

THE NEST OF THE GOLDFINCH (*Astragalinus t. tristis*) BASED ON STUDY OF THE DESERTED NESTS.

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Everyone who has noticed birds at all is sure to know the Goldfinch, although he may call it a "Wild Canary." He is a jolly little fellow and his undulating flight and pretty "Perchic-o-ree" call are known by every bird-lover. But it is only the select few who know him the year round; who have watched him through the winter in his brown suit, and watched his nest-building in the summer.

All through the winter the Goldfinches who remain with us wander about in little bands of from six or eight up to a score or two, subsisting on weed-seeds and scattered grain. In the spring the males change their brown coats for others of brilliant yellow and black, but they still wander about, reinforced by their brethren who have wintered in the south, until mid-summer.

In late July or early August the Goldfinches set about building their dainty, cup-like nests, in which the females lay from four to six very light blue eggs, which in a couple of weeks hatch out into baby Goldfinches. Then comes a busy time; for the parents must hurry around and catch enough insects, mainly plant-lice and flies, for their insatiable little charges. When the young finally leave the nest their food soon changes to the regulation diet of their family; a little gleaned grain, thistle, milkweed, sunflower and weed seeds.

During the winter, the Goldfinches are found mainly on pasture lands or fields that were allowed to grow up to weeds after the crops were gathered, their distribution being determined almost entirely by that of suitable food. In the spring they wander anywhere, and in the fall, when all the weed-seeds are ripe, when grain is being gathered in and left scattered on the ground, when all nature seems to be making provision for the seed-eaters; in this season the Goldfinches may roam where they please, and always find themselves in

a land of plenty. But in the summer, when they are burdened with the care of a family and have to find insects for their young, the Goldfinches seek out some spot that combines the advantages of concealing the nests with that of attracting the insects that must be obtained for their growing young.

The nests that I have found were usually in some such general situation as this. A patch of woods is bordered by a slashing in which numerous small elm and hickory saplings mingle with large thorn bushes of about the same size. Beyond the slashing lies a small area filled with weeds, and beyond that a great red clover field. In such a slashing of two or three acres, there may be from two to half a dozen Goldfinch nests. Another favorite place is in the midst of a bed of thistles or of a berry-patch surrounded by woods, and sometimes nests are found in a lone tree in the middle of a pasture, overgrown with weeds.

The average height of the nest from the ground is from six to ten feet. By far the majority of nests that I have seen were at that height. In slashings they are almost always placed so. Nests in thistles or berry-bushes are usually only three or four feet up, but when the nest is placed in a lone tree or in a tall tree in the edge of woods it is sometimes from twenty-five to forty feet up. Messrs. Baird, Brewer and Ridgeway, in their "North American Land Birds," say that the nest is "very rarely higher than ten feet," which suggests that eastern birds may build lower than ours, on the average.

According to my observations and reading, the nest is invariably placed at a fork, and usually in a crotch. Most nests will be found in an upright, two or three pronged crotch and bound to each fork at the rim and along the sides. An interesting variation from this type was found, in which the nest was bound to both forks of a two-pronged crotch and the bottom supported by a twig, the whole nest being on one side of the crotch and not in it. Occasionally the nest will be found saddled on an almost horizontal limb, but always

at a place where there is a fork, or a couple of side branches, so as to offer a broader surface for the foundation.

It does not seem to matter much what kind of a tree is used, so that it has a good crotch at a convenient distance from the ground. Thistles are often used, as are also berry or rose bushes. The favorite tree seems, about here, to be the American elm, but this apparent preference is probably due to the abundance of suitable elm saplings in the slashings and their good supply of upright crotches of three or four prongs. Nests were also found in maple, apple and shagbark hickory trees.

There is considerable variation as to size, especially of the cavity. The average height of the nests examined was two and three-fourths inches, the average diameter three and one-half inches. The average depth of the cavity was one and one-half inches, and its average diameter two and one-half inches. This would make the walls of the nest each half an inch thick and the bottom an inch and a quarter thick. This average size, and especially depth of the cavity, is probably too small, for several of the nests examined had phenomenally thick bottoms and broad, shallow cavities.

The shape of the nest is that of a round-bottomed china cup. The cavity is usually deep, so that the bottom is not more than twice as thick as the sides. In a few of the nests, as mentioned above, the cavity was so shallow (because the bottom was thick, not because the nest was small) that it was rather of the shape of a saucer than of a cup.

Not having witnessed the building of the nests I cannot say as to the method of construction. The nests have a base, formed by stretching strips of bark from one fork of the crotch to another, so as to form a framework in the shape of a hammock. The spaces between and around these are filled with a felting of shredded vegetable matter. Upon this the cup is built. Similar strips of bark run around and around the rim and sides of the cup, and the interstices are filled with felting as before. The bottom of the cup is mostly felting, with sometimes a few strips of grass or

bark to reinforce it and hold it in shape. Within all is the lining, covering the bottom and the lower part of the sides of the cavity.

The materials used vary a great deal in exact kind, but the general type of things necessary is the same in all. For the framework of the base and cup, long strips of some material, five to seven inches long and one-sixteenth to one-fourth inch wide, are required. These are often of grapevine bark, and milkweed inner bark is also much used. The framework may be composed entirely, or almost entirely, of grapevine bark, of milkweed bark, of grass-stems or weed-stems; or it may be composed of all of these, together with hickory, elm or raspberry bark.

Apparently the materials nearest at hand are used. Two nests taken from elm trees in a slashing containing many milkweeds and few other sources of supply, have the framework almost entirely of milkweed bark, with a little elm bark in one (Nos. 1 and 4 in the table). Another (No. 6), from a slashing containing no milkweeds, but near a large patch of wild grapevines, has its framework entirely of their bark.

The framework is often fastened together with cobwebs. The felting, which fills all the interstices of the framework and fastens it to the crotch, hangs out in rags, giving the nest a fantastic tattered appearance. It is composed mostly of comparatively coarse "vegetable wool." The felting also contains always some fine grass-stems or twigs and cobwebs, usually a dried leaf or two of the tree the nest is built in, often a little dried moss or some hickory leaf-stems, and I once found a good deal of real wool.

The "vegetable wool" mentioned before, is composed of very finely shredded vegetable fibers. The most common substance in it is the outer bark of the milkweed, although it often contains also a little bark or grass substance. The milkweed plant is common in all kinds of places, and its dried stem often stands till a year or two after its death. On these dead stems the thin outer bark hangs in little ragged shreds, inviting attention. The inner bark is very tough and strong

and is often used for the framework, as stated above. The outer bark is of a silvery-gray color, and when finely shredded and packed down looks much like dirty thistledown. Under the lens, however, its curling tendency and splittings and flat shape of the strands is easily seen.

This "wool" is the felting used in most cases. In some nests a similar substance has been prepared from grass-stems, while in the nest mentioned above (No. 6), in which the entire framework was of grapevine bark, the felting is very scanty, consisting of cobwebs and a few fine grass-stems. In another nest (No. 7) the framework is mainly of grass-stems, while the felting contains fine rootlets, cobwebs, a little "vegetable wool" and considerable real wool, evidently picked from the barbed-wire fence of a nearby sheep pasture.

The lining should be, of course, thistle-down, according to all precedents. However, in only one of the eleven nests I examined was there any considerable amount of it, and in only one other was there any trace of it. Two nests, each built near a swamp, were lined with the yellowish down of the cat-tail, and the rest were lined mainly with very fine "vegetable wool." This "vegetable wool" looked so much like dirty thistledown that I was at first deceived as to its nature, but on making a microscopic examination the difference could be readily seen. The wool was in such fine shreds that its source can be only a subject of conjecture. Most was of a silvery-white, greatly resembling dirty thistledown, and this, I think, came from the thin outer bark of the milkweed. Other specimens, showing a yellowish tinge, were probably made up of shredded grass-stems, while another owed its pinkish tinge to an admixture of some kind of shredded bark. In the nest (No. 6) so conspicuously of grapevine bark and lacking in milkweed "products," the lining was extremely scanty, being composed of fine strips of grapevine bark, mixed with a little "wool," probably from grass-stems. In nest No. 5, on the other hand, built where milkweeds were many and grapevines few, the lining was of extremely fine "milkweed wool," and in some places was fully three-quarters of an inch thick.

It is interesting to wonder whether there is any connection between the color of the lining and the color of the eggs. The lining gives a general effect of a dirty white, which would match pretty well the light bluish tint of the egg. Does the bird make a point of having a light-colored lining, or is it merely that the available materials all give that effect? This point could perhaps be determined by a careful study during the nest-building period. It does not seem likely that the bird does this, but there is the possibility.

One other point, however, is well worth noting. I refer to the correlation between the bird's nesting materials and feeding habits. The nesting materials are all such as could be gathered under the same circumstances as feeding, and many of them, such as the grass and weed-stems, and the "vegetable wool," come from plants which are themselves sources of food supply.

The chief point that has forced itself upon my attention, throughout my study of the nests, has been the use of the most easily available materials. In none of the nests was there any material that could not have been gathered within a hundred yards of the nest, and in most the materials could have been duplicated within twenty feet. For the framework the Goldfinch demands long flexible strips, but they may be bark of either milkweed or grapevine, or grass-stems or small twigs from weeds. For the felting, cobwebs are apparently a necessity, but for the rest vegetable fibers, wool, grass-stems, bits of weed and bark, or dead leaves will serve. If, for the lining, thistledown is available, well and good; if not, why, cat-tail down or fine "vegetable wool" will serve. This adaptability enables it to increase more rapidly than if it demanded thistledown alone for its lining. If this were the case, it would be concentrated in colonies, around the few thistle patches that the country around here affords. Now, on the contrary, it can find some good substitute anywhere, and is found distributed rather with regard to suitable nesting trees and food conditions than to nest materials.