated into races and species.¹ We certainly have little evidence of mutations within recent times which have, in nature, resulted in new bird races or species, nor have we been observing long enough to see clearly the workings of selection.

Realizing the difficulties of measurement and description involved in such situations, it seems perfectly logical to suppose that morphological or physiological differences may not always be the first to appear when racial separation is in process. A new behavior pattern may just as well initiate the modification. This is exactly where the importance of careful field observations made at the range extremes of species comes into the picture. In these variations of behavior may lie the clues to some of the racial separations which are occurring, or which may occur, in these disjunct populations.

The Wilson Ornithological Club has taken a proper pride in its objective—the study of the living bird in the field. What group of observers, then, may more fittingly search out and record for future students of the evolutionary process such detailed, and often seemingly unimportant, bits of information relating to variations in behavior patterns as are to be gathered where birds are reaching their geographical limits?

A few specific observations will give point to these remarks. Let us first consider Bewick's Wren (*Thryomanes bewicki*). This bird is

¹ One rare exception is R. E. Moreau's interesting estimate of the age of certain Egyptian subspecies (*Ibis*, 1930: 229-239).

approaching the northern limits of its range in West Virginia. As many writers have pointed out, it seemingly has had great difficulty in competing with the more aggressive House Wren. Whether or not this competition be the sole cause, Bewick's Wren is today largely absent from the broader river valleys, territory which it once occupied abundantly; local in much of the hill country; and really common only in mountainous sections, where it reaches the fringes of the red spruce forests at 4,000 feet elevation.

Bewick's Wren has shown itself to be a highly plastic species and has thrown off a number of races throughout its range. Although the birds which now nest at the borders of the spruce forest have not been shown to be racially distinct, may it not be that we have here the ideal pattern for a true racial separation? Certainly the environment of the southern highlands is quite different from any occupied elsewhere within the range of the species.

Another bird to watch is Swainson's Warbler (*Limnothlypis swainsoni*). Within recent years observers have learned that this bird, so long associated exclusively with the cane brakes of the south, also occupies a considerable area of the southern highlands in Tennessee, North Carolina, Virginia, and West Virginia. It nests at altitudes up to 3,000 feet or more, and chooses sites that are tangles of rhododendron, mountain laurel, hemlock, and American holly. So far as is known, there are no connecting populations between the coastal or river swamps and the mountains. A more perfect set of conditions for racial separation could scarcely be asked for. We have regarded Swainson's Warbler as a stable species which has not undergone any racial differentiation. However, we have no idea how long this mountain population has occupied its present range. If this be a comparatively recent extension, then we may be witnessing a case where behavior change precedes morphological modification.

In the case of Bachman's Sparrow (*Aimophila aestivalis bachmani*) we have an even more interesting situation. Dr. H. C. Oberholser has examined a number of West Virginia and Pennsylvania birds of this species, and he pronounces them indistinguishable from Carolina specimens. Yet, as I have pointed out in another paper (*Wilson Bulletin* 50, 1938:86-109), the northern birds very seldom build domed or arched nests, but such nests are almost invariable with southern birds. Here is a considerable behavior difference without any observable morphological change to accompany it. It would certainly be rash to say, though, that such a modification will not appear in time.

These are but a few instances. Mr. A. F. Ganier, in a paper before the Wilson Club in 1940, called attention to the morphological intergradation between Yellow-throated and Sycamore Warblers, despite the fact that behavior of the two races, at least in the selection of nesting sites, is quite different. In the southern portion of its range the Black-throated Green Warbler is by no means restricted to coniferous

forests, since it nests in many beech-maple, or oak-hickory, associations, with no conifers nearby. Such instances might be multiplied indefinitely.

Every paleontologist and every comparative anatomist mourns the relative scarcity of bird fossil remains. Yet no one imagines that evolution is finished, or that it is a static process. With every considerable range extension there arises the possibility that birds will be thrown into an environment so new that changes in behavior and changes in morphology may eventuate. We have seen, and marked, many such range extensions. The notes on bird behavior which we take today may guide the thinking of the student of evolution a good many years hence.

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AVES, ZOOLOGICAL RECORD, 77, for 1940 (published in 1941), 60 pp. By W. L. Sclater. 6 s + 4 d postage. Zoological Society of London, Regent's Park, London, N.W. 8.

For the seventy-seventh consecutive year the Zoological Society of London has published its classified index to the ornithological books and papers of the world. As during the first World War, the present volume reflects in its reduced size the unsettled state of our civilization. Only 830 titles are listed, compared with 1,446 for 1939. It should be noted that the former method of cross-indexing has been slightly changed and thereby definitely improved.

The volume was prepared by W. L. Sclater who has carried this burden since R. Bowdler Sharpe passed the duty on to him after preparing the 1908 index. Thus it is Sclater's thirty-second volume!

Ornithologists everywhere should support this important service and improve their knowledge of the subject by buying annual copies of the valuable Aves section.—J. Van Tyne.