

f. Three and one-quarter by three and one-half inches. This opening is in the upper corner of the building, within the angle formed by the corner board and the trimming beneath the roof. The bird using this hole roosts on a two by three inch board forty inches below the hole, as is evidenced by the accumulation of droppings along this board and on the floor directly below.

g. Three and one-quarter by four inches. Between the angle formed by the juncture of the corner-board and the cornice, a similar position to *c*, on the opposite side of the building. Here a drop of forty-two inches is required to reach the same supporting boards to which more direct access is secured by making entrance through holes *d* and *e*.

Observation of these holes discloses the fact that the bird prefers, or more probably requires, a projection or some other foothold to which it may cling while chipping out a hole in a flat surface such as the side of a building. Each of the holes, as well as the incompleated ones not sketched, are drilled close against a board used as trimming (shown in the sketch by heavier shading) which furnishes a support to the prospective lodger. The broken lines drawn through the figures to show location of the joints between the boards would indicate that operations are commenced along this juncture, apparently for the reason that the crack facilitates the beginning of the project, though the boards are tongued and grooved and fit snugly together.

Benicia, California, January 12, 1922.

A LAW GOVERNING THE ELEVATION OF THE NESTING SITE

By CHARLES KETCHUM AVERILL

IN Chapman's "Warblers of North America" particular attention is given to the vertical range in the trees of the arboreal species in their summer homes. Thus, the Cape May "lives in the tops of high coniferous trees". The Blackburn "is a lover of deep mixed growths and the upper branches of the biggest conifers". Other species of the same genus, *Dendroica*, are more lowly in range. The Prairie Warbler keeps near the ground. Of the Chestnut-sided we note that "its beat lies between the ground and the tops of small deciduous trees". In this way we may note the habit of each species and make a list of those that are high ranging and another of those that range low.

From the same source we may learn the nesting height of each species, and place this information opposite each. In the *Auk* (vol. 37, October, 1920, p. 572) I called attention to the fact that as length of wing is a factor in ease and power of flight, and the tail an impediment to flight, the bird with the longer wing and shorter tail might be called the better flier, and species so proportioned were the ones making the longer migrations. Taking the wing and tail lengths from Ridgway's "Birds of North and Middle America", the figures being the average given for the male bird in every case, and subtracting the latter from the former we may complete the table of the genus *Dendroica* by placing the wing and tail difference in a third column.

TABLES SHOWING THE RELATION BETWEEN WING LENGTH AND HEIGHT OF
NESTING IN THE GENUS DENDROICA

I. LOW RANGING		
	Nesting height	Wing minus tail mm.
Prairie Warbler	Bushes	9.8
Palm and Yellow Palm Warblers	On or near ground	12.5
Golden-cheeked Warbler	Up to 15 ft.	10.9
Magnolia Warbler	8 to 20 ft., once 35 ft.	11.4
Chestnut-sided Warbler	3 ft.	13.2
Black-throated Blue Warbler	2 ft.	14.1
Kirtland Warbler	On or near the ground	12.6
	Average	12.1
II. HIGH RANGING		
	Nesting height	Wing minus tail mm.
Pine Warbler	10 to 80 ft.	18.5
Cerulean Warbler	5 to 50 ft.	20.5
Cape May Warbler	low nesting	19.1
Townsend Warbler	rarely noted, once 4 ft.	17.2
Hermit Warbler	2½ to 45 ft.	15.6
Blackburn Warbler	10 to 40 ft.	19.5
Yellow-throated Warbler	30 to 40 ft.	16.2
Sycamore Warbler	similar to last	15.7
Grace Warbler	50 to 60 ft.	22.0
Bay-breasted Warbler	5 to 20 ft.	20.3
Black-throated Green Warbler	3 to 40 ft.	16.0
	Average	18.3

From these tables we learn that to range high and nest high is the prerogative of the long-winged birds. In no case does a short-winged species nest high. That high ranging and high nesting should go together is not surprising, since in feeding the young, the adult birds make so many trips to and from the nest that it is a great economy of time and labor to have the nest and feeding range near the same elevation, just as humans have found the flat more convenient than the storied dwelling.

Why only the longer winged warblers nest high is an interesting question to which it is possible to give an answer worth considering. The farther removed from the ground, the safer the nest and its occupants, so there is an influence toward high nesting. But the leaving of the nest by the young on the first flight is an event of great import attended with considerable danger, and the better flier will be able to leave with greater safety. We have all noticed the excitement in the family when the young bird takes its first flight and no doubt this is caused by the sense of danger. Thus those that build high are the longer-winged birds; but the converse is, of course, not true, as many long-winged birds nest on the ground.

Three long-winged species have been omitted from the table, the Black-poll, Myrtle, and Yellow warblers. These breed across the continent, north to the tree limit, where all trees are low and stunted. A preference for a high nesting site would be incompatible with such a range. Although at the southern limit of the breeding range occasionally a high nest may be found, we should expect as a rule these species to be low nesting, as is the case. The members of the genus *Helminthophila* are ground nesting and are not high

rangers in the breeding season, although they are arboreal. Other warblers nesting in trees are the Parula and Eastern Redstart, but there are not enough species in each genus to interest us. The Olive Warbler of the southwest is a high-nesting bird, thirty to fifty feet, and is decidedly long-winged.

Among the vireos the high rangers are the Red-eyed, Warbling, and Yellow-throated. These also nest high at times, the Red-eyed, five to forty feet, the Warbling, eight to forty feet, the Yellow-throated, ten to thirty feet*. The White-eyed Vireo and its relatives, being much shorter-winged, live nearer the ground, nesting in thickets. It is not necessary to give figures of wing and tail length as all the members of the genus *Vireo*, to which the White-eyed Vireo belongs, have the rounded form of wing which is shorter always than the pointed wing and indicates poor flight ability, while the Red-eyed, Warbling, and Yellow-throated (genera *Vireosylva* and *Lanivireo*) have pointed wings. The Black-whiskered, Philadelphia, and Solitary vireos are all tree-nesting birds of pointed wing but rather lower in preference of nesting site.

In the finch family all species that range well up in the trees are long-winged. Goldfinch, Purple Finch, Siskin, Redpolls, Crossbills, Rose-breasted Grosbeak and Indigo Bunting all nest above the ground. The Pine Grosbeak, arboreal and nesting off the ground, is one of the long-winged, and the Evening Grosbeak, also long-winged, nests up to twenty feet. In the genus *Spizella*, as is the case with nearly all "sparrows", the nest is on the ground or in a low bush, except that of the Chipping Sparrow, which nests a few feet up and is the longest winged of its kind. It is also less of a ground bird than its relatives. All our North American sparrows are short-winged and therefore low or ground nesting.

The Eastern species of *Icterus* follow the law also, as is seen from the table immediately following.

EASTERN SPECIES OF ORIOLES

	Nesting height	Wing minus tail mm.
Baltimore Oriole	20 to 40 ft.	21.1
Orchard Oriole	10 to 15 ft.	9.0

TYRANT FLYCATCHERS

I. HIGH RANGING

	Nesting height	Wing minus tail mm.
Kingbird	15 to 25 ft.	33.9
Olive-sided Flycatcher	25 ft.	38.0
Wood Pewee	20 to 40 ft.	17.2
	Average	29.7

II. LOW RANGING

	Nesting height	Wing minus tail mm.
Phoebe	Low	14.6
Yellow-bellied Flycatcher	On ground	15.1
Acadian Flycatcher	Up to 8 ft.	15.0
Traill Flycatcher	Near the ground	12.7
Least Flycatcher	5 to 15 ft.	9.9
	Average	13.4

*All nesting elevations are from Chapman's "Handbook of Birds of Eastern North America."

III. HIGH RANGING BUT RATHER LOW NESTING

	Nesting height	Wing minus tail mm.
Great Crested Flycatcher	Generally less than 20 ft.	10.0
THRUSHES NESTING ABOVE GROUND		
Wood Thrush	About 8 ft.	37.5
Gray-cheeked Thrush	Low trees or bushes	31.0
Olive-backed Thrush	About 4 ft.	30.8
	Average	33.1
THRUSHES NESTING ON GROUND		
Hermit Thrush		24.2
Wilson Thrush		27.9
	Average	26.0

Other birds ranging and nesting high are the Tanagers, Cedar Waxwing, Kinglets, Robin (at times), Bluebird, Crows, and Grackles. These are all long and pointed of wing. Apparently the only short and round winged bird in eastern North America to nest high is the Blue-gray Gnatcatcher, ten to sixty feet; this is the only exception to the law.

All our passerine birds that fly at any considerable elevation above the ground have the long, pointed wing, as Grackles, Red-winged Blackbirds, Cowbirds, Rusty Blackbird, Longspurs, Shore Larks, Titlarks, Robin, Kingbirds, Bluebirds, European Starling, Crows, Ravens and, of course, the Swallows. Even such as fly in flocks in the open above the trees are of the same wing form, as Goldfinches, Siskins, Redpolls, Crossbills, Purple Finches, Cedar Waxwing.

To sum up: Birds with long pointed wings may nest high or low, but the short and round winged are low nesting. In short, among groups of similar passerine North American birds the power of flight is closely related to the elevation of the nest in species that are arboreal.

Bridgeport, Connecticut, January 8, 1922.

FROM FIELD AND STUDY

Red-wings of the Imperial Valley, California.—During the comparatively few years since agricultural development in the Imperial Valley of California has been in progress, many species of birds have extended their ranges to include this favored area, some have multiplied apace, and not a few of them are, to some extent, changing their habits to conform to new conditions. Chief among these in numbers is probably the Sonora Red-wing (*Agelaius phoeniceus sonoriensis*). Coming in from the valley of the Colorado River, where they were practically limited to the riparian association, the blackbirds have spread over the broad and fertile plain of the Imperial and, fattening unmolested on the grain crops, have become amazingly abundant. There seems to have been little competition in their ecological position, and, with few apparent enemies, their untold thousands have already become such a serious menace that it is being loudly and insistently demanded that some steps be taken to control their depredations.

Red-wings seem to be rather evenly distributed over the valley floor during the