

THE PHILOSOPHY OF BIRDS' NESTS AND COMPARATIVE CALOLOGY IN CONSIDERATION OF SOME LOCAL NIDICOLOUS BIRDS

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(Continued from June Number)

The nest-building instinct of the Owls is less developed, many species laying in cavities without lining, yet of the 34 nests of the Great Horned Owl recorded by Jackson and Pennock in Chester County, 29 were in the open where a nest had to be repaired or constructed. The Long-eared species builds a rather loose structure of sticks, twigs and leaves, in a cedar. The Snowy and Short-eared as ground nesters, dispense with sticks and use a lining of moss and grass. The Cuckoos build a very rudimentary nest of twigs, principally in the thick underbrush, in which both sexes are employed. Both the Yellow-billed and Black-billed deposit a few carelessly arranged twigs, lined scantily with a few leaves, wild grape-vine bark, rootlets or weeds; the latter most often adding an oak, chestnut or maple blossom, perhaps a horse hair, and I have found the former in one instance actually to consist of just a dozen twigs and a few leaves, on which the eggs rested.

Maurice Thompson records a curious habit of the Yellow-bill in carrying material gripped by both bill and foot. The male was silly in some of his performances, time and again removing a stick which had previously been worked in the nest with great care. This work was begun in the morning, then nothing was done for two or three days together, followed by steady labor for two or three hours. Truly the American Cuckoo is but a step removed from the Cowbird in its lack of nesting instinct. In the platform type of nest-builders there are many large, untamable species, experienced in the utter futility of defence against man and in the end they must lose out. Professor Rennie came to the conclusion that this type of builder will continue to make a platform nest to the end and that the facilities of all inferior animals are stationary but it is evident to the writer that the platform nest is admirably adapted to the essentially ground feeder and rather inept arboreal nester and that scarcely any other type would serve so well as a landing stage, feeding table and gymnasium for the rather clumsy builder and its progeny.

(4) The less advanced tree-cavity nester, species dispensing with all extraneous materials like the Carolina Paroquet, Vulture, Sparrow Hawk and many of the Owls, are comparable to the rock-cavity nesting species only in part, for some species evidently have passed through the platform building stage to the less troublesome method.

The Turkey Vulture nests indifferently in hollow trees, logs, rock crevices, under thick coverts or in abandoned buildings, reasonably remote and darkened, and will return year after year to the same site. Though the species is ordinarily very wild in this locality, it will cling to its nest with remarkable pertinacity, showing great anger when disturbed.

The Sparrow Hawk is equally adaptive to the tree or rock cavity and will sometimes appropriate a box. As a pet it appears very intelligent and playful. One raised in the vicinity would fly after and snatch the cap from a youngster of a family of boys and in turn elude its pursuers. Many of the Owls are confirmed cavity nesters, the smaller species generally occupy the Woodpeckers' burrow, and when the Great Horned Owl (or Duck Hawk) nest in a cavity the usual materials of an open nest are not supplied.

Howitson observed as early as 1828 that the eggs of many if not most birds which nest in holes or even in covered nests, are of a uniform white. This is true of nearly all North American earth burrowers and woodhewers, but the cave and natural cavity-nesting species offer some inconsistencies, and on the other hand there are some open nesters like the Albatross, Flamingo, Gallinæ, Pigeon and Hummingbird. Doubtless the pallid or colorless shell is the most primitive type now existing and the pigmentation is a later development useful but not essential for protection or concealment, but no law has been established.

(5) It is not strange that the highly specialized Woodhewer should not only nest where it obtains its food but should construct its nest by the same method, in which it plies its pickax exclusively and unlike the great majority of nest-builders, carries the debris away. The Flicker prefers the orchard, grove or isolated trees. The entrance is two inches or more, and the hole gourd-shaped, one or two feet deep, the excavation performed by both sexes in a week or two.

The versatility of the *Colaptes* is so great that it would probably survive changes that would exterminate nearly all other

genera of the family, especially if the changes were rapid; since it has shown that it can adapt itself to ground burrows and artificial nesting sites and especially as it is often a ground feeder with an almost omnivorous appetite. A South American form, *C. agricola*, is said to nest habitually in earth banks in treeless plains, and a probable allied species of South Africa, *Geocolaptes olivaceus*, has a similar habit. The Titmouse, Chickadee and Nuthatch sometimes excavate their own nests in rotten wood, in which both sexes, like the Woodpeckers, assist, a week or more being consumed in the process and the abundant lining requiring several additional days.

Knight states that the Red-breasted Nuthatch first makes a series of small holes in the bark so as to remove the central portion entire and leave a bare spot an inch in diameter which is continued straight in for two and downward five to nine inches. In this locality the White-breasted generally cleans out a decayed knothole in a large living tree, and lines it with soft materials like rabbits' fur. The European Nuthatch contracts the entrance with clay, while the Syrian builds a mud nest under rocks.

It is possible for any species with a sharp bill and accustomed to clean out a wood cavity, to peck out a nesting place in decayed wood, hence it is not surprising to learn that the Prothonotary Warbler has been detected in the act.

(6) Glnemaker is most appropriate for the agglutinated type of nest-builder, having highly developed salivary glands secreting a mucilaginous substance, of which the Oriental edible Swifts' nest is entirely composed.

It would seem that the bill and feet of our Chimney Swift are poorly adapted for the construction of a twig nest. I have repeatedly watched the bird break off twigs from a nearby locust while on the wing, but its movements were so rapid that I have been unable to ascertain positively whether it uses its feet or bill in the act; however, its bill is employed in the actual construction in which both sexes assist. Usually 8 or 10 feet down, a bit of the interior wall of the chimney is coated repeatedly with saliva, to which is pressed lengthwise the first well-saturated short twigs, and continued in a semi-circular, shallow, rigid basket firmly attached to the wall by the flat side, until completed in two more weeks, or the eggs may be deposited before it is entirely finished.

I have found the nest 20 feet below the chimney top, just above the open fireplace on the interior wall in colonial houses, and also attached to the interior boards of a belfry. It has recently been reported nesting on the sides of an open cistern.

In pre-colonial days this Swift nested in hollow trees but quickly adapted itself to the stick and clay, and later the stone chimneys of the settlers, and successfully solved the base plate so different from the segment of a circle, obviating the more nearly circular nest possible in a hollow tree.

We are singularly lacking in information on the nesting habits of our Eastern birds prior to the progress of civilization and there is no hint of the Chimney Swift building in rock fissures, but from its easy adaptation to chimney nesting, it is possible that it was at some former period familiar with rock surface, though not with rock crannies since it does not build in chimney angles. The species is not partial to strong sunlight and doses in the semi-obscurity of the flue during the greater part of the day, coming forth in the early morn and eve until 9 or 10 o'clock.

Vaux's Swift builds a similar nest in a hollow tree, being a few centuries behind the former species. In fact Jewett recently records it nesting in an unused farmhouse chimney on an island in the Columbia river, and Finley discovered a nest in the base of a sixty-foot iron stack, the first records of this species adapting itself to the ways of civilization.

The White-throated Swift glues its felted nest of feathers and grasses, well coated with agglutinated saliva, to the rock fissures of lofty cliffs, and the eggs of the Black Swift have been found by Vrooman in like situations on the bare earth.

In these four species, representing three genera, we have a most graphic illustration of the progression of the nidification of the family, from that of the primitive nesting Black Swift to that of the progressive Chimney Swift, all of which are of a social nature and colonize whenever practical.

(7) The resemblance of the texture of some of the smaller birds' nests to that of a felted hat or cloth of man's manufacture, as Rennie has long since observed, is striking. It is not interwoven but merely pressed or milled by the birds' feet, chin and breast, and like all good felt, said to be treated with a glutinous substance from the salivary glands, not inferior to the shellac of commerce used in the finest felting, though it must be

confessed that the writer has been unable to detect its presence and thinks the cobweb sufficiently strong as a base for the successive layers of vegetable down, while the lichen-encrusted veneer clings to the silk-bound exterior far better than if affixed by a weak solution of glue.

The Ruby-throated Hummingbird in this locality usually builds its nest entirely of white plant down and the base envelops the branchlet. I have observed the female, who does all of the work, gather down from the blossom of the Indian tobacco found in patches of barren ground. The lichen with which it is stuccoed is taken from the bark of an ancient oak. The nest is generally padded well out on a horizontal branch of oak or beech, 12 to 20 feet above the ground and the problem of swaying is solved by a deep-cupped interior and contracted rim.

There is little variation in the nest throughout its range, "willow, poplar, oak, sycamore, fern or milkweed down"; describers usually mark time in mention of exact source of the materials. Wilson once found a nest attached to the trunk of a tree and others to tall rank weeds. He describes the composition as the downy substance from the giant mullein and fronds of the fern. A well-made Hummer's nest will hold sufficient water to drown the tiny young, per contra John Burroughs. I have known of only one instance of the Ruby-throats' departure from the normal nesting site and that was placed on the sliding block of a hammock on a porch, though some of the Western species sometimes nest on bent hanging wire, rope, etc.

In the Hummingbirds' nest the acme of daintiness and finish is attained. The tiny creature darts into the half-formed cup to pack and mould it by whirling around, sometimes with the throat pressed over the rim. Our smallest Hummer, the Calliope, constructs a nest described as a marvel of ingenuity, with outer veneer of bits of bark and shreds of pine cone, closely placed to a dry cone on a dead limb. It resembles it so closely as to almost defy detection.

Many of the Flycatchers are coarse, inadequate feltmakers, usually only in the lining. The Western Wood Pewee offers the best example. It is composed of plant fibre, blossoms, small grey velvety leaves and finely shredded bark, lacking the lichen-covered exterior of the Eastern species, as well as being deeper and more solidly built.

Wilson found the Kingbird building at no great height in an

apple or sassafras, a bulky nest of small twigs and blossom tops of the yarrow, well compacted with tow and wool, and usually lined with fine fibrous grasses and horsehairs. At this date it has to be content with cotton twine and horsehair in place of tow and wool. A pair nesting in a partly submerged sycamore had developed a Kingfisher-like taste for minnows and I repeatedly observed it making a catch well out in a large quarry hole.

The Goldfinch's nest is also less typical of the feltmakers' art, though beautifully consistent in the lining of plant down. This species feeds when it can upon the seeds of the thistle and frequently gathers the down for lining. It has even been suggested that the very late nesting dates—July, August and September—has something to do with the late ripening of this plant.

The Yellow Warbler constructs a most excellent example. A nest from Iowa is composed of silvery plant fibre and fine strips of grape-vine bark, lined heavily with down from the cottonwood. This bird sometimes builds a two- or three-storied nest to dispose of the objectional Cowbirds' egg.

Coues describes the nest of the Blue-Gray Gnatcatcher comparable only to that of a Hummer. A truncated cone, remarkably deep-cupped and contracted at the orifice; the walls closely felted with the softest vegetable fibre, in some cases woven with spider's web and stuccoed with lichen.

The occasional bits of wool or plant down found in the lining of the Wood Pewee's nest scarcely admit its inclusion here, though its lichen studded exterior gives it a very poor third place to the Ruby-throat and Gnatcatcher. The stucco work is not for ornamentation but the result of the instinctive desire to hide the too prominent nest, resulting often in a fortuitous imitation of surroundings because the lichen gathered close by is often in harmony.

(8) A superior nest to that of the platform type is the cupped and interlaced brush nest of the Crow, Jay, Cardinal, Cedar Waxwing, Shrike, Mocker and the like, which employ a stick or twig base, and that of the Sparrow, Indigo Bunting and Chat which use grasses for a base, while the Tanager dispenses with a base altogether and builds a frail lining-like nest supported by many-branched vegetation to offset the lack of cohesion.

The Crow builds yearly a large compact nest in which some earth is incorporated. Once I found a nest lined with a quantity

of crimson-dyed bristles from some discarded finery, and again a structure on a beech limb in every way like the nest of a Heron, flat, loose and unlined, doubtless the final effort for the season, in which haste had led to reversion to the platform type.

Slate ridge, the backbone of Chester County, has always been a great breeding ground for the Crow. The nest was commonly placed in the predominate chestnut, but by 1914 this timber was completely destroyed by blight and as the species frequently construct long before the first buds have burst into leaf, for a few seasons leading up to the extermination of the chestnut, many birds built in recently killed trees and were seriously inconvenienced by the subsequent lack of leaf screen. A panic seized the species and for some years following the ridge was almost deserted for small groves and isolated cedar, beech, elm, oak, ash, cherry, pine, and mulberry in the midst of the farm land, where the sitting bird could be flushed with extreme difficulty, in marked contrast to the quick response to a single tap at the base of a forest tree. I banded a young Crow just out of nest on the hills, May 17, 1914, and it was shot on a farm a few miles away six years later.

I found the Fish Crow nesting in colonies in white cedar and holly groves on the New Jersey coast. It is solitary in South-eastern Pennsylvania.

In the middle of May I observed a pair of Brown Thrashers inspecting a nesting site in our woodbine. The next morning the nest was begun at 6:30, the female hopped about within a radius of 10 feet to collect a full bill of damp and broken leaves; the male followed with fragments of the same material but apparently did not know what to do with it, for he always dropped it short of the nest. The female promptly deposited her material and went through the motions of shaping it with her breast for half a minute or less. The structure was completed at 6:45 the following morning.

The Chipping Sparrow uniformly lines its grass nest with horse hairs, the Field with the same and fine grass stems, and the Song mostly with the latter. The Indigo Bunting favors the Field Sparrow type of lining, while the Cardinal, Scarlet Tanager and Chat prefer a lining of wild strawberry runners. The near future may require the "Hairbird" to seek in suburban towns at least, other lining material than the convenient horse-hair.

(To Be Continued)