

In the summer of 1932 there were at least twice as many Coots on the marsh, but no diving ducks, no Eared Grebes, and other species of birds were less numerous. Forster's Terns were seen often to attack Coots and drive them from the vicinity of terns' nests and young.

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BACHMAN'S SPARROW IN THE NORTH-CENTRAL PORTION
 OF ITS RANGE

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SCOPE OF THE STUDY

The latest (1931) edition of the A. O. U. Check-List gives the breeding range of Bachman's Sparrow (*Aimophila aestivalis bachmani* Audubon) as "Upper and Lower Austral zones in central Illinois (locally to southeastern Iowa), southern Indiana, southern Ohio, extreme southwestern Pennsylvania, and central Virginia south to central Texas, Louisiana, Mississippi, Alabama, and northwestern Florida." The present paper attempts a survey of this species as it occurs in West Virginia, southwestern Pennsylvania, and southeastern Ohio, with some notes on its occurrence in Virginia, Maryland, Kentucky, and Tennessee. It will be seen that this territory occupies a position in the north-central portion of the bird's breeding range, roughly midway between central Virginia and central Illinois. In the Check-List West Virginia is not specifically mentioned as within the breeding range, being included by implication only, nor is there any mention of Maryland. Data hereinafter included will show the regular (sometimes common) occurrence of Bachman's Sparrow in West Virginia, and its occurrence, at least occasionally, in western Maryland.

HISTORY

Within the territory covered by this paper the first record for Bachman's Sparrow was made in southeastern Ohio. Dr. Lawrence Hicks (in mss.) supplies the following data: "The first Ohio record was a specimen taken by Rev. W. F. Henninger on April 23, 1897, with others observed on May 3 and 6 of the same year, near South Webster in the Portsmouth region. The species was not heard from again until a specimen was taken by C. M. Weed August 18, 1900, at

Columbus. Next Miss Laura Gano found the species on April 25 and 27, 1901, near Cincinnati and subsequently obtained many sight records on Grosbeck Hill, Avondale, and College Hill, near Cincinnati. On April 23, 1903, Dawson collected a specimen on Rose Hill, near Cincinnati, in company with Miss Gano. This specimen is now in the Cincinnati Museum of Natural History.

"On June 10 and 11, 1903, Dawson found a nest of pure white eggs, and caught a juvenile bird near Sugar Grove, Fairfield County. From 1905 to 1915 there are no published records on the species, as there was practically no ornithological work done in the Ohio territory which this species occupies. Since 1915 much information on the species has been obtained, almost entirely by the various members of the Wheaton Club of Columbus."

In another paper Hicks (1935) states, ". . . it seems reasonably certain that this species has invaded the State [Ohio] from the south and southwest during the last half-century."

Writing in the WILSON BULLETIN in 1936, Miss Katie M. Roads records a nest with four eggs, pure white in color and presumably those of Bachman's Sparrow, which was found and called to her attention in Marshal Township, Ohio, in the spring of 1898.

In West Virginia Bachman's Sparrow made its first recorded appearance in Wood County, along the Ohio River, in late summer of 1903. Rev. E. A. Brooks (1912) states: "My first record of the occurrence of Bachman's Sparrow in West Virginia was made in Wood County, in late summer 1903. Since then it has become quite common in the northern and central parts of the State. Many were observed at Waverly, Wood County, from 1903 to 1907."

During the summer of 1907 individuals of this species were recorded in Upshur and Lewis Counties, near the central part of the State, and in Monongalia County, adjacent to the Pennsylvania border. F. E. Brooks found the bird at North Mountain, Berkeley County, in the Eastern Panhandle, on June 22, 1910, and A. B. Brooks records it from White Sulphur Springs, Greenbrier County, on May 15, 1913. The first West Virginia nest was discovered by Mr. Duffy Hornbeck, near Hinkleville, Upshur County, in July, 1913.

Speaking of the status of Bachman's Sparrow in Pennsylvania, Mr. W. E. Clyde Todd (in mss.) writes: "I added the species to the Pennsylvania list in the spring of 1910, when I secured an adult male specimen about a mile north of the town of Beaver. However, a nest with one egg, supposed to belong to this species, but never fully identified, had been taken near Waynesburg on May 16, 1909, by Mr. J. B.

Carter. Later research and travel by Dr. S. S. Dickey has revealed Bachman's Sparrow as a regular, even if not common, summer resident in various other parts of Greene County, while Mr. B. H. Christy has traced it to Allegheny and southern Beaver Counties."

Prof. W. W. Cooke (1914) records the occurrence of the species in southwestern Pennsylvania, and states that it reaches even northern Ohio. The first definitely determined nest of the species discovered in Pennsylvania came as a result of work done in Greene County by Dr. Dickey. Here he collected, on May 20, 1916, a set of five eggs. Two birds were collected by him, also in Greene County, in 1916. These are now deposited in the Academy of Natural Sciences at Philadelphia.

The data given above present strong evidence that Bachman's Sparrow reached the territory covered by this paper through an invasion from the south and southwest, following roughly the valley of the Ohio River. It may well be that birds moving northeastward from the Ohio into central West Virginia moved down the valley of the northward-flowing Monongahela, reaching Monongalia County, West Virginia, and Greene County, Pennsylvania, by this route.

Hicks, as has been stated, considers that the movement into Ohio was an invasion, although he believes that the species might have been overlooked for a number of years. Cooke (*loc. cit.*) speaks of the northward movement of the species as an "invasion". In central West Virginia, particularly in Upshur County, competent field workers covered the territory for twenty years before Bachman's Sparrow was discovered, and it seems impossible that they would have overlooked so outstanding a songster. A glance at the accompanying map will show the regular northeastward progression of the discoveries made in the territory covered by this paper.

There are evidences which point to a more general northward movement of the species during the early years of the twentieth century. Eifrig (1915) found several individuals near Chicago, Illinois, in May, 1915, and he is sure that the birds had not been previously overlooked. Leopold (1923) states, "The latter [species, Bachman's Sparrow], a southern form, has only recently been found to nest at River Forest, near Chicago, where its numbers increase each year." Mr. W. E. Saunders (in Canadian Field Naturalist, XXXIII, No. 6, p. 118) records the first specimen of Bachman's Sparrow ever taken in Canada, a male from Point Pelee, Essex County, Ontario, Canada's most southern extension.

This invasion apparently reached its limits in our area about 1915; the period of maximum abundance, at least in West Virginia and Pennsylvania, being reached between 1915 and 1922. From that time until the present, a number of observers have noted marked decreases in Bachman's Sparrow populations. Dickey (as quoted in the manuscript of Mr. Todd's forthcoming "Birds of Western Pennsylvania") states: "In recent years (i. e., since 1922), however, although I have often been afield (in Greene County), I have failed to meet with this species. Either it has dwindled in numbers, or I have completely overlooked it."

Professor E. R. Grose, of Glenville State Teachers College, in conversation with the writer, states that he has not been able during the last few years to find the birds in places in Upshur and Gilmer Counties, West Virginia, where fifteen years ago they were common.

Professor C. R. Bibbee (1934), in collecting work done for the West Virginia University Museum during 1923-26, failed to find the species at all, although much of his work was done in Wood County where the original discovery in the State was made.

The writer (1934) records sharp decreases in numbers of the birds in Upshur County, and similar observations have been made in other parts of the State. Conclusions of A. B. Brooks and Fred E. Brooks, both with wide experience in West Virginia, are along similar lines.

During recent years Haller and the writer have found the species in small numbers in Monongalia County, West Virginia, and Haller has collected a specimen in Ohio County, West Virginia, in 1934, and another in Wayne County, West Virginia, in 1937. A single individual was heard singing in Upshur County during 1935. Christy has in some recent years found small numbers of the birds in Beaver County, Pennsylvania.

It seems reasonable that a similar recession in numbers has occurred in Ohio, but Dr. Hicks makes no mention of it, and the writer cannot find positive evidence to support such a conclusion. Perhaps the best indication that such may have been the case is found in the fact that in only a very few Ohio counties does Hicks consider Bachman's Sparrow even tolerably common at present. While I have no similar Ohio evidence, it is certainly true that the species was common to abundant in some West Virginia counties fifteen years ago.

RANGE

Hicks (1935) says of Bachman's Sparrow in Ohio, "It now occurs in numbers locally in 32 counties of southern and eastern Ohio (mostly

unglaciaded Allegheny Plateau)". In a latter paper (1937), and in correspondence, he furnishes data from seven additional counties, so that the Ohio county list would now read as follows:

Hamilton, Clermont, Brown, Adams, Scioto, Lawrence, Butler, Warren, Clinton, Highland, Pike, Jackson, Gallia, Montgomery, Greene, Fayette, Ross, Vinton, Meigs, Pickaway, Hocking, Athens, Washington, Franklin, Fairfield, Perry, Morgan, Noble, Monroe, Licking, Muskingum, Guernsey, Belmont, Knox, Coshocton, Tuscarawas, Ashland, Holmes, and Wayne.

Only one of these, Wayne County, where Bachman's Sparrow is regarded as very rare, lies entirely outside the unglaciaded Allegheny Plateau. Most of the territory occupied by the species would be referable to the Carolina faunal zone, with here and there a hint of Transition conditions.

Distribution of the species in West Virginia (at least so far as we now know it) offers a far more irregular picture. The list of counties where breeding birds have occurred is as follows:

Wayne, Cabell, Putnam, Kanawha, Fayette, Greenbrier, Mason, Jackson, Roane, Clay, Nicholas, Wood, Wirt, Calhoun, Braxton, Webster, Ritchie, Gilmer, Lewis, Upshur, Randolph, Doddridge, Harrison, Barbour, Taylor, Marion, Monongalia, Preston, Hardy, and Berkeley.

Of these counties, most are in the western portion of the State, near the Ohio River, but there are a number of interesting exceptions. Through the valleys of the Great Kanawha River, and its tributaries, the New and Greenbrier Rivers, the species under consideration has been able to cross the State from the Ohio River to a point (White Sulphur Springs) very close to the Virginia line. In northcentral West Virginia the species came into the valley of the Monongahela River, and apparently used it for a northward movement. The higher ranges of the Allegheny Mountains seemingly serve as an effective barrier to eastward movement, and we have but two records from the eastern slopes of these ranges. Of these one was made by Fred E. Brooks at North Mountain, Berkeley County, on June 22, 1910; the other was made by the writer at Wardensville, Hardy County, on July 6, 1925. Both of these points lie within, or close to, the Shenandoah Valley. Dr. J. J. Murray and others have found Bachman's Sparrows somewhat farther south in the Valley, and it may be that these were birds which had moved north by that route rather than having crossed the mountains. Naturally, these are but surmises.

Perhaps the most striking feature of the bird's range in West Virginia is to be found in the altitudes to which it has attained. Near

French Creek, Upshur County, where much intensive work has been done, the species was positively common at elevations of 1700 feet. In Webster County a number of individuals were observed at altitudes around 2500 feet. Recent observations in Monongalia County have been at nearly 2000 feet, while individuals have been noted in Preston County at elevations well above 2000 feet. Both these latter counties are adjacent to the Pennsylvania line. The altitudinal record for the State, so far as I am aware, was made near Pickens, Randolph County. Here, on Turkeybone Mountain, at elevations around 3000 feet, the

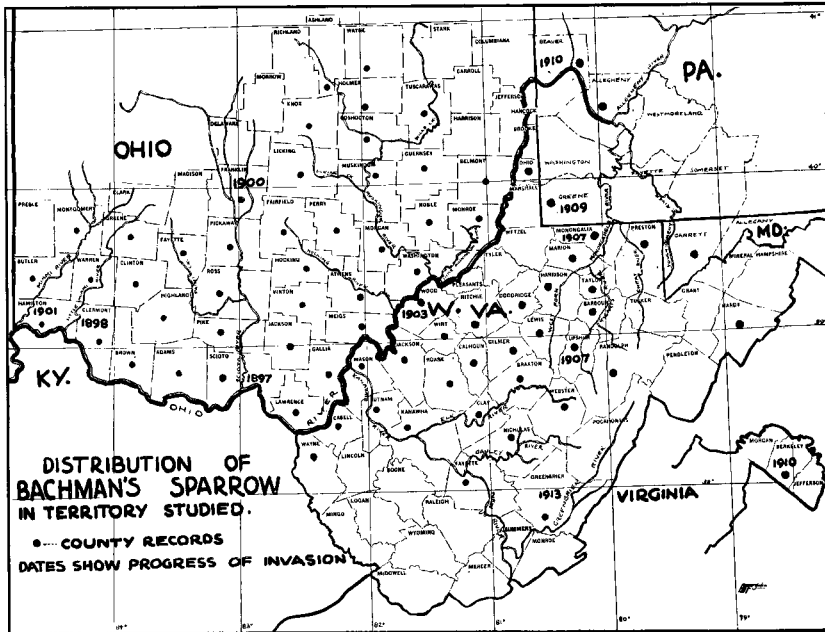


FIG. 17. Map of the area treated in Mr. Brooks' paper on Bachman's Sparrow.

birds were found in 1920, and perhaps in other years. The territory thereabout lies within the "Spruce Belt", the natural growth of Red Spruce (*Picea rubens*) which followed the higher Allegheny summits. At the time the Bachman's Sparrows were found, the area had, of course, been cleared, but Winter Wrens, Veerys, Magnolia and Cairns's Warblers, Juncos, and Red-breasted Nuthatches all nested nearby.

Robert L. Mason in his "Lure of the Great Smokies" (p. 312) records Pine Woods Sparrow (*Aimophila aestivalis aestivalis*) from the open areas atop some of the Great Smoky Mountain peaks, but I can find no recorded instances of Bachman's Sparrow breeding at high alti-

tudes elsewhere than in the territory covered by this paper. Mr. H. P. Ijams states (in correspondence) that in his experience in eastern Tennessee he does not know of the bird outside the Carolina Life Zone.

Freer (1933) tells of finding individuals of this species on some of the Blue Ridge summits in Virginia, but assumes that they were migrants. Bruner and Field (1912) found Bachman's Sparrow in the Transition Zone (2000-5000 feet elevation) in western North Carolina, but no evidence is presented that the birds were breeding there.

In this connection mention should be made of an observation on Bachman's Sparrow made in Garrett County, Maryland. The author found in June, 1923, and recorded (1936) a male in full song near Oakland. This is on that part of the Allegheny Plateau known locally as the "Tableland", and has an elevation of about 2600 feet. Garrett County forms the extreme western extension of the State, and is near enough the Monongahela Valley (being in part within that drainage system) so that stray birds might have found their way there from points of lower elevation.

Whatever its range and habitat may be elsewhere, there can be no doubt that in West Virginia at least Bachman's Sparrow has been at times a common breeding species in many regions which have been placed in the Transition Zone, and has invaded regions definitely within the Canadian Zone.

Two regions of seeming promise in West Virginia await further study. There is in the southwestern portion of the State, along the Big Sandy River and its tributaries, a considerable territory which is, biologically speaking, virtually unexplored. Dr. Murray quotes Mr. F. M. Jones as saying that Bachman's Sparrow is "a summer resident in restricted areas in southwestern Virginia". Since the West Virginia territory mentioned above is directly adjacent to southwestern Virginia, the need for field work there is strongly indicated. Another area which had virtually no ornithological attention during the time when Bachman's Sparrow was most common in the State is the tier of counties along the Ohio River north from Wood to Brooke (where Dr. George M. Sutton failed to find the species during his extensive observations there). No records for the species (save Haller's recent one in Ohio County) exist in this area.

According to Mr. Todd's studies, the known Pennsylvania range for this species is a somewhat discontinuous one. Dr. Dickey and Mr. J. Warren Jacobs have noted the bird in Greene County, and Mr. Todd and Mr. Christy have found it in Allegheny and Beaver Counties. There are, apparently, no records from Fayette and Washington Coun-

ties, although the presence of the birds there might be expected. The strong probability suggests itself that the Pennsylvania invasion may have taken place through the Monongahela, rather than through the Ohio Valley. The fact that there are no Ohio records along the river north of Belmont County; the apparent absence of the species in Washington County, Pennsylvania*; and the point mentioned that Sutton has failed to find the birds in the Northern Panhandle of West Virginia (along the Ohio River), all suggest the Monongahela route, particularly when it is known that the species was fairly common in Marion and Monongalia Counties, West Virginia, and in Greene County, Pennsylvania. That no Fayette County, Pennsylvania, records exist may be due to lack of field work there. Mr. Todd (in mss.) concludes as to species, "Its local range in our region will probably be found to approximate those of such species as the Mockingbird, Carolina Chickadee, etc."

MIGRATION

From the records available, it seems that Bachman's Sparrow arrives in our territory fairly early in the spring, and leaves during late summer or early autumn. Cooke (1914) lists the following spring arrival dates from Ohio: Cincinnati, two years; average April 24, earliest April 23, 1903; Cedar Point, May 14, 1909.

Hicks (in correspondence) writes as follows: "Our Wheaton Club records for the Columbus region, which includes some of the Sugar Grove hill country near Lancaster, have eleven years of spring migration records on the species. The earliest spring date is April 10, 1925, although I have taken it at Portsmouth as early as April 2. The median spring arrival date is April 22. The median fall departure date is August 17, and the latest known date of departure August 28, 1931, although again I have taken it in Adams County in southern Ohio as late as September 2."

From West Virginia, E. A. Brooks (1912) gives the median spring arrival date of the species at Waverly, Wood County, for five years (1903-07) as April 25. At French Creek, Upshur County, spring arrival dates for ten years are available. The earliest is March 27, 1921; the median date is April 11; and the latest is April 22, 1926. Conditions for observation here were exceptionally favorable, since

*Mr. Bayard H. Christy, of Sewickley, Pa., informs me in correspondence that on July 21, 1935, he found a singing male Bachman's Sparrow in Hanover Township, Washington County, Pa., just across the line from Beaver County. Revisiting the area two days later, he again found the singing male, and another bird which he took to be the female. She had dried grass in her beak, but no further indications of a nest or young birds could be found.

one or more observers were in the field every day in country frequented by the birds. Regular departure data were not gathered at French Creek, but I can find no mention of the species in field notes after September 1. In view of the late nestings (recorded further on) young birds must have taken their departure very soon after sustained flight was possible.

Pennsylvania migration records are few, but Mr. Todd notes that Dr. Dickey found two singing males (probably new arrivals) near Waynesburg, on April 15, 1922. He thinks also that the bird which he secured at Beaver, on April 29, 1910, may have been a new arrival.

The following spring arrival dates given by Cooke (1914) are for points near enough our territory to be of interest: Lynchburg, Virginia, April 7, 1901. Washington, D. C., two years; earliest date of arrival, April 26, 1914; average date of arrival, April 27. Rockwood, Tennessee (near), three years; earliest date of arrival, April 3, 1884; average date of arrival, April 7. Eubank, Kentucky, seven years; earliest date of arrival, March 20, 1889; average date of arrival, April 6. Bicknell, Indiana, four years; earliest date of arrival, March 19, 1908; average date of arrival, March 25. Bloomington, Indiana, four years; earliest date of arrival, April 6, 1884; average date of arrival, April 11.

HABITAT

Every observer from North Carolina and Tennessee northward would agree, I believe, that Bachman's Sparrow is decidedly local in its distribution, highly selective in the places it chooses for breeding territory. I quote at some length from the excellent notes pertaining to this species in Ohio furnished by Dr. Hicks: "The Bachman's Sparrow is a most interesting species. I have it on my list of twenty species on which I have been doing special ecological distribution work. There are few, if any, Ohio breeding species which are as fascinating.

"A person acquainted with the ecology of the species can readily find twenty-five birds for every one located by the 'hit and miss' method. The species could hardly have existed in Ohio before the white man came, except about a few prairie openings, the only extensive ones of the Bachman's type being in Adams County. The cutting of the forest, soil erosion, and the abandoning of farms have favored the species. It is practically never found in a field until at least four years after cultivation has ceased. Also, it is practically confined to hill country, although it occurs in a few areas where the hills are relatively low—practically never in valleys or on the lower slopes. Usually

it is found on those ridge tops which drop away sharply in a divide to either side.

"The choicest locations are about fifty to one hundred yards down from the ridge tops in old deserted fields. A typical territory is a circle 150 feet each way from an eroded gully which has healed and is now well covered with miscellaneous trees, shrubs, and particularly blackberry brambles. The territory is more attractive after about five per cent of the open grass lands adjacent to the gullies are dotted with blackberry briars. Usually the center of the territory is close to the upper end of the gully, and the abundant plants are the dry soil goldenrods and asters, wild oat grass (*Danthonia spicata*), and various other grasses, composites, and miscellaneous weeds typical of dry eroded slopes. A good water supply, with humid and fertile soil, soon produces a vegetation set-up too dense for this species.

"The species occurs in some sites like the one described above where seedling pines also occur, but there is no indication that pines add anything to the attractiveness of the habitat.

"Another common vine in these areas is *Smilax glauca*, and other shrubs include three species of sumac" (*Rhus typhina*, *Rhus glabra*, and *Rhus copallina* (?) auth.).

In West Virginia both E. A. Brooks and A. B. Brooks make mention on numerous occasions of finding the birds in fields partially grown up to briars and shrubs. In the Upshur County territory with which I am most familiar, the habitat picture for the species is almost an exact duplicate of that described by Hicks as typical. One field where several nests were found occupied both slopes of an eroded ravine, the vegetative cover including as principal species beard grass (*Andropogon*), goldenrods, asters, daisies, fleabane (*Erigeron*), and other composites, greenbriers (*Smilax*) of several species, blackberry, and such shrubs as sumac, crabapple, hawthorne (*Crataegus*), and flowering dogwood (*Cornus florida*). Black walnut, white oak, tulip poplar, and red and sugar maples were beginning a forest invasion. In this field of approximately twelve acres there were at least four singing males during the summer of 1920, and two nests were found in the same area in the summer of 1925.

The experience of Miss Eva Fling and Harold Roush in Marion County is apparently somewhat different. Writing from Fairmont, West Virginia, in 1916, they say, "Found this sparrow [Bachman's] in a large grassy cove. . . . Fairly common in open fields all during the summer." In other notes made the same year they state, "We found this bird inhabiting large grassy fields and 'coves' on the road to

Smithtown, about four miles from Fairmont. Tolerably common in this locality.”

Since West Virginia has no prairie land, and had, before the coming of the settler, almost no open lands of any description, it is obvious that this species could not have found here, prior to clearing operations, territory suited to its peculiar needs. This fact will be of assistance in explaining the invasion which apparently took place.

Mr. Todd (in his manuscript of “Birds of Western Pennsylvania”) quotes as follows from Dr. Dickey’s notes on the Pennsylvania habitat of Bachman’s Sparrow: “In southwestern Pennsylvania it is partial to open, scattered groves of white, red, and black oaks, and to waste fields grown up to poverty grass (*Danthonia spicata*), intermixed with briers, saplings, small shrubs, and herbage.

“My first experience with this sparrow was in the summer of 1913, when with two companions I was engaged in trying to locate some old Indian trails across Greene County. On July 29, southwest of Kirby, a new bird song attracted my attention. It came from an open grove of old white oaks where the ground beneath was covered with poverty grass. After some maneuvering I contrived to spot the singer, which was perched on some dead branches, and to identify it satisfactorily as a Bachman’s Sparrow. During the next two days our journey took us across hills and valleys into the general vicinity of Brock and Rose-dale, and two more males were encountered—one in a waste-field grown up to poverty grass, briers, and saplings, on the north side of the valley of Dunkard Creek; the other in a rolling pasture about four miles west of the Monongahela River and only a half-mile from the West Virginia line.

“Later experience with this sparrow has confirmed its observed liking for sterile fields and open oak groves. It thus occupies an ecological niche which is, generally speaking, otherwise unattractive to bird life.”

From observers in areas near to the territory covered in this paper come pertinent notes on the habitat of Bachman’s Sparrow, most of them in general agreement with observations already quoted. Mr. Harold H. Bailey, in his “Birds of Virginia” speaks of his bird as “inhabating the more open pine woods, where it places its nest on the ground, well concealed by low vegetation”. Dr. Murray also speaks of it in Virginia as “frequented open, scattered pine woods, as farther south”. Mr. Ijams, writing of this sparrow near Knoxville, Tennessee, tells of a field where some years ago a few pairs could be found during the breeding season. He describes the territory as “rocky hill pasture,



FIG. 18. Nest of Bachman's Sparrow near Hinkleville, Upshur County, West Virginia. Note the open construction, with no doming or arching.



FIG. 19. Nest of Bachman's Sparrow parasitized by a Cowbird. The nest is completely open. French Creek, Upshur County, West Virginia.

with thorny shrubs and blue grass". Dr. Jesse M. Shaver, writing from Nashville, Tennessee, says, "This species occurs with the Field Sparrow in old fields, especially those which have much broom grass (*Andropogon*), or many shrubs forming an early stage of shrub invasion". From the region of Bowling Green, Kentucky, Dr. Gordon Wilson, of Western Kentucky State Teachers College, speaks of this species as "found only in very restricted areas".

NESTING

The pure white eggs laid by Bachman's Sparrow make its nest an object of special ornithological interest. Ground-nesting passerine birds are not, generally speaking, given to laying white eggs, and most ornithologists in the territories where these birds breed will search long and diligently for a nest. Even where the birds are fairly common, however, nests are by no means easy to find. From my own experience I think of them as being in the same category (so far as difficulty of detection is concerned) as the nests of Grasshopper or Savannah Sparrows. Since all of the habitat notes quoted in the last section apply to breeding birds, it is obvious that much of the information there given is also pertinent at this point.

No other person in our territory, so far as I am aware, has had opportunities for studying the nesting of this sparrow that have come to Dr. Hicks, both through his own observations, and through the activities of the Wheaton Club. I quote again from his voluminous notes: "I have found about twenty-six nests in all, *only two of which seemed to me to be clearly domed* [italics the author's] as the nest of the Meadow Lark would be, although about one-half were built somewhat higher on one side. Many of the nests found have not been followed up, but I have survival data on most of them, and find that the percentage of success is distinctly higher than that which Mrs. Nice has found for the Song Sparrow, and which I have found for the Field Sparrow and the Vesper Sparrow.

"The causes of predation losses we now know to be rather complex, and not so easily explained as being due to the color of the eggs. I doubt very much if the species' nesting success would be significantly altered if the eggs looked like those of the Vesper Sparrow."

In West Virginia I have had opportunity to observe eight nests, and have received partial data on two more. In every case the nests found have been in such territory as is described under "Habitat". Most of the nests were found by accident, although at least one was discovered by watching the parent birds.

Perhaps the most striking feature of all the nests which I have seen is that not one of them has been distinctly domed or arched. Bendire (1888) states that *all* nests of this species are domed and cylindrical, and later writers have generally followed him in this description. The nest of Pine Woods Sparrow (*Aimophila aestivalis aestivalis*) is described by Bendire as "not arched over in any way, perfectly round, with the sides or rims everywhere of equal height".

Hoxie (1910) tells of finding a nest in Chatham County, Georgia, which (from the singing of the bird) he assumed to be that of Bachman's Sparrow. When the nest was examined, however, it proved to be open, not domed, and he concludes that it must have been the nest of Pine Woods Sparrow, although he raises a question as to the breeding of the two birds in the area. The first record which I can find of an undomed nest definitely ascribed to Bachman's Sparrow is one mentioned by Simons (1915). He tells of finding a nest of this species near Buffalo Bayou, Texas, on April 25, 1914, and speaks of it as "not arched or roofed over".

Whether or not it may be a peculiarity of those birds which come farther north to breed, Dr. Hicks' experience, together with my own, seems to indicate that domed nests in our territory are distinctly unusual. I have seen several nests that were built higher on one side, but none of them could be fairly referred to as "cylindrical". Reference to the accompanying photographs will show the open character of most of the nests which I have seen.

I quote from the correspondence of Dr. Paul R. Cutright, now of Beaver College, Jenkintown, Pennsylvania. Writing from Hinkleville, Upshur County, West Virginia, in July, 1914, he says: "I went over yesterday evening (July 10) to see the Bachman's Sparrow's nest, but it had been destroyed. It was near the place where the Hornbeck boys found a nest last summer. The nest was in good shape, and one of the eggs was found a few feet from it. One side of the egg was broken, and we could not save it. The nest was practically all formed from grass, with a few horse hairs in the lining. Like the one last year, it was on the ground in a bunch of broom sedge, and open, although Chapman says the nest is domed. I believe that it could be compared in size with the nest of the Song Sparrow. There were four eggs in each nest."

The first nest found in West Virginia (referred to above) was the discovery of Mr. Duffy Hornbeck, near Hinkleville, in July, 1913. After the eggs had hatched a single infertile egg was collected and placed in the collection of Mr. Orr King, Weston, West Virginia. It

measured .75 x .60. Another nest, with four eggs, was found in the same locality by Mr. Hornbeck, and was photographed by F. E. Brooks on July 19, 1918.

Nests with eggs were found near French Creek on the following dates: May 27, 1919; May 30, 1922; June 11, 1925; July 17, 1925; and July 2, 1926. All contained four eggs save one (see accompanying photograph) which contained three eggs of Bachman's Sparrow and one Cowbird egg. Of the eight nests, the first, found by Mr. Hornbeck, was successful, except for the one infertile egg mentioned; the second, as described by Dr. Cutright, was destroyed; the third (1918) was successful; the fourth (1919) was destroyed; the fifth (1922) was parasitized by a Cowbird, and the parents abandoned the nest after the Cowbird's egg was removed; the sixth (June, 1925) was successful; the seventh (July, 1925) was destroyed; and the eighth (1926) was destroyed, by a blacksnake in this instance. Thus three nests were successful, or partially so, and five were destroyed or abandoned. These data are not sufficiently numerous to justify any conclusions as to predation, and it must remain for further study to determine whether or not pure white eggs are a handicap to this ground-nesting bird.

The fact that two nests were found in May and five in July would seem strongly to indicate that in our territory at least many pairs have two broods annually. Bendire (1888) believed this to be true of the birds farther south as well. No banding was done in our studies, but singing males occupied the same territory, so far as we could determine, from April until July or August. In view of the fact that observers are in agreement as to the early southward migration of the species, it would seem that late July broods would be somewhat hurried in their activities.

As mentioned previously, at the height of their abundance in the Upshur County territory four pairs (possibly five) occupied a field of approximately twelve acres. One male whose nest was discovered had a favorite singing perch in a small walnut tree about fifty yards from the nest. The birds were not crowded in their territory, and we found some points from which habitual singing was carried on at distances of seventy-five to one hundred yards from the nest.

Brooding birds were found to sit very close, allowing themselves to be approached within a few feet before flushing. When flushed, the bird would frequently drag its wing, flutter along the ground, and, in general, go through a performance that we have come to think of as "injury-feigning". I write this with fear and trembling in view of the fact that observers with many times my experience have stated that

they have never noted a clear case of "injury-feigning" in a passerine bird. Nevertheless, I have noted a performance similar to that described above from Vesper, Grasshopper, and Lark Sparrows, as well as from the species under discussion. I do not insist that this is necessarily "injury-feigning", but it is much like the performance of a Killdeer in leaving her nest.

Parent birds do not fly directly to the nest, but, in common with some other ground-nesting sparrows, drop inconspicuously into the grass and weeds from low perches at some distance from the nest, making their approach in such a manner that it is very difficult to follow them. In one case where we found a nest by watching the birds the habitual approach was from an old rail fence about thirty feet from the nest. Bushes along the fence-row gave us some concealment, and we watched for a long time until we became reasonably certain of the approximate location of the nest. Both parents were carrying insects to the young birds, and they were shy and secretive. When the nest was located (it contained four young birds) both parents nervously flew from low perches in weeds and grass to the ground, remaining within sight for very brief intervals. Presently one of the adults (the male?) flew away, and he did not return so long as we were in the vicinity of the nest.

Dr. Dickey (as quoted by Mr. Todd) writes of his experience in Greene County, Pennsylvania: "Some four years before I personally met with the species (1909), however, Mr. J. B. Carter had stumbled across a strange nest in a hillside field adjoining an oak copse, close to Waynesburg. It had somewhat the appearance of a nest of the Grasshopper Sparrow, and was tucked in a tussock of dead grass near a thicket. It held but one egg, pure glossy white in color, which measured .74 x .53. The discovery of this nest gave me some pause. It was apparently deserted, but seemed not to belong to any species with which I was then familiar. Subsequent disclosures, however, pointed to its being the nest of Bachman's Sparrow—the first actual case of the breeding of this species within our borders.

"On May 10, 1916, while traversing a grove of white oaks just north of town—I saw a small brown bird fly up from the ground into a tree, and burst into a song that at once disclosed its identity as a Bachman's Sparrow. Soon his mate joined him, and the pair dallied about the grassy plots and then went into a nearby pasture with scattered hawthorne shrubbery. Returning to the spot two days later, I found the female gathering material for her nest, the location of which was thus betrayed—in a clump of dry poverty grass in a wide aisle of

the grove. On May 20 I again returned and collected the nest with a set of five fresh eggs. The nest was a *dome-shaped* [italics the author's] affair with a foundation of dry grass-stems and blades. It was rather loosely arched over, and was lined with finer grasses and horsehair. The eggs were white with a faint bluish cast, and were slightly glossy in texture. The parent birds divided their time between the oak trees and the ground, feeding in both; they repeatedly perched in plain sight, manifesting little fear."

Dr. Shaver, Mr. Ijams, Dr. Wilson, and other observers in nearby territory testify to the difficulties involved in finding nests. Dr. Wilson states that he has never been able to locate a nest of this species in Kentucky. Mr. Ijams does not mention seeing a nest in eastern Tennessee, and Dr. Shaver says that he has seen very few in that State. In a list of seventeen records from the vicinity of Washington, D. C., and from nearby points in Virginia and Maryland, furnished me by Dr. H. C. Oberholser, there are few if any mentions of nests having been found.

Four eggs seem to be the usual number in our territory, all the nests which I have seen, save the one parasitized by a Cowbird, having that number. Nests with three eggs have been noted, however, and Dickey in Pennsylvania and Bailey in Virginia record occurrences of five eggs.

SONG

Many writers have paid tribute to the musical ability of Bachman's Sparrow, but few persons who are acquainted with it will believe that any verbal description, or transliteration, will do it justice. Those who have been so fortunate as to hear Dr. A. A. Allen's recent recordings of the song of Pine Woods Sparrow will have a better idea of the almost identical Bachman's Sparrow notes. No recording, however, can catch all its qualities and variations, or bring out the whispered notes that add so much charm to the efforts of the singer.

Dr. Frank M. Chapman (in "Handbook of Birds of Eastern North America", Second Rev. Ed.) writes of Pine Woods Sparrow: "When singing it seeks an elevated perch" [by no means always true in the case of Bachman's Sparrow. Auth.]. "In my opinion its song is more beautiful than that of any other American Sparrow. It is very simple . . . but it possesses all the exquisite tenderness and pathos of the melody of the Hermit Thrush; indeed, in purity of tone and in execution

I should consider the Sparrow the superior songster. It sings most freely very early in the morning and late in the afternoon, when the world is hushed and the pine trees breathe a soft accompaniment to its divine music."

Writing this time of Bachman's Sparrow, the same author quotes Ridgway as finding its song somewhat like the "plaintive chant of the Field Sparrow, but as far sweeter and louder, the modulation, as nearly as can be expressed in words, resembling the syllibles *thééééééé-thut, lut, lut, lut*, the first being a rich, silvery trill, pitched in a high musical key, the other syllable also metallic, but abrupt, and lower in tone".

Such a transliteration as that given above might well represent one common variant of the song, but it is far from telling the whole story. A much fuller, and, to the ears of this author at least, a much more precise description is that given by Strong (1918). He records: "The bird sang with only short rests, and the duration of the song which was very variable, was about two to three seconds. Usually the song started with a single long note followed by a group of short notes in a tempo so fast that we could not be sure of our count. So far as we would determine, the bird had seven to twelve notes in this group, usually about ten. As a rule, they were of essentially uniform pitch, but not of the same pitch as the long opening note. The pitch was sometimes lower than that of the first note and sometimes higher. A few performances had two or three opening notes not so long as the usual, single one. On one occasion, the song was repeated or rather one song followed another with no interruption or pause, both being a little shorter than usual.

"The quality was remarkably variable, but it tended to be fairly uniform in a single song. Sometimes the series of rapid notes was thin and resembled somewhat the song of a Junco. At other times it was relatively rich and full. Intermediate grades of quality occurred."

To me, the most notable quality of this sparrow's song is its wide variation. A person hearing a single song might, as many persons have, compare it with the song of the Field or Vesper Sparrow, even with one two-note song of the Chewink, but not from them would come this change in pitch, arrangement, tempo, and modulation. Definitely, there is a song-sequence, no two sequences being exactly the same, but each with a recognizable pattern. Each may contain ten or more separate songs, showing five, six, or more variations. The louder songs are

not uncommonly interspersed with "whisper songs", so low that they are inaudible to a person at a little distance. Frequently there are broken twitterings between the more ordered songs as well. As with many of our fine songsters, individual birds show wide variations in their vocal abilities.

A. B. Brooks writing of this bird from Morgantown, West Virginia, in May, 1907, observes: "He was near the same place where we had heard him singing before. The field where he stays is covered over with little tufts of weeds and brush. After I had listened to his song as long as I wanted to, I followed him for a while. He would hide in these tufts of weeds and grasses, and would allow me to walk up within two feet of him. He can beat any sparrow by half that I have ever heard when it comes to singing. I give some marks which will illustrate the song of the bird as I heard it. I took these down as he sang." (Here follows a diagrammatic representation of the song-sequence which shows seven variations given in a series of twelve songs). "When I approached a little nearer he discovered me and changed his song into a fine, mixed-up combination of slurs, whistles, and thrills."

At French Creek, Fred E. Brooks notes that on the evening of April 15, 1923 (the recorded date of arrival for the species at that place), he heard a whole series of songs given on such a high pitch that they were almost inaudible. He also mentions hearing a "whisper song" a number of times.

Mr. Todd, in conversation, tells of first hearing the song in Florida in 1903, and of recognizing it instantly when he unexpectedly heard it again near Beaver, Pennsylvania, in 1910. He also quotes Dickey to the effect that the song carries so well as to be audible, under favorable circumstances, at distances of half a mile. Earle A. Brooks speaks of the song as unforgettable, once heard.

Apparently the birds are well within their song-cycle when they arrive in our territory. Singing begins immediately, and is continued frequently until well along in July. Dickey notes a singing bird on July 29. I have heard their songs, given infrequently, a few times in August. Early morning and late afternoon seem to be preferred as singing times, but one of my most acute boyhood recollections has to do with the song of this bird, together with that of the Field Sparrow, coming to me through the heat as I picked blackberries under a blazing July sun.

The singing bird usually chooses a low perch, frequently a rail fence or a clump of bushes. I have heard the song given from perches thirty to fifty feet above the ground, and I am reasonably certain that I have heard it given a few times directly from the ground. There is a possibility, however, that in these cases the singing bird may have hopped up on some low weed as the song was delivered.

The hill country of which we are writing frequently has periods of chilly weather, with occasional heavy snows, after Bachman's Sparrows arrive in the spring. As with other birds, these sparrows frequently interrupt their singing during these cold spells. I have known singing to cease for a period of nearly two weeks, but I have several times heard songs, usually given spasmodically, when the temperature was near the freezing point.

Like Field Sparrows, these birds frequently sing on moonlit nights, the richness and beauty of the music intensified by the attendant circumstances.

GENERAL NOTES

As a general rule, my experience with Bachman's Sparrow would lead me to regard it as a shy bird, difficult to observe. It has well developed the sparrow habit of dropping from some low perch when approached, and skulking away in the grass and weeds. Were it not for the unmistakable song, I can well realize how it might be overlooked in any given territory for a long time. Dickey, however, mentions finding the birds easy to observe about their nests, and, as already quoted, A. B. Brooks tells of a male that allowed approaches within two feet.

I have recorded briefly elsewhere (1934) a most unusual opportunity for observing the birds which came to us on our Upshur County farm during May, 1925. Much to our surprise, a pair of the birds, evidently nesting in a nearby brushy field, began frequenting one of our window feeding shelves. No similar circumstance had come to our attention, and we tried a variety of foods with the birds. They took raisins freely, but, like so many birds which we have fed, seemed to prefer the kernels of black walnuts to any other food which we could offer them. They also took coarse corn meal, cornbread, particles of cracked corn in ordinary poultry feed, and "cracklings" left from the "trying-out" of lard.

Both birds fed at the small shelf at the same time, and, once they had come, manifested little fear. They would sometimes remain for periods of five minutes or more, feeding both on the low shelf and on the ground where particles of food had been scattered. Visits continued for about three weeks, but, whether or not they were giving full attention to the problems of nesting, the birds came more and more infrequently. We did not see them at the shelf very early in the morning or late in the evening, the times when singing was most in evidence.

Stoddard (in "The Bobwhite Quail", p. 58, 1931) speaks of the frequency with which bird dogs "false point" Bachman's Sparrows. Dog handlers, he says, commonly refer to these birds as "stink birds". Since these sparrows are not found in our territory during the open season on quail, and particularly in Ohio, where quail hunting is prohibited by law, such observations by hunters in this section would necessarily be infrequent. I have heard dog trainers in this area speak of their dogs pointing "ground sparrows", and it is possible that the present species was the bird meant.

Bendire (1888), in the first lengthy account of Bachman's Sparrow, quotes Dr. William C. Avery, of Greensboro, Alabama, as having noted peculiar actions from the birds when flushed from the nest. He states that the flushed bird invariably runs (not flies) away from the nest, and that it imitates the movement of a snake, even giving at this time a distinct hissing note. While the present author has not heard the hissing note mentioned, the actions described by Dr. Avery correspond closely with those described as apparent "injury-feigning" in this paper. Dr. Avery also speaks of flushing four juvenile birds which flew like a covey of miniature Bobwhites, rising with an audible whir of wings, and he has noted this same sound from adult birds when they were flushed suddenly.

When distinctly domed nests are built this method of construction would seem to present difficulties to Cowbirds seeking to parasitize the nests. As mentioned earlier, however, one of the nests which came under my observation held a single Cowbird egg, and Woodruff (1907) tells of finding a nest in Carter County, Missouri, which held two eggs of Bachman's Sparrow, and three eggs of the Cowbird.

Specimens of Bachman's Sparrow from a part of the territory covered by this paper (West Virginia and Pennsylvania) have been examined by Dr. H. C. Oberholser, U. S. Biological Survey, Washington,

and have been found by him to be identical with examples from the South-Atlantic coastal regions. Various Ohio museums have a number of specimens taken in that State; Mr. Todd mentions the example taken by him near Beaver, Pennsylvania, in 1910, now in the Carnegie Museum in Pittsburgh, and there are two specimens taken by Dr. Dickey in Greene County in 1916, now in the Academy of Natural Sciences, Philadelphia. In West Virginia, Fred E. Brooks took a specimen at French Creek in 1911, the skin now being in the Carnegie Museum collections, and Karl Haller has two West Virginia specimens in his collection, one taken in Ohio County in 1934, the other taken in Wayne County in 1937.

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SUMMARY

1. The paper attempts a survey of Bachman's Sparrow (*Aimophila aestivalis bachmani* Audubon) as it occurs, or has occurred, in southeastern Ohio, West Virginia, and southwestern Pennsylvania.

2. Evidence is presented to show that this species invaded the territory under consideration from the south or southwest during the latter years of the nineteenth and the early years of the twentieth centuries, the invasion reaching its northern limits, and the bird its maximum abundance from 1915 to 1922. In general, the valleys of the Ohio and Monongahela Rivers were followed in this movement. A distinct recession in numbers over a large part of the territory since 1922 is recorded.

3. Data are presented showing widespread distribution of the bird in southeastern Ohio, and in West Virginia west of the Allegheny Mountains, with a limited distribution in southwestern Pennsylvania. In West Virginia at least, the birds invaded the Transition Life Zone, and even reached the Canadian Life Zone.

4. Habitat notes show the species to be practically restricted in breeding range (in the areas under consideration) to brushy hillsides or wooded borders on fairly steep slopes.

5. The conclusion is reached that, in this territory at least, most of the nests are not domed or distinctly arched, although some nests of this type have been found. Four eggs is the usual complement, with three and five occasional. There is reason to believe that many pairs raise two broods annually.

6. The song-sequence is described, and notes on the high vocal abilities of the bird are presented.

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