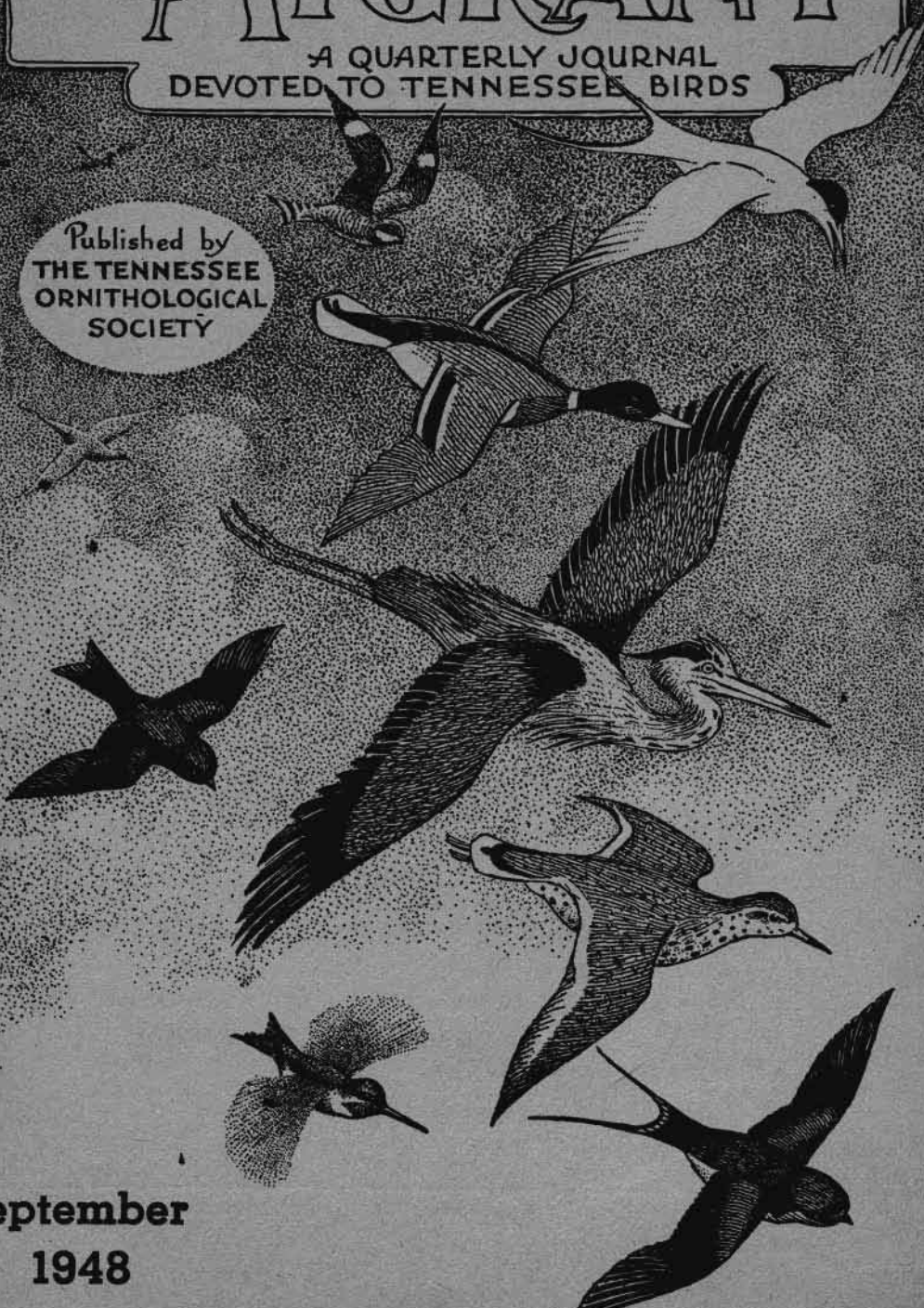


# THE MIGRANT

A QUARTERLY JOURNAL  
DEVOTED TO TENNESSEE BIRDS

Published by  
THE TENNESSEE  
ORNITHOLOGICAL  
SOCIETY



James  
36

September  
1948

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# THE MIGRANT

Published by the Tennessee Ornithological Society, to Record and Encourage the Study of  
Birds in Tennessee. Issued in March, June, September and December

VOL. 19

SEPTEMBER, 1948

No. 3

## THE ALTITUDINAL LIMITS OF CERTAIN BIRDS IN THE MOUNTAINS OF THE SOUTHEASTERN STATES

By HENRY M. STEVENSON and ARTHUR STUPKA

### INTRODUCTION

Bird students in Tennessee may find within their State a variation in altitude exceeded in very few States east of the Mississippi River. Some of them have had the opportunity of working both in the highest mountains and in the river bottoms around Memphis. Naturally they have given some thought to the altitudinal distribution of various species of birds, and some have put their thoughts and experiences into writing. Such published records, both from Tennessee and other southeastern States, along with the unpublished data of the authors and a few other observers, provide the basis for the present paper.

For the most part, the species treated here are those which winter or summer to some extent in the mountains of Tennessee, North and South Carolina, Alabama, and Georgia, although occasionally comparisons are made with records farther north (Virginia, West Virginia, and Kentucky). It is believed that those elevations which are characteristic of a species' range in any one of the five States first mentioned are fairly typical of its range in the others, within the limits imposed by the extremes of land elevation in these States. (The fact that this generalization would not hold so well if it included Virginia and West Virginia is discussed below.)

Although some published observations indicate something of the altitudinal extremes reached by certain species during the spring and fall migration (or during post-nuptial wanderings), such data are relatively scant. Therefore this report does not deal with this phase of distribution. Also, those water birds which are absent from the mountains in the breeding season have been omitted.

Relying largely on sight records, the present work refers only to full species and employs binomial names throughout, even though an occasional reference is made to the known distribution of certain subspecies. Whenever possible the common names also denote full species rather than subspecies. This procedure is followed even when the subspecies may be safely assumed. Thus Cairn's Warbler (*Dendroica caerulescens cairnsii*) is discussed under the heading of "Black-throated Blue Warbler (*Dendroica caerulescens*)".

As is inevitably the case when sight records are investigated, some ap-

pear to be acceptable whereas others must be rejected. Decisions of this sort are based on such factors as: (1) the likelihood of the occurrence at the particular time and place; (2) the reputation of the observer for caution and accuracy in field identification, as well as his total experience in the study of birds; (3) recognition on the part of the observer that a given record is unusual, and an accompanying statement that his observation was therefore carefully made.

Even though Brooks (1934 and later papers) and others have shown that a number of southern species occur higher in the mountains of Virginia and West Virginia than they have been recorded in States farther south, this interesting fact is still unrecognized by some students of birds. Consequently any known instances which exemplify this surprising phase of altitudinal distribution are pointed out herein. Conversely, it is well known and deemed normal that most southern species are found at progressively lower maximum altitudes as one proceeds northward, and that northern species are generally found at increasingly high minimum altitudes as they are traced southward. For most species which exemplify the latter and more generally recognized principle the known altitudinal limits in Virginia and West Virginia are omitted from this paper.

Although the writers are aware of the fact that altitude in itself may have no direct effect on bird distribution, no attempt is made in this paper to discuss the true factors governing distribution. Rather, a few of the highest and lowest records (both for summer and winter, in many cases) are simply stated for most species, along with the authority for each record. Wherever no statement regarding minimum altitude is made herein, it may be assumed that the species under discussion is found at that time of year virtually at sea level somewhere in the Southeast.

In the interest of brevity the name of the authority is omitted for certain records. Except in those instances where another authority is mentioned, the junior author is sole authority for such records in the Great Smoky Mountains; the senior author assumes the responsibility elsewhere (e.g., Emory, Virginia; Whitetop Mountain, Virginia). Such records have not been published before. Conservation of space is also achieved by the abbreviation of the names of states, in most cases, and by the use of the symbol "f" for "feet".

Altitudinal extremes given in the ensuing list are fully understood by the writers to be merely the known extremes at this time. Future records (and unpublished records made previously) will doubtless extend many, if not most, of these known limits. This article will have served a valuable function if it stimulates further research on altitudinal limits, or the publication of records already in existence.

Scientific nomenclature herein follows that of the A.O.U. Check List (1931), except that the revised names acted upon by the present A.O.U. Committee through July, 1948, have been substituted for the earlier names of these species.

#### ACKNOWLEDGEMENTS

For the unpublished field notes he has submitted, the authors wish to

thank Dr. James T. Tanner, of Knoxville, Tennessee. The field notes of Raymond J. Fleetwood and Dr. Milton B. Trautman, covering their work in the Great Smoky Mountains, also proved valuable. For aid in securing published information, we are indebted to Dr. J. J. Murray, Lexington, Virginia; Dr. John Grey, Charlottesville, Virginia; Harry T. Davis, Raleigh, North Carolina; Albert F. Ganier, Nashville, Tennessee; Thomas Imhof, Birmingham, Alabama; and Ernest P. Edwards, Sweet Briar, Virginia. Our appreciation for the helpful criticisms of Tanner and Ganier are also acknowledged here.

#### ANNOTATED LIST

Great Blue Heron (*Ardea herodias*). Found near Highlands, N. C., in June by Miss Mary Crosby, and in July by Charlton Ogburn (Stevenson, 1941). These records, at altitudes of 3500 to 3800', are of interest in being the highest summer records available, although they do not necessarily indicate the breeding of the species at this altitude. In winter it is not known to range so high, but has been found at Blacksburg, Va., where the altitude is 2170' (the Handleys, 1946).

Green Heron (*Butorides virescens*). The senior author's June records of this species at Franklin, N. C., like those of Ogburn, may be taken to indicate breeding at an altitude of 2000' (Stevenson, 1941).

American Bittern (*Botaurus lentiginosus*). Evidence that this species may breed in the mountains at least as high as 2000' is based on Ogburn's record of one seen at Franklin, N. C., June 21, 1929 (Stevenson, 1941). It is quite surprising that the Bittern should winter (perhaps casually) equally as high in the mountains, yet it was found at Blacksburg, Va., December 24, 1945 (Handley, et al., 1946).

Turkey Vulture (*Cathartes aura*). That this species is unlimited in its altitudinal range in the Southeast in summer is evidenced by records of birds soaring over the top of Mt. Mitchell, N. C., the peak of which is 6684' above sea level (Burleigh, 1941). Other observers are in agreement in finding it at the tops of the highest mountains. As to actual nests, it is not likely that they occur above 4000' in the Smokies, and the same may be true of other southern mountains. This vulture has been recorded as high as 2400' in winter near Emory, Va., and is said to be "rare in winter" in the mountains of North Carolina (Pearson, Brimley, & Brimley, 1942).

Black Vulture (*Coragyps atratus*). In the vicinity of Emory, Virginia, where the nearest mountains rise to about 2400', this vulture is found occasionally in summer and rather commonly in winter. Murray (1931) gives a record at a comparable altitude, near Mountain City, Tenn., August 28, 1930, which may be indicative of its summering there. Later (1933), however, he speaks of having found its nest "at an altitude of over 3000 feet" near Lexington, Va. In West Virginia, Handley (1931) saw it at 2100' near Lewisburg, July 3, 1930.

Sharp-shinned Hawk (*Accipiter striatus*). Burleigh (1941) reports this bird above 6000' on Mt. Mitchell as early in summer as July 31, indicating that it may have nested nearby. Somewhat earlier in summer it has been

found at altitudes of 3500' (Wetmore, 1941) and 3700' (Stevenson, 1941) in the same State. It appears that the highest winter records are at similar altitudes, at Boone, N. C. (Brown, 1914 & 1916).

**Cooper's Hawk (*Accipiter cooperii*).** One was seen near Highlands, N.C., by the senior writer (1941) at an altitude of 3600', June 17, 1937, but Murray (1937) and Wetmore collected one at about 5500' on Mt. Rogers, Va., June 3, 1937. It has been found in winter as high as 2700' at Windom, N. C. (Hutchins & the Hughes, 1945), and 2200' near Emory, Va.<sup>1</sup>

**Red-tailed Hawk (*Buteo jamaicensis*).** All observers agree that this species is practically unlimited in altitudinal range in summer, and Burleigh (1941) implies that it may be found at any time of the year as high as 6000' on Mt. Mitchell.

**Red-shouldered Hawk (*Buteo lineatus*).** Known to summer at least as high as 1650' at Pine Mountain, Ga. (Stevenson, 1941), and at about the same altitude near Mentone, Ala., where it was found in June, 1943. Curiously enough, the highest winter records exceed the altitudes mentioned above: Blacksburg, Va., 2170' (the Handleys, 1946); Shenandoah National Park, Va., 2800' or above (Stevens & Scott, 1947).

**Broad-winged Hawk (*Buteo platypterus*).** Several observers have found this hawk around Highlands, N. C., up to at least 3900' in summer, but in the Great Smokies, at least, it ranges up to 6500' or above.

**Golden Eagle (*Aquila chrysaetos*).** Now quite rare, this eagle may still nest in suitable regions from the highest elevations down to about 1500'. A fairly recent summer record is that of two, seen together, in the Great Smokies, June 16, 1938, at 4886' (Ganier & Clebsch, 1938).

**Marsh Hawk (*Circus cyaneus*).** Occurs rarely in winter at Blacksburg, Va., at 2170' (the Handleys, 1946). It is also known to winter locally in the Great Smokies as high as 1800'.

**Peregrine Falcon (*Falco peregrinus*).** Even though most nesting records and many winter records are referable to mountainous country, there is no evidence that this falcon is restricted in its vertical distribution at any time of the year.

**Sparrow Hawk (*Falco sparverius*).** James T. Tanner and the senior author saw one on Little Roan Mountain, June 28, 1946, at an altitude of 5700', but no other summer records in the Southeast are above 4500', at which altitude Murray (1936) reports it between Whitetop and Mt. Rogers, Va. In winter it is known to occur regularly up to 2200' in southeastern Virginia, but one was seen in the Great Smokies by Franklin McCamey at 5700', January 5, 1948.

**Ruffed Grouse (*Bonasa umbellus*).** Virtually unlimited upward, and found at about the same altitudes in summer and winter. Of recent breeding records, one in Stephens County, Ga., is at a rather low altitude (Odum,

<sup>1</sup> James T. Tanner has seen the species above 4000' near Elizabethton, Tenn., on February 25, 1946, but it may have been migrating northward this late in winter.

1945b). Toccoa, the County seat, has an elevation of 1200', presumably about the same as the altitude at this nesting site. The eastward range of the species in North Carolina, as outlined by Pearson, Brimley, and Brimley (1942) probably carries it down to similar levels.

Bob-white (*Colinus virginianus*). In Virginia, Murray (1936 & 1937) has found the Quail in summer as high as 5000' on Whitetop Mountain and Mt. Rogers, and it reaches 6300' at that season in the Great Smokies. Elsewhere it has been found between 4000 and 4500' (Sprunt, 1935); Ganier & Clebsch, 1946); (Stevenson, 1941). It is problematical whether there is any appreciable downward migration in fall and winter. The highest winter record in the Great Smokies is Fleetwood's, at 5188', December 13, 1934, but there appear to be no other winter records above 2500'.

Turkey (*Meleagris gallopavo*). Evidence that this species is of almost unlimited altitudinal range is obtained from the record of its occurrence at 8100' in the Great Smokies, June 27, 1937, (Wetmore, 1939).

King Rail (*Rallus elegans*). Louis Rice supplied evidence of its breeding up to at least 3950' in the southern mountains by bringing to the senior author the wing of one of these marsh birds which had been killed at his home near Highlands, N. C. He stated that he had seen others of its kind shortly before, about June, 1937 (Stevenson, 1941).

Black Rail (*Laterallus jamaicensis*). Three summer records in the Southeast are at altitudes of 2000' or slightly higher. Ogburn reported it at Franklin, N. C., June 21, 1929 (Stevenson, 1941); and Addy (1940), near Blacksburg Va., collected one which "by all indications was not nesting." Stevenson (1947b) flushed one of these small rails at Abingdon, Va., June 27, 1946.

Killdeer (*Charadrius vociferus*). Breeds in the high pastures around Emory, Va., up to about 2300', but its upward limits in other parts of the Southeast are not well known. It also winters around Emory to some extent at virtually the same maximum altitude (Stevenson, 1946).

Woodcock (*Philohela minor*). May occasionally breed at the highest altitudes in the Southeast. One was collected at 5000' in the Great Smokies, June 19, 1937 (Wetmore, 1939); and Tanner (1942) and others found its nest on Roan Mountain at 6000'. Murray (1937) and Wetmore flushed three at about 5500' on Mt. Rogers, Va. There seem to be no published winter records at altitudes higher than 1000'.

Wilson's Snipe (*Capella gallinago*). Records at two localities in southwestern Virginia indicate the wintering of this species as high as 2100': Emory (Stevenson, 1946) and Blacksburg (the Handleys, 1946). It may be expected at similar or somewhat higher altitudes in other southern States, wherever marshy conditions occur.

Spotted Sandpiper (*Actitis macularia*). An unusually high breeding record exists for Highlands, N. C. (3800'), where a pair raised young in the summer of 1944 (Howell, Sargent, & Wall, 1947). Elsewhere it breeds up to 2000' or more near Emory, Va., and near Asheville, N. C., Burleigh having found young just out of the nest at the latter place, June 20, 1932 (Pearson, Brimley, & Brimley, 1942).

Mourning Dove (*Zenaidura macroura*). In summer this species has been found up to 4550' by Fleetwood in the Great Smokies; 4100' near Highlands, N. C. (Stevenson, 1941); and about 3500' in Highland County, Va. (Murray, 1938). The highest winter records are at somewhat lower elevations: 2700' at Windom, N. C. (the Hughes & Hutchins, 1947), and 2300' near Emory, Va.

Yellow-billed Cuckoo (*Coccyzus americanus*). It is surprising that this southern species would summer as high as 4800' near Boone, N. C., where it was collected on July 11 and 12, 1939 (Wetmore, 1941), yet fail to nest around Highlands even at much lower altitudes (Stevenson, 1941).

Black-billed Cuckoo (*Coccyzus erythrophthalmus*). A summer record at a high altitude is that of one collected on Elk Knob, near Boone, N. C., at 5100', July 17, 1939 (Wetmore, 1941). Tanner writes that he saw two above 4000' on Unaka Mountain, near Erwin, Tenn., June 8, 1941. In the Great Smokies, Trautman has detected it as high as 5800', June 22, 1940. In North Carolina it breeds near sea level.

Barn Owl (*Tyto alba*). Although referred to as a "rare winter resident" at Blacksburg, Va. (2170') (the Handleys, 1946), this owl apparently has not been recorded above 1500' by any other observers in the Southeast.

Screech Owl (*Otus asio*). Seen in summer in the town of Highlands, N. C., where the altitude is slightly above 3800' (Stevenson, 1941). Stupka (1946) gives 3500' as its upward limit in the Great Smokies. Wherever found, the species will doubtless prove a permanent resident.

Horned Owl (*Bubo virginianus*). Although Dr. Earl Henry has found this owl at 6000' in the Great Smokies, December 18, 1938, and Roy Brown (1918) found it at Boone, N. C. (3300'), in December, 1917, early summer records at the higher altitudes seem to be lacking. Doubtless it will prove resident at most elevations at which it is recorded.

Barred Owl (*Strix varia*). Wetmore (1939) and other observers have found this species as high as 5700' on Roan Mountain in summer, and its summer range reaches 6400' in the Great Smokies. Other records indicate that it winters to some extent at high altitudes. Burleigh (1941) recorded one near the top of Mt. Mitchell (about 6600'), January 4, 1933. Although such a record may be very unusual, it has been found in winter near Boone, N. C., at 3400' or above (Crook, 1935).

Saw-whet Owl (*Aegolius acadica*). Stupka (1946) and others have found this little owl in recent summers at altitudes of 5000' or above in the Great Smoky Mountains, where it will doubtless prove resident.

Chuck-will's-widow (*Caprimulgus carolinensis*). Odum (1945a) and Burleigh found this bird up to at least 1600' in Pickens County, Ga., May 28, 1945. One was reported at Greeneville, Tenn. (above 1500'), by Miss Willie Ruth Reed, June 7, 1941 (T.O.S. members, 1941). A pair was flushed on a mountain near Guntersville, Ala., at about 1300', June 26, 1945; and natives speak of its occurrence on Monte Sano (1400'), near Huntsville.

Whip-poor-will (*Caprimulgus vociferus*). Reinke's record at 4100' near Highlands, N. C., apparently establishes the upward range of this goatsucker (Stevenson, 1941), and its other extreme in the breeding season may be indicated by records in western Tennessee at approximately 500' (Coffey,



1944; Calhoun, 1941). Farther south it occurs in summer at altitudes of about 1000' near Atlanta, Ga. (Griffin, 1941).

Nighthawk (*Chordeiles minor*). A very surprising record for early summer is that of one seen at 3500' in Highland County, Va., June 4-11, 1938 (Murray, 1938). It would seem unlikely that even so late a spring migrant as this species would have lingered well into June, and over a period of one week, unless breeding or summering at this site. Other summer records probably do not exceed 2500'.

Chimney Swift (*Chaetura pelagica*). Found at nearly all altitudes in summer, although Burleigh's (1941) record at the top of Mt. Mitchell, May 23, 1930, may not be late enough to represent breeding near that point. This species, however, may be found regularly in June above the summits of Roan Mountain (6300') and the highest peaks of the Great Smokies.

Ruby-throated Hummingbird (*Archilochus colubris*). Also found in summer at practically all altitudes. Burleigh (1941) found it up to 5000' on Mt. Mitchell in June, and Ganier and Clebsch (1946) encountered it at least as high in the Unicois. Several observers have seen Hummingbirds above 6000' on Roan Mountain in late June. In the Great Smokies they have been found at 6500' on Mt. Le Conte and Mt. Guyot.

Belted Kingfisher (*Megasceryle alcyon*). Found to be of regular summer occurrence at Highlands, N. C., up to 3800' (Stevenson, 1941), and to 3500' in Highland County, Va. (Murray, 1938). At the former locality a nesting burrow was found. Apparently it does not winter quite so high in the mountains. The highest records available for that season are at altitudes of about 2200': near Asheville, N. C. (Wallace, 1936); and around Blacksburg (the Handleys, 1946) and Emory, Va. In the Great Smokies, however, it winters at 2500' near Elkmont, Tenn.

Flicker (*Colaptes auratus*). Summers up to 5000' at three localities in the Southeast: Great Smokies (Wetmore, 1939), Unicoi Mountains (Ganier & Clebsch, 1946), and Whitetop Mountain, Va. (Murray, 1936). On Roan Mountain, however, Ganier (1936) found the species at altitudes of about 6000' in June, 1936. In winter Flickers have been found as high in the mountains as 2800' in the Shenandoah National Park, Va., December 28, 1946 (Stevens & Scott, 1947); and both Brown (1914) and Crook (1935) have seen them in December at elevations of about 3400' near Boone, N. C.

Pileated Woodpecker (*Hylatomus pileatus*). Ganier and Clebsch (1946) found this large woodpecker up to 4000' or higher in the Unicois, but they have shown (1938) that it may reach 5000' in the Great Smokies. Stevenson (1941) recorded it as high at 4100' near Highlands, N. C. Probably it spends the entire year at such altitudes.

Red-bellied Woodpecker (*Centurus carolinus*). The upward limit of this species in the mountains of Georgia may be marked by a specimen collected at 2600' by Denton (1947) and Burleigh, on Yonah Mountain, White County. Present evidence indicates that it ranges somewhat higher in the mountains as one proceeds farther north: Brooks (1934) has found it upward of 3500' in West Virginia, and Stevens and Scott (1947) recorded it at 2800' or above in the Shenandoah National Park, Va., December 28, 1946. Like most other

woodpeckers, it is probably resident at all elevations where found.

**Red-headed Woodpecker (*Melanerpes erythrocephalus*).** One of the most surprising of occurrences during the senior writer's field work in the Blue Ridge Mountains of North Carolina was the discovery of a few of these birds on Billy Cabin Ridge, near Highlands, at an altitude of 4000', June 22, 1937. They were not found there on later trips in 1937 and 1941, nor was the species recorded in the town of Highlands or at Franklin, despite the relatively low altitude of 2100' at the latter town (Stevenson, 1941). The second highest records are at 2900' at Shady Valley, Tenn., June 8, 1934 (Ganier & Tyler, 1934), and June 5, 1937 (Wetmore, 1939). In certain winters the species is common at Blacksburg, Va., where the altitude is 2170' (the Handleys, 1946), but few published winter records may be found for the higher altitudes. Brown (1914), however, found three at Boone, N. C., at 3000' or above, December 24, 1913.

**Yellow-bellied Sapsucker (*Sphyrapicus varius*).** Recorded in summer up to 5100' on Rocky Bald, 12 miles west of Franklin, N. C. (Wetmore, 1941), and at a similar maximum altitude in the Unicois (Ganier & Clebsch, 1946). Exceptional records in the Great Smokies are at elevations of 5800' (Trautman) and 6300'. Its downward limit at this season seems to be 3500' near Highlands, N. C. (Stevenson, 1941). The Sapsucker has been recorded in winter as high as 2200' near Emory, Va. A record at 6000' in the Great Smokies, December 22, 1940, is probably exceptional.

**Hairy Woodpecker (*Dendrocopos villosus*).** Probably of unrestricted altitudinal range in the South. Burleigh (1941) found a nest at 5700' on Mt. Mitchell, May 7, 1931, and indicates that the species may be found near the top (6600' or above) at any time of the year. It may also be encountered the year 'round about the top of Clingman's Dome (6640').

**Downy Woodpecker (*Dendrocopos pubescens*).** Burleigh (1941) reports the casual summer occurrence of this species near the top of Mt. Mitchell, and has seen it at 6000' as late as December 11, 1930. His implication is, however, that it does not spend the entire winter nor breed at such high altitudes. On Roan Mountain, Ganier (1936) records a pair at 5600' and a single individual at 5900', June, 1936; and Wetmore (1939) states that one was collected in the Great Smokies at 6300', June 25, 1937. It may be expected in winter up to 5000' or above, having been seen at 5700' in the Great Smokies, December 21, 1941.

**Red-cockaded Woodpecker (*Dendrocopos borealis*).** Oddly enough, this typically southern species extends its range northward into Tennessee and Kentucky chiefly in the mountains (although there are no records at extremely high elevations). This coincidence is attributable, in part, to the greater amount of pine woods in these mountains than in the nearby lowlands. The highest records for Tennessee are at Beersheba (1900') and Jamestown (1700') (Mayfield, 1932); and on Andy McCully Ridge, near Rabbit Creek, 2210' (Fleetwood, 1936). Mengel (1940) found the species on the Cumberland Plateau in Laurel County, Ky., July 2-7, 1939, but does not state the altitude for these records.

Kingbird (*Tyrannus tyrannus*). Records by several independent observers of the summering of this flycatcher along the Little Tennessee River, at Franklin, N. C. (2000'), may indicate its maximum breeding altitude in the Blue Ridge Mountains. Farther north, however, it occurs in all suitable habitats around Emory, Va., up to about 2400'.

Crested Flycatcher (*Myiarchus crinitus*). Summer records for the present species are as high as 3900' in the Great Smokies (Wetmore, 1941); 4000' in the Unicois (Ganier & Clebsch, 1946); and 4100' in the Blue Ridge Mountains of North Carolina (Stevenson, 1941). Tanner writes of seeing several individuals above 4000' on Unaka Mountain (near Erwin, Tenn.), but does not indicate the exact maximum altitude.

Phoebe (*Sayornis phoebe*). Among the highest summer records are the following: two seen by members of the T.O.S. at 5000' or above in the Great Smokies, June, 1938 (Ganier & Clebsch, 1938); one in the same mountains seen by Trautman at 4700', June 19, 1940; and one collected on Elk Knob, near Boone, N. C., at 4800' in mid-July, 1939 (Wetmore, 1941). As the breeding season begins very early, these June and July records may represent wanderers from lower elevations. Its minimum breeding altitude depends largely on latitude. Breeding records below 500' are few in north Alabama, but it breeds at 250' in west Tennessee (Ganier) and probably breeds near sea level in North Carolina and Virginia. Although its maximum winter range around Emory, Va., is about 2300', two were seen at Windom, N. C. (2700'), December 21, 1946 (the Hughes & Hutchins, 1947).

Acadian Flycatcher (*Empidonax virens*). Recorded as high in summer as 3600' near Shady Valley, Tenn. (Wetmore, 1939), and 3800' near Highlands, N. C. (Stevenson, 1941). Whereas the normal upward limit in the Smokies is near 4000', Trautman found one at 5000' or above, June 22, 1940. Even as far north as West Virginia this species ranges up to 3400' (Brooks, 1945).

Alder Flycatcher (*Empidonax traillii*). As this species is just beginning to extend its breeding range from the North into the southeastern States, it will be interesting to note the altitudes at which it is discovered. Brooks (1945) records its only breeding station in West Virginia at 3400'. More recently it was found apparently breeding at Abingdon, Va., at about 2000' (Stevenson, 1947a & b). Although Tanner and Stevenson searched for it diligently on the alder balds of Little Roan Mountain (6000'), June 28, 1946, it was not to be found there.

Least Flycatcher (*Empidonax minimus*). The collecting of one on Elk Knob, near Boone, N. C., at 4800', July 16, 1939 (Wetmore, 1941), presumably marks the upward limit of this species' breeding range. Stupka has found them in summer in the Great Smokies ranging from 4800' down to 1300' and Stevenson noted a few at Fontana, N. C. (1800').

Wood Pewee (*Contopus virens*). This high-ranging flycatcher has been recorded in June at 5000' in the Great Smokies by Ganier & Clebsch (1938), and Murray (1936) found it at 5500' on Whitetop Mountain, Va., in early June, 1936. The highest records for North Carolina seem to be somewhat

lower: 4100' near Hayesville (Wetmore, 1941) and 4200' near Highlands (Stevenson, 1941).<sup>1</sup>

Olive-sided Flycatcher (*Nuttallornis borealis*). Little has been published on the altitudinal range of this rare breeding bird in the Southern mountains. Ganier and Clebsch (1938) indicate its summer range in the Great Smokies to be in the balsam-spruce forests from approximately 4500 to 6000'. Some of the supposed summer records at lower altitudes are not wholly satisfactory.

Horned Lark (*Eremophila alpestris*). Although it is usually a bird of the plains and valleys, the Lark occasionally occurs at high altitudes both in summer and winter. It was found on the bald of Little Roan Mountain (5800') by Tyler and Lyle, June, 1935; and the following year one pair and one immature bird were seen at the same spot in June (Ganier, 1936). More recently, Tanner writes that he has seen the species there in summer. Murray (1938) reports a pair at about 4000' in Highland County, Va., June 9, 1938. Its minimum altitude in summer is about 250' near Memphis, or perhaps at or near sea level in North Carolina and Virginia. Burleigh (1941) saw a flock of about 20 on the top of Mt. Mitchell, January 24, 1930, but it may not winter regularly above 2500'.

Rough-winged Swallow (*Stelgidopteryx ruficollis*). Found regularly up to 4000' at Highlands, N. C., where one was seen flying over Mt. Satulah (4560'), June 16, 1941 (Stevenson, 1941). Fleetwood saw one at 4900' in the Great Smokies, June 5, 1935, but there appears to be no other records above 2700'.

Barn Swallow (*Hirundo rustica*). Breeds in the mountain valleys at least as high as 2850' at Shady Valley, Tenn. (Ganier & Tyler, 1934), and 2500' in Nelson County, Va. (Freer, 1936). Murray (1938), however, found the species to be common at 3000' and present at 4000' in Highland County, Va. Its minimum breeding altitude for most of the southern states is at sea level, but it may not necessarily be found nesting at all altitudes between the two extremes.

Purple Martin (*Progne subis*). This large swallow has been found rarely in summer at Franklin, N. C., at 2000' (Stevenson, 1941), and at Emory, Va., at about the same altitude. Wetmore (1939) mentions one seen at Shady Valley, Tenn. (2900') June 4, 1937.

Blue Jay (*Cyanocitta cristata*). Burleigh (1941) states that the Blue Jay is not known to breed above 4500' on Mt. Mitchell, but there is definite evidence of its breeding in the Unicois up to 5000' (Ganier & Clebsch, 1946). In the Great Smokies, moreover, there are two summer records as high as 5800' and 6000', and a number of ornithologists have found it up to 6000' or higher on Roan Mountain in June. A record of Blue Jays seen "on top" of Whitetop Mountain, Va., evidently was made well above 5000' (Murray, 1936), and the senior writer heard one there July 16, 1946. There appear to be few winter records comparable to those made in summer. One

<sup>1</sup> Although Burleigh (1941) found the species near the top of Mt. Mitchell occasionally from July 31 to September 11, he does not imply that it breeds at such altitudes.

was seen at 5000' in the Great Smokies, December 21, 1936. Roy Brown found the species at Boone, N. C. (3300'), and Scott (1947) speaks of two seen at 4250' (at least) in Highland County, Va., December 29, 1946.

**Raven (*Corvus corax*)**. Probably unrestricted upward except by lack of suitable nesting sites, but may not occur much lower than 3000' in summer, at which altitude Wetmore (1939) reports one on Big Frog Mountain, Tenn., July 13, 1937. Formerly the Raven nested in the mountains of north Alabama at altitudes as low as 1000' (Howell, 1928). The lowest winter record is at 1300' near Gatlinburg, Tenn., except for occasional records on the coast of the Carolinas.

**Crow (*Corvus brachyrhynchos*)**. Records for the Blue Ridge Mountains of North Carolina (Stevenson, 1941) do not show that the Crow ranges higher than 3100' in summer; and Ganier and Clebsch (1946) failed to find it above 3500' in the Unicois. Apparently its upward breeding limit in the Great Smokies is about 3000'. Farther north, however, three investigators have seen it up to 4500 or 5000' on Whitetop Mountain, Va., and Tanner has found it about as high on Roan Mountain. In winter the Crow has been found commonly at Boone, N. C. (3300' or above), on the Christmas bird counts of Roy Brown and Compton Crook. Ernest Edwards and the Stevensons encountered it at about 4000' on the lower slopes of Mt. Rogers, Va., December 30, 1944 (Edwards, et al., 1945).

**Black-capped Chickadee (*Parus atricapillus*)**. Ranges downward from the highest mountain tops in the South to 3500' or below. Numerous observers have encountered this chickadee at 6600' or higher, but few have identified it below 5000'. In the Great Smokies, however, Tanner has found it at 3500' and Bellrose (1938) at 3800'.<sup>1</sup> It is only natural that the species should occur as low as 4000' farther north, as in Highland County, Va. (Murray, 1938). Burleigh (1941) considers this bird to be of only accidental occurrence on Mt. Mitchell since the cutting of the timber. It is not known to what extent the Black-cap may descend into the valleys in winter, as most of the Christmas census records of it in the South obviously refer to *P. carolinensis*.

**Carolina Chickadee (*Parus carolinensis*)**. One may not safely relegate all chickadees seen at high altitudes to *atricapillus*, for the present species reaches at least 5000' in some places in the South. Wetmore (1941) collected one 12 miles west of Franklin, N. C., at 5100', and it reaches 5400' in that State on Mt. Pisgah (July 20, 1937). At Highlands it was once found at 4900', although this record was overlooked in the preparation of the published list for that region (Stevenson, 1941). It seems likely that this species will be found at similar maximum altitudes in winter.

**Tufted Titmouse (*Parus bicolor*)**. The maximum altitudinal range for this species is about the same as that for the Carolina Chickadee. In the Great Smokies it occurs regularly at 5600', but other records are considerably lower. Wetmore (1941) reports having taken one 12 miles west of

<sup>1</sup> Records made at even lower altitudes in the summer of 1948 (3000', Stevenson; 2900', Tanner) are probably referable to this species, but the diagnostic two-note whistle was not given on either occasion, thus making a positive identification quite difficult.

Franklin, N. C., at 5100', and Ganier and Clebsch (1944) also found it at this altitude in the Unicois. Murray (1936) found it at 5000' on Whitetop Mountain, Va., and the senior author saw one at 4900' on the same mountain, July 7, 1946. It probably remains at these altitudes all winter, as it has definitely been recorded above 4000' at that season.

White-breasted Nuthatch (*Sitta carolinensis*). Three records agree well on the maximum altitude at which this species may be found in summer: Wetmore (1939) found it up to 3800' near Shady Valley; and (1941) reported another near Hayesville, N. C., at 4100'; Stevenson (1941) saw it as high as 4000' near Highlands. Ganier and Clebsch (1946), however, found it up to 5200' in the Unicois; and in Virginia, Murray (1936) has once seen the species as high as 5000' on Whitetop Mountain (June 2, 1936). In winter Tanner has encountered this nuthatch at 4000' or above on Unaka Mountain (near Erwin, Tenn.,) February 25, 1946; and it occurs regularly up to 5600' in the Great Smokies at all seasons of the year.

Red-breasted Nuthatch (*Sitta canadensis*). Apparently unrestricted upward in the nesting season, and found as low as 3700' around Highlands, N. C. (Stevenson, 1941). Even in winter Burleigh (1941) has found them in certain years at the very top of Mt. Mitchell. At the same season the species has often been reported at sea level.

Brown-headed Nuthatch (*Sitta pusilla*). There appears to be no published information on the upward limits of this little nuthatch, therefore it may be well to record its occurrence on mountains around Birmingham, Ala., at elevations of 1300' or higher. There it may be found the year around. Its westward limit in North Carolina (e.g., Burke Co.) (Pearson, Brimley, & Brimley, 1942) probably carries it up to similar altitudes.

Brown Creeper (*Certhia familiaris*). Again with this species, the evidence is that it is not restricted upward in the breeding season. It ranges downward in the Highlands, N. C., region to 3600'. A record at 2500' or less in the Great Smokies, June, 1938 (Ganier & Clebsch, 1938) is low enough to require a qualifying statement, as no other summer records in these mountains are at elevations lower than 3500'. Most individuals winter at much lower altitudes. Burleigh (1941) did not find it above 4500' at that season, but Batchelder (1886) reported one at 6223' on Jones's Knob, N. C., December 30, 1885, and it winters regularly up to 6000' or above in the Smokies. Brown (1914 & 1916) reports its wintering at about 3300' near Boone, N. C. Other published records are below 3000'.

House Wren (*Troglodytes aedon*). Within its geographical range, this little wren may be found at almost any altitude in the Southeast. Two singing birds were heard on Whitetop Mountain, Va., July 16, 1946, at 5100 and 5300'. Previously Murray (1936 & 1937) had found it at 4500' on the same mountain and at 5000' on Mt. Rogers. On the other hand it breeds near sea level in Virginia and North Carolina. A December record at Blacksburg, Va. (the Handleys, 1946), provides evidence that the House Wren occasionally winters above 2000'. Another was seen at 1500' near Gatlinburg, Tenn., December 20 and 21, 1942.

Winter Wren (*Troglodytes troglodytes*). Breeds from the tops of the

highest southern mountains to altitudes of 4000' or below. Howell and Burleigh found it near Highlands, N. C., at the very low altitude of 3700', but it must be very scarce there (Stevenson, 1941). Wetmore (1939) and others saw one at an elevation of 3600' on Snake Den Mountain, Tenn. Most winter records are at lower altitudes, although Stupka has stated that some individuals remain "at . . . high elevations throughout December" (T.O.S. members, 1942). Two of these exceptional records were made at elevations of 6300 and 6500', on December 17, 1939, and December 30, 1941, respectively. Burleigh (1941) reports the species absent from the top of Mt. Mitchell in mid-winter. The highest records (except in the Smokies) seem to be near 3400'; one found on a Christmas bird count near Boone, N. C., by Crook (1935); another seen at Balsam Gap, N. C. (Batchelder, 1886).

Bewick's Wren (*Thryomanes bewickii*). There are several published records of this wren's breeding at high altitudes in the Southeast. Murray (1936) collected one on Whitetop Mountain, Va., at 4500', June 4, 1936; and Wetmore (1941) records the collecting of specimens in summer near Boone, N. C., at 4500 and 4800', and near Creston at 4600'. Raymond Fleetwood's journal indicates that he heard one singing at 5000' in the Great Smokies July, 1934, and June, 1935. Even in West Virginia it is reported to nest as high as 4000' (Brooks, 1942). Farther southwest it may be found in summer at altitudes of 200' or lower. This wren has been found wintering at Blacksburg, Va., at altitudes of about 2100' (the Handleys, 1946), and Batchelder (1886) found a few at comparable altitudes around Asheville, N. C., in December.

Carolina Wren (*Thryothorus ludovicianus*). Wetmore (1941) cites a summer record near Creston, N.C., at 4300', and a number of observers have seen it as high as 4000' around Highlands. Speaking for the Great Smokies, Stupka states that it is "not known to nest above 4000 feet" (T.O.S. members, 1942).<sup>1</sup> The highest winter records are in the Great Smokies: 5280' on January 26, 1935 (Fleetwood), and 5040' on November 28, 1944. It has been reported up to 3500' at Boone, N. C., by both Roy Brown and Compton Crook.

Mockingbird (*Mimus polyglottos*) Most of the higher summer records for this species are just above 2000'. Both Stevenson (1941) and Wetmore (1941) noted it at Franklin, N. C. (2000'), and it proved rather common near Emory, Va., up to 2200'. Mrs. Grinnell saw one at Skyland, N. C. (2250'), June 10, 1942 (Brimley & Grey, 1942). Mrs. W. G. Hartzog, however, saw one in the summer of 1944 at the high elevation of 3300', at Boone, N. C. (Smith, 1945). Burwell (1942) also mentions one killed at this locality, but does not indicate the time of year. Around Emory, Va., it may be seen throughout the year, and it has been listed on Christmas bird counts at a comparable altitude at Brevard, N. C. (the Orrs, 1939).

Catbird (*Dumetella carolinensis*.) The highest summer records are near 6000': Great Smokies (Wetmore, 1939); Mt. Mitchell (Burleigh, 1941); and

<sup>1</sup>Although two independent observers have found it well above 6000' in July and August, both agree that it does not nest at such an elevation (Burleigh, 1941; Stupka).

Roan Mountain (Ganier, 1936; Tanner & Stevenson). It reaches 6300' on Forney Ridge, in the Great Smokies; and Stevenson found it at 6400' on Mt. LeConte, June 9, 1948.

Brown Thrasher (*Toxostoma rufum*). The normal upward limit in the breeding season is probably about 5000', but exceptional records are much higher. Tanner and Stevenson saw one on Roan Mountain at 6000', June 29, 1946; and Burleigh (1941) has seen a few as high as 6200' on Mt. Mitchell. Murray (1937) and Wetmore found one at 5700' on Mt. Rogers, Va. Otherwise the highest records are at about 5000' in the Unicois (Ganier & Clebsch, 1946) and 4500' near Highlands, N. C. (Stevenson, 1941). There are two exceptionally high winter records: one seen on Brasstown Bald (northern Georgia), at 4500' November 24, 1945 (Burleigh, 1945); and one in Pocahontas County, W. Va., at 3400' (Brooks, 1945). Ordinarily it probably does not winter much above 2200', at which altitude it was found by Burleigh at Bent Creek, N. C. (Pearson, Brimley, & Brimley, 1942); and by the Orrs (1939) at Brevard.

Robin (*Turdus migratorius*). There is no evidence that this hardy thrush recognizes any altitudinal limits in the breeding season, as it occurs from the tops of the highest mountains down to very near sea level. Even in winter a few records are at high altitudes. It winters regularly up to 5200' in the Great Smokies, and one small flock was seen at 6000', December 28, 1947. Scott (1947) and Stevens encountered it at 4250' or above in Highland County, Va., December 29, 1946, and there are two records at about 3500': near Boone, N. C. (Crook, 1935); in the Shenandoah National Park, Va. (Stevens & Scott, 1947).

Wood Thrush (*Hylocichla mustelina*). Wetmore (1939) reports its summering up to 5100' in the Great Smokies; and Burleigh (1941) gives 5000' as the upward breeding limit for Mt. Mitchell, as do Ganier and Clebsch (1946) for the Unicois. Tanner and Stevenson heard it singing at about the same altitude on Roan Mountain, June 28, 1946. One record in the Great Smokies (June 19, 1943) is at an elevation of 5400'.

Hermit Thrush (*Hylocichla guttata*). The winter range of this species may rarely reach 3000', at least in the Great Smokies.<sup>1</sup> Stevens and Scott (1947) saw one in the Shenandoah National Park, Va., at 2800'; and numbers have been reported at Windom, N. C. (2700') (Hutchins & the Hughes, 1945).

Veery (*Hylocichla fuscescens*). Ranges in the breeding season from about 6500' in the Great Smokies and 6200' on Roan Mountain down to about 3200' near West Jefferson, N. C. (Wetmore, 1941), as well as on Brasstown Bald, Ga. (Burleigh, 1927). One seen in the Smokies at 2800', June 4, 1937, is unusual, but the date is late enough to denote its summering at that point.

Bluebird (*Siala sialis*). The occasional summering of this species at high altitudes is evidenced by the record of Ganier (1936) and others who found its nest on Little Roan Mountain at 5800', June 25, 1936. Tanner and Stevenson saw a Bluebird at 5600' on the same mountain, June 28, 1946. Ganier

<sup>1</sup>One seen in these mountains at 4900', December 4, 1939, may have been a late fall migrant.



and Clebsch (1938) report the presence of two in the Great Smokies at 4500' or above, June, 1938. Even in Virginia, Murray (1936) has found it up to 5500' on Whitetop Mountain. Occasional winter records in the Great Smokies are at altitudes of 5200 (December 19, 1937) and 5000', but other records are much lower. Brown and Crook found the species at about 3300-3700', near Boone, N. C.

**Blue-gray Gnatcatcher (*Polioptila caerulea*).** This species evidently breeds in the mountains at least as high as 2300' at Emory, Va., and 2100' at Franklin, N. C. Oddly enough, it ranges higher in the mountains as one proceeds northward; Brooks (1945) refers to its breeding at nearly 4000' in West Virginia.

**Golden-crowned Kinglet (*Regulus satrapa*).** Recorded in the breeding season from the highest altitudes in the Southeast down to about 3700', at which altitude it has been seen near Highlands, N. C. (Stevenson, 1941), and at Cone's Lake (Blowing Rock), N. C. (Murray, 1946a). Inasmuch as Burleigh (1941) has found this kinglet all winter on Mt. Mitchell, there is no evidence that it is restricted by altitude at that season.

**Ruby-crowned Kinglet (*Regulus calendula*).** Winter records at Blacksburgs, Va. (the Handleys, 1946), and Asheville, N. C. (Wallace, 1936), probably are at altitudes of 2000' or more. The only winter record at Emory, Va., was at 1700' (Stevenson, 1946).

**Cedar Waxwing (*Bombycilla cedrorum*).** Breeds from the highest altitudes in the South down to about 300' above sea level in North Carolina (Pearson, Brimley, & Brimley, 1942).

**Shrike (*Lanius ludovicianus*).** In southwestern Virginia, at least, this species is a permanent resident up to altitudes of 2000' or slightly higher. In North Carolina it has been found at approximately 2800' in summer at Waynesville, and at 2200' in winter at Asheville (Pearson, Brimley, & Brimley, 1942).

**Starling (*Sturnus vulgaris*).** The highest summer records for the Southeast are those reported by Murray (1936 & 1937) for Whitetop Mountain, Va. (4500'), June, 1936; and on nearby Mt. Rogers (evidently about 5000'). This foreigner invaded Highlands, N. C. (3800'), as early as 1941 (Stevenson, 1941). Very likely it will be found there in winter also, but the highest published winter record at present is that of 11 individuals listed at 3400' near Boone, N. C., December 21, 1934 (Crook, 1935).

**White-eyed Vireo (*Vireo griseus*).** To some extent this species occurs as a breeding bird as high in the mountains as 3800' around Highlands, N. C. (Stevenson, 1941). Ganier and Tyler (1934) report that it was fairly common up to 3000' in Shady Valley, Tenn., in June. It is surprising to learn of its summering at 3400' as far north as West Virginia (Brooks, 1945).

**Yellow-throated Vireo (*Vireo flavifrons*).** Evidently an occasional individual summers (or breeds) at high altitudes, as one was found singing at 3900' near Highlands, N. C., June 24, 1937 (Stevenson, 1941), and Branch Howe found the species in June, 1943, apparently in the same spot. It was found up to 3200' in the mountains near Fontana, N. C., June 11, 1948, but other summer records are below 3000'.

Blue-headed Vireo (*Vireo solitarius*). Unrestricted in upward breeding range, this species occasionally breeds as low as about 500' above sea level (Pearson, Brimley, & Brimley, 1942; Fleetwood, 1947). Westward it has occurred in summer somewhat lower than 2000' in the Great Smokies, where Fleetwood recorded one on July 6, 1934.

Red-eyed Vireo (*Vireo olivaceus*). Collected in North Carolina as high as 4300' near Creston, July, 1939 (Wetmore, 1941), and seen up to 4200' around Highlands (Stevenson, 1941). That it may summer at higher altitudes locally is attested by the following records: one at Newfound Gap (5040') in the Great Smokies, June 20, 1933 (Ganier & Mayfield, 1946); another at that locality, June 14, 1944; nest found at 4800' on Whitetop Mountain, Va., by Murray (1936), who speaks of it as "common everywhere." It was again found to be common at the last locality between 4800 and 5100', July 7, 1946.

Warbling Vireo (*Vireo gilvus*). Breeds up to altitudes of about 2000' in southwestern Virginia. The highest records in North Carolina, at Asheville and Weaversville, are at elevations of about 2200' (Pearson, Brimley, & Brimley, 1942). Along the Mississippi River it nests within 200' of sea level.

Black and White Warbler (*Mniotilta varia*). Wetmore (1939) mentions a June record of this species in the Great Smokies at 5000', and it has been collected at that elevation in the Unicois by Ganier and Clebsch (1946). The senior author (1941) found it common near Highlands, N. C., up to 4800'. Downward, it probably breeds within 300' of sea level in Alabama (Howell, 1928) if not in other southeastern States.

Swainson's Warbler (*Limnithlypis swainsonii*). Among the most surprising of ornithological discoveries in recent years has been the fact that this warbler, formerly thought to be an Austral species, at times breeds high in the mountains of the Southeast. Stevenson (1941) found it summering around Highlands, N. C., at altitudes of 3700 and 3800'; and Wetmore (1939) reports one taken at 3000' near Shady Valley, Tenn., June 8, 1937. In West Virginia, Brooks and Legg (1942) found it up to 2000'.

Worm-eating Warbler (*Helmitheros vermivorus*). Found in summer up to 4200' in the vicinity of Highlands, N. C. (Stevenson, 1941), and at about the same altitude in West Virginia (Brooks, 1934). A very surprising record is that of one seen by Trautman at 5800' in the Great Smokies, June 22, 1940. The minimum altitude is not well known, but there are records of its nesting as low as 500'.

Golden-winged Warbler (*Vermivora chrysoptera*). Recorded in June as high as 5000' or more in the Great Smokies (Ganier & Clebsch, 1938) and at 4300' near Creston, N. C., on July 13, 1939 (Wetmore, 1941). Brewster has indicated that it breeds as low as 2000' in western North Carolina (Pearson, Brimley, & Brimley, 1942), and three summer records in Georgia evidently are at comparable altitudes: Rising Fawn, Young Harris, and Margaret (Greene, et al, 1945). It breeds near Gatlinburg, Tenn., however, at altitudes as low as 1450'.

Blue-winged Warbler (*Vermivora pinus*). Found to be a fairly common summer resident on Lookout Mountain near Mentone, Ala., at alti-

tude of about 1600' (Stevenson, 1944). Records at Young Harris and Margret (Fannin Co.) Ga., apparently are at about 1900-2000' (Greene, et al., 1945). Records at Autaugaville (Howell, 1928) and Florence, Ala. (June 18, 1940) at altitudes of about 450', mark the approximate breeding limit.

Orange-crowned Warbler (*Vermivora celata*). Winter records of this hardy warbler at Swannanoa and Weaverville, N. C., establish its wintering at altitudes of about 2200' (Pearson, Brimley, & Brimley, 1942).

Parula Warbler (*Parula americana*). At two localities in North Carolina this species has been found to summer at rather high altitudes: near Hayesville, 3500' (Wetmore, 1941), and at Highlands, 4100' (Stevenson, 1941). In Virginia, however, Murray (1936) found it as high as 5300' on Whitetop Mountain, June 2, 1936; and both Fleetwood and Trautman have found it about 5000' in the Great Smokies in June.

Yellow Warbler (*Dendroica petechia*). Two summer records in the Highlands, N. C., region are at the exceptionally high altitudes of 3000 and 3700' (Stevenson, 1941); and Murray (1938) recorded one at about 3000' in Highland County, Va. The other extreme is represented by its probable breeding near sea level in North Carolina (Burleigh, 1937.)

Black-throated Blue Warbler (*Dendroica caerulescens*). Breeds from 6590' on Mt. LeConte (Stevenson), and 6000' on Mt. Mitchell (Burleigh, 1941) and on Roan Mountain, down to 3000' or lower. It has been recorded in summer as low as 3200' near Highlands, N. C. (Stevenson, 1941), and at 2900' in the Great Smokies (Stevenson); but Ganier (1923) found a nest with eggs near Beersheba, Tenn., at an altitude of about 2000', May 26, 1922.

Myrtle Warbler (*Dendroica coronata*). According to Pearson and the Brimleys (1942), this winter visitant ranges up to 2000' in North Carolina. It reaches about the same elevation at that season at two Virginia stations: Emory (Stevenson, 1946) and Blacksburg (the Handleys, 1946).

Black-throated Green Warbler (*Dendroica virens*). Breeds from the highest elevations in the South down to about 500' in Alabama. In Virginia and the Carolinas, *D. v. wayneii* breeds near sea level, but its upward breeding limits are not well known.

Cerulean Warbler (*Dendroica cerulea*). Evidently ranges in summer from 2400' near Emory, Va., down to about 300' in central Alabama, (Howell, 1928) and 250' near Memphis, Tenn.

Blackburnian Warbler (*Dendroica fusca*). Recorded in early summer from 5900' in the Great Smokies (Wetmore, 1939) and 5000' on Mt. Mitchell (Burleigh, 1941) down to 2600' in Pickens County, Ga. (Odum, 1945a & b), and to 2400' at Fontana, N. C., where it was common on June 11, 1948.

Yellow-throated Warbler (*Dendroica dominica*). A most unusual record is that of a singing bird near Highlands, N. C., at an altitude of 3750', June 19, 1937 (Stevenson, 1941). Evidently it breeds regularly up to 2700' at Fontana, N. C., where one was seen at 3200'.

Chestnut-sided Warbler (*Dendroica pensylvanica*). Breeds as high as 6300' on Mt. Mitchell (Burleigh, 1941) and 6500' in the Great Smokies (Stevenson). Found in summer as low as 2000' at Franklin, N. C., and 2100' near Dillard, Ga. (Stevenson, 1941).

Pine Warbler (*Dendroica pinus*). Apparently bred in the town of Highlands, N. C. (3800'), in the summer of 1937, but not in 1941 (Stevenson, 1941). Its breeding at this altitude is thought to be exceptional, and it is doubtful whether it normally winters at altitudes much higher than 1500'.

Prairie Warbler (*Dendroica discolor*). The senior writer (1941) has found this species in the breeding season up to 2200' near Dillard, Ga., and to 2600' near Fontana, N. C.; but it occasionally ranges up to 4000' in Virginia and to 3000' in West Virginia (Brooks, 1937).

Palm Warbler (*Dendroica palmarum*). Late December records at Blacksburg, Va. (the Handleys, 1946), and Burleigh's winter record at Asheville, N. C. (Pearson, Brimley, & Brimley, 1942), indicate that the Palm Warbler sometimes winters at altitudes of about 2200'.

Oven-bird (*Seiurus aurocapillus*). The upward breeding limit of this species appears to be slightly in excess of 5000'. At about this elevation it has been recorded in the Great Smokies (Ganier, 1926), in the Unicois (Ganier & Clebsch, 1946), and near Highlands, N. C. (Stevenson, 1941). A slightly higher record for the Great Smokies is that of one seen by Stupka at 5300' in June, 1944. Murray (1936) has found it at 5200' on Whitetop Mountain, Va., and he (1937) and Wetmore recorded one at 5300' on Mt. Rogers. The nesting of this bird in the hills near Florence, Ala., at about 600' (Howell, 1928) affords an example of its other altitudinal extreme at that season, although there is evidence that it may nest near sea level in southeastern Virginia (Duvall, 1937).

Louisiana Water-Thrush (*Seiurus motacilla*). The highest altitude at which this species has been recorded in summer is 5000', 12 miles west of Franklin, N. C. (Wetmore, 1941). Ganier and Clebsch (1946) found it up to 4250' in the Unicois, and the senior author (1941) has records as high as 4000' around Highlands, N. C. The Water-Thrush's other altitudinal extreme at this season is near sea level (Pearson, Brimley, & Brimley, 1942).

Kentucky Warbler (*Oporornis formosus*). Among the highest early summer records available to the writers are those at Highlands, N. C., at about 3200' (Stevenson, 1941); and the report of one near Cosby, Tenn., 3500' (Wetmore, 1939). It reaches 3400' in the Great Smokies. Farther north, moreover Brooks (1934) indicates that it breeds up to 3500' in West Virginia.<sup>1</sup>

Yellow Throat (*Geothlypis trichas*). Although this little warbler was not recorded higher than 3950' in the Blue Ridge Mountains of North Carolina (Stevenson, 1941), it has often been recorded in summer at higher altitudes farther north. Wetmore (1941) reports collecting one near Creston, N. C., at 4600'; and it breeds regularly, though locally, in the Great Smokies at 6300'. Murray (1937) and Wetmore found it at about 5000' on Mt. Rogers, Va. Ganier and Clebsch (1938) show the Yellow-throat to occur in the Great Smokies at altitudes in excess of 5000', and below 2500', but do not cite records for elevations between 2500 and 5000'.

<sup>1</sup>The statement that the Kentucky Warbler ranges up to 4000' in North Carolina (Pearson, Brimley, & Brimley, 1942) is not substantiated by definite published records. If such records exist, they may refer to migrating individuals.

Yellow-breasted Chat (*Icteria virens*). Burleigh (1941) implies that a singing male seen at 5000' on Mt. Mitchell was summering at about that altitude, and the senior author heard one singing at 5400' on the slope of Mt. LeConte, June 9, 1948. The species has also been found up to 4400' near Highlands, N. C. (Stevenson, 1941). It is known to reach 4000' in Virginia (Hostetter, 1947), and Brooks (1934) has found it up to 3600' in West Virginia. By contrast, it breeds at sea level in some parts of the South.

Hooded Warbler (*Wilsonia citrina*). The maximum altitude at which this species is known to summer appears to be 4900', Fleetwood having found one at this level in the Great Smokies, June 7, 1934. Elsewhere it reaches 4200' in the Unicois (Ganier & Clebsch, 1946) and 3950' around Highlands, N. C. (Stevenson, 1941). Farther north Murray (1946b) and Brooks (1934) report it at 3500' in Virginia and West Virginia, respectively.

Canada Warbler (*Wilsonia canadensis*). Breeds from the highest altitudes in the South (Burleigh, 1941; Stupka) down to 3400' near Highlands, N. C. (Stevenson, 1941), and in the Great Smokies.

Redstart (*Setophaga ruticilla*). Summer records in the Great Smokies are at altitudes much higher than those in other parts of the South. Fleetwood found three at 5600' or above, June 13, 1934; and the junior author has two records at 4900' (June 11 and 12, 1937). Freer has found the species in Virginia at 3100' and 3600' (Murray, 1946b), but as the dates are not stated these birds may have been migrants. There seem to be no other records of its summering any higher than 2300' (Pearson, Brimley, & Brimley, 1942).

English Sparrow (*Passer domesticus*). The appearance of several of these aggressive birds at Highlands, N. C. (3800'), about 1920 or 1925 may mark the highest altitude at which the species has been recorded in the Southeast. These birds were shot by a public-spirited citizen, and the species had not returned there up to 1941 (Stevenson, 1941).

Meadowlark (*Sturnella magna*). In the region under immediate consideration there seem to be only two summer records at altitudes above 2400': a singing bird found near Highlands, N. C., at 3000', July 8, 1937 (Stevenson, 1941); and numbers seen up to 3000' at Shady Valley, Tenn. (Ganier & Tyler, 1934).<sup>1</sup> Farther north, however, Murray (1936; 1937; 1938) has several records ranging from 4000 to 5000' in Virginia. At three locations the Meadowlark has been found wintering at elevations above 2500': Stevens and Scott (1947) list one at 2800' or above in the Shenandoah National Park, Va., December 28, 1946; Hutchins and others (1946) found a few at Windom, N. C. (2700'); and Brown (1914; 1916) reported large numbers at 3000' or above near Boone, N. C., in December.

Red-wing (*Agelaius phoeniceus*). Breeds to some extent at Highlands, N. C., at 3800' (Stevenson, 1941); and Ganier and Tyler (1934) found it in June at Shady Valley, Tenn. (2800'). Even in Virginia, Murray (1938) records it as high as 3000' in Highland County. Its normal upward limit in

<sup>1</sup>It seems uncertain whether Meadowlarks seen in "late summer" at Boone and Blowing Rock, N. C. (Murray, 1946a), should be regarded as breeding birds, late summer wanderers, or early fall migrants.

winter is probably about 2000', but Brown (1919) found it once at Boone, N. C., at an altitude of about 3300'.

Orchard Oriole (*Icterus spurius*). Breeds up to about 2300' (or more) in southwestern Virginia, and to 2000' at Franklin, N. C. (Stevenson, 1941).

Baltimore Oriole (*Icterus galbula*). Evidence that this species has nested as high as 3800' above sea level is obtained from two earlier investigators at Highlands, N. C. It could not be found there, however, in 1937 nor in 1941 (Stevenson, 1941), and it may not breed regularly above 2500'. South-westward it breeds at altitudes of 200' or lower.

Grackle (*Quiscalus quiscula*). Records as high as 4000' at Blowing Rock, N. C. (Murray, 1946a), seem indicative of its breeding nearby, as they were made as early in summer as "mid-July." Otherwise it has been found in summer as high as 3000' in Highland County, Va. (Murray, 1938), and 2800' at Shady Valley, Tenn. (Ganier & Tyler, 1934). It is of scarce occurrence in winter at Blacksburg, Va. (2170') (the Handleys, 1946), and there seem to be no published winter records at higher altitudes.

Cowbird (*Molothrus ater*). Probably marking the normal upward limit in the breeding season are Perrygo's records at Shady Valley, Tenn. (2900'), June, 1937 (Wetmore, 1939), but an extremely high record is that of an immature collected at 5000' in the Unicois by Ganier and Clebsch (1946), June 20, 1944. Blacksburg, Va., appears to be the highest locality for which a winter record has been published (the Handleys, 1946).

Scarlet Tanager (*Piranga olivacea*). Most of the high records for the breeding season are near 5000'. At that altitude Ganier and Clebsch (1946) saw it in the Unicois; Murray (1936) found it on Whitetop Mountain, Va.; and Tanner and Stevenson heard one singing on Roan Mountain, June 29, 1946. One was found in the Great Smokies at 5040' (or higher), June 20, 1933 (Ganier & Mayfield, 1946); and another was seen at 5800' in these mountains by Trautman, June 22, 1940. Evidently it breeds at altitudes as low as 600 or 700' in Alabama (Howell, 1928) and possibly lower in Tennessee (Calhoun, 1941) and North Carolina.

Summer Tanager (*Piranga rubra*). The maximum altitude at which this Austral species summers appears to be about 2500' in the Great Smokies (Ganier & Clebsch, 1938). It also reaches 2300' around Emory, Va., and its nest was found at 2400' on Cheaha Mountain, Ala., June 6, 1948.

Cardinal (*Richmondia cardinalis*). Occasionally found in summer up to 4200' around Highlands, N. C. (Stevenson, 1941). Murray (1932) mentions a few seen at Blowing Rock, N. C. (4000'), without citing dates. Hostetter (1947) has found it at 3820' at Mountain Lake, Va. Doubtless the species remains at these altitudes all winter. A rather unusual record is that of a Cardinal seen by Fleetwood at 4492' in the Great Smokies, June 16, 1935.

Rose-breasted Grosbeak (*Phoebastria ludovicianus*). Ganier and Clebsch (1944) give 5200' as the maximum summer altitude for this species in the Unicois, and indicate (1938) that it reaches 5000' in the Great Smokies. Murray (1936) saw it at 5000' on Whitetop Mountain, Va., and Wetmore (1941) speaks of one taken near Boone, N. C., at 5100'. There are two ex-

ceptionally high records: one singing on Little Roan Mountain at 5700' in June, 1936 (Ganier, 1936); and one seen at 6000' on Mt. Le Conte, June 13, 1943. Pearson and the Brimleys (1942) state that "it breeds . . . at an elevation of 3000 feet and upward," but there seem to be no definite records below 3500'.

Blue Grosbeak (*Guiraca caerulea*). A breeding record at Weaverville, N. C., is at the unusually high altitude of 2200' (Pearson, Brimley, & Brimley, 1942).

Indigo Bunting (*Passerina cyanea*). The breeding of this species at high altitudes in North Carolina is evidenced by its regular summering up to 4900' near Highlands (Stevenson, 1941) and 4800' near Boone (Wetmore, 1941). Ganier and Clebsch (1938) indicate that it reaches or exceeds 5000' in the Great Smokies. Apparently it formerly bred near the top of Roan Mountain (6300'), but it seemed to be absent there in 1946. It is very surprising to read that it was ". . . fairly common along the summits", June 22-27, 1936, and ". . . seen or heard at eight locations" (Ganier, 1936), as Tanner and Stevenson failed to find any there on June 28 and 29, 1946. For so conspicuous a bird as the Indigo Bunting this is surely of some significance. Its occasional summer occurrence at such altitudes, however, is substantiated by records in the Great Smokies: June and July, 1936, 6300'; June, 1940, 5700' at two localities.

Purple Finch (*Carpodacus purpureus*). A winter record at an extremely high altitude is provided by Burleigh (1941), who found one singing near the top of Mt. Mitchell (6500'), January 24, 1930. Its normal upward limit at that season must be much lower.

Pine Siskin (*Spinus pinus*). Breeds on some of the highest mountains in the Southeast, but may rarely occur much lower in summer. Wetmore (1939) refers to a young female taken at 2700' in the Great Smokies, July 2, 1937. The lowest extremes given by Ganier and Clebsch (1938) are between 4500' and 5000'. It is probably unlimited in its vertical distribution in winter.

Goldfinch (*Spinus tristis*). Virtually unlimited by altitude in the South east in summer. Burleigh (1941) asserts that it breeds near the top of Mt. Mitchell, and Ganier (1936) found it near the summit of Roan Mountain. On the other hand, it may be found throughout the summer in parts of Alabama where the altitude is not more than 200' above sea level, and probably breeds nearer sea level in North Carolina. In winter it ranges up to 5000' in the Great Smokies, and more rarely to 6100' (December 21, 1941).

Red Crossbill (*Loxia curvirostra*). Summers near or at the tops of the highest mountains in the Southeast, but at times possibly much lower. Ganier and Clebsch (1938) speak of finding it between 5000 and 6000' in the Great Smokies. Stevenson (1941) saw flocks at 3800 to 4000' at Highlands, N. C., and others have found them there more recently. Some records are at much lower elevations. At 1300' Stupka (1938) found a pair of adults feeding young near Gatlinburg, Tenn., April 10, 1938; he and Dr. Alfred Lewy found adults and young there, May 5, 1945. Joe Manley saw an adult Crossbill feeding a young one at Cades Cove (1800'), March 29, 1939. This species

is probably unrestricted in its altitudinal range in certain winters.

Towhee (*Pipilo erythrophthalmus*). Ranges up to at least 6300' in the breeding season, according to the testimony of several independent observers, and to 6500' in the Great Smokies. It is surprising to find (Burleigh, 1941) a winter record at 5200' on Mt. Mitchell, February 6, 1931. The wintering of this species at such an altitude must be most unusual, as it was found by Brown (1916) only once in December at Boone, N. C. (about 3300'). Howell and Wright (1945) reported it at Highlands, N. C. (3800'), December 24, 1944.

Savannah Sparrow (*Passerculus sandwichensis*). Two records indicate that the maximum altitude reached by this species in winter is about 2200': near Asheville, N. C., by Burleigh (Pearson, Brimley, & Brimley, 1942); Blacksburg, Va. (the Handleys, 1946).

Grasshopper Sparrow (*Ammodramus savannarum*). Records at Shady Valley, Tenn. (2900') in June, 1937 (Wetmore, 1939) may mark the upward limit of the species in the breeding season. It is surprising to learn that it has occurred in winter at about 2200' at Swannanoa, N. C., where Burleigh collected one on December 29, 1931. (Pearson, Brimley, & Brimley, 1942).

Vesper Sparrow (*Poocetes gramineus*). Like the House Wren, this northern species may be found at almost any altitude within its geographical range. Wetmore (1941) reports collecting it at an altitude of 4500' near Boone, N. C., in July, 1939, and Ganier (1936) refers to a record at the summit of Little Roan Mountain (5700'), June, 1936. Murray (1936) found it at 5500' on Whitetop Mountain, Va. A breeding record at a very low altitude (about 300?) is supplied by Craighill at Rocky Mount, N. C. (Pearson, Brimley, & Brimley, 1942). In northeastern Tennessee the Vesper Sparrow winters at altitudes of 1500 to 1800', and Batchelder (1886) saw it around Asheville, N. C. (2200'), in December, 1885.

Pine-woods Sparrow (*Aimophila aestivalis*). Two singing birds were heard on Lookout Mountain, near Mentone, Ala., at an elevation of 1800', June 11, 1943; and Ganier (1923) found this species at a comparable altitude near Beersheba, Tenn. In Georgia, Denton and Odum (1945) report it as high as 2000' in Cherokee County, July 29, 1945. This sparrow evidently breeds at even higher altitudes farther north. One seen by Freer (1933) at 2500' in Augusta County, Va., April 15, 1933, was probably breeding there, as it is known to summer almost as high in the mountains somewhat farther west in that State (Stevenson, 1947b). Brooks (1938) has several West Virginia records between 2500 and 3000'.

Junco (*Junco hyemalis*). Found throughout the year at the summit of Mt Mitchell (Burleigh, 1941). In summer it has been recorded as low as 3500' in North Carolina by Wetmore (1941) and Stevenson (1941); and in the Unicois by Ganier and Clebsch (1946). In the Great Smokies, however, there are records as low as 2600' (Ganier & Clebsch, 1938) and 2750' (Stevenson). Although Sprunt (1924) gives 2800' for the minimum range of *J. h. carolinensis* in Buncombe County, N. C., he does not state the date of its occurrence at that altitude.



Tree Sparrow (*Spizella arborea*). Scott (1947) speaks of finding several at 4250' or above in Highland County, Va., December 29, 1946. From this elevation it ranges downward to about 250' near Memphis, Tenn., and near sea level in Virginia and North Carolina.

Chipping Sparrow (*Spizella passerina*). Recorded in summer as high as 4050' around Highlands, N. C. (Stevenson, 1941), and summer records in Highland County, Va. (Murray, 1938), apparently were at similar elevations. It ranges regularly up to 4500' in the Great Smokies, however, where there are exceptional records by Trautman at 5800 and 6300'. It also breeds near sea level in parts of the South. The highest winter record is that of Burleigh's at Bent Creek, N. C., presumably at an altitude somewhat in excess of 2000' (Pearson, Brimley, & Brimley, 1942).

Field Sparrow (*Spizella pusilla*). Murray (1936) found one singing on Whitetop Mountain, Va., at an altitude of about 4900', and Stevenson heard one in song there at 5300', July 16, 1946. Burleigh (1941) records its breeding up to 5200' on Mt. Mitchell. The highest summer record in the South is that of Trautman—5800' in the Great Smokies, June 22, 1940. It may also be found at the same season near or at sea level. The highest winter records are at Boone, N. C. (about 3300'), where Brown (1916; 1918) and Crook (1935) found it fairly common in December.

White-crowned Sparrow (*Zonotrichia leucophrys*). The highest localities where this sparrow has been found in winter are at altitudes of about 2200': Asheville, N. C. (Pearson, Brimley, & Brimley, 1942); and Blacksburg (the Handleys, 1946) and Emory, Va.<sup>1</sup>

White-throated Sparrow (*Zonotrichia albicollis*). Brown's (1919) record of one found on a Christmas bird count at Boone, N. C., (3300'), may be exceptional, although it winters in small numbers up to 2700' at Windom (Hutchins, et al., 1946).

Fox Sparrow (*Passerella iliaca*). Both Ray Brown and Compton Crook have encountered a few Fox Sparrows on their Christmas bird counts at Boone, N. C., even though it tends to be scarce in winter at 2000' or above. James Hutchins and others (1946) saw one at Windom, N. C. (2700'), December 27, 1945. The highest record is in the Great Smokies where Fleetwood saw one at 4000', February 4, 1935.

Swamp Sparrow (*Melospiza georgiana*). Ranges up to 2200' in winter near Emory, Va. (Stevenson, 1946), and to about the same altitude at Asheville, N. C. (Pearson, Brimley, & Brimley, 1942).

Song Sparrow (*Melospiza melodia*). Found in the breeding season up to 6000' or above on Roan Mountain (Ganier, 1936, Tanner and Stevenson) and on Mt. Mitchell (Burleigh, 1941). In one part of the Great Smokies (Clingman's Dome) it reaches 6400'. The mountain population ranges downward to about 700', for Coffey (1942) found it around Chattanooga, Tenn., in July, 1942. Furthermore, *M. m. atlantica* breeds at sea level in North Carolina and Virginia, but in the Southeast it appears that Song Spar-

<sup>1</sup>One seen by Miss Boggs at Waynesville, N. C. (2875'), December 1, 1931) Pearson, Brimley, & Brimley, 1942), may have been wintering, although the date does not seem too late for the fall migration.

rows are nowhere found in the breeding season at altitudes from approximately 100 to 800'. Both Brown and Crook found the Song Sparrow common in December at Boone, N. C. (3300'). It would not be surprising to find so hardy a species even higher in the mountains in winter, but published records for these elevations are lacking.

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## THE MIGRANT

A QUARTERLY JOURNAL DEVOTED TO THE STUDY OF TENNESSEE BIRDS  
PUBLISHED BY THE TENNESSEE ORNITHOLOGICAL SOCIETY

Free to members. To subscribers, \$1 per year; single copies 30c.

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Fred W. Behrend, Secretary, 322 Carter Boulevard, Elizabethton, Tenn.

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All items for publication should be sent to

James T. Tanner, Editor, Department of Zoology, University of Tennessee,  
Knoxville, Tennessee

The Tennessee Ornithological Society was founded, October 1915.

Publication of THE MIGRANT was begun, March 1930.

*The simple truth about birds is interesting enough;  
it is not necessary to go beyond it.*

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### NOTES HERE AND THERE

The Elizabethton Chapter of the T. O. S. is again conducting regular observations of the fall migration of hawks. Trips have been planned for several week ends thruout the season to Hump Mountain, where in previous years they have had some success in seeing migrating hawks. The Knoxville Chapter is also planning, either as a group or by certain individuals, field trips to places where hawk migration may be observed.

The December issue of THE MIGRANT will contain the reports from the various Christmas bird counts held over the State. For this reason the issue will not appear until some time after the counts are made. The December issue will also contain several notes and items which could not be carried in this number.

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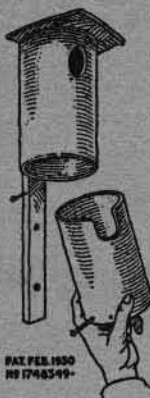
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