

NIDIFICATION.

Situation of Nest.—I fail to discover any great uniformity in the choice of nesting places throughout its breeding range, which is not surprising, considering the well known capabilities of the bird for adapting itself to existing conditions, and which indeed is absolutely essential in a species so abundant numerically and ranging over so wide and diversified a territory. On Avery's Island, La., it seems to prefer trees near the edge of the woods, occasionally close to water or in yards or pastures. In the South Atlantic States the lowland pine forests, usually a dead pine, now and then an oak, apple, maple, chinaberry, ash, beech, willow, palmetto, or an unrecognizable stub. Mr. W. L. Foxhall calls to mind one dead pine, perforated with 25 or 30 holes, most of which were in use at one time or another. In the Middle and Eastern States: apple, sycamore, oak, butternut, cherry, elm, chestnut, maple, poplar, beech, ash, pine, hickory, etc. In Southwestern Pennsylvania Mr. J. Warren Jacobs has found the choice to be about as follows: 1st, along streams and in orchards; 2nd, pasture fields on hillsides; 3rd, in woods. He has also found the sycamore to be the favorite, with the apple and maple second, the beech and locust third, oak and cherry fourth, and all other varieties fifth. At Croton Falls, N. Y., it appears to have no marked preference, as it is found in the low wet meadows and again in the highest and driest woodland, the fruit trees in orchards and the willows bordering the water appear favorites; while about Cincinnatus and Buffalo the edge of woods, groves, orchards or isolated trees, always in dead wood, have their claims. Mr. C. L. Rawson used to fancy that it preferred apple trees at Norwich, Conn., but old orchards disappear and no particular tree now seems to be the favorite. At Fitchville a row of old elms are now the homes of half a dozen Wacups. At Taunton, Mass., it selects perfectly sound apple trees, occasionally an ash, oak or walnut in an open field:

while about Ponkapog it breeds in orchards, swamps, thinly or densely wooded ground, with only one instance of a living evergreen, but any other tree living or dead. At Cornish Me., all found in trees standing away from the thick woods, mostly apple orchards; and about Pittsfield, almost any locality, except perhaps the deeper woods, along the shores of the ponds, especially in overflowed ash swamps it is found. From Ohio westward the apple orchard is a favorite with the poplar, willow, maple, oak, elm, walnut, cottonwood, etc., more or less resorted to, according to availability. Mr. R. M. Strong states that, like many other species, it is rapidly adapting itself to civilization, and gives an instance of a bird excavating a nest about five feet up in the trunk of a shade tree standing on one of the most traveled streets of Oberlin, Ohio. At Glen Ellyn, Ill., Mr. Benj. T. Gault has found that in addition to old and neglected orchard trees, old and partly decayed white oaks, black jacks, and both dead and living elms and poplar are usually selected. At Iowa City, Ia., Mr. Paul Bartsch says that while orchards are the favorite, at times it seeks a more lofty location, such as is afforded by the bare approaches of that giant of the forest, the sycamore; and at Grinnell the favorite trees are the box elder, linden, soft maple, cottonwood, white willow, poplar, in the order named, and in fact almost any tree if it is sufficiently decayed to be easily worked. Summing up the evidence, it is found to be an inhabitant of the open country rather than the deep woods in the north and west.

The preceding may be called the natural nesting sites, but at the same time does not complete the list of available situations for this remarkable bird. Gate posts, fence posts, telegraph, telephone and electric light posts are frequently utilized on the treeless islands and beaches of the east as well as the prairies of the west. Mr. J. H. Bowles writes that on Cape Cod large numbers of poles are literally honeycombed with holes, some of which are used for nesting purposes. It has been found breeding far out on the prairie in an old wagon hub, surrounded by weeds; also in barrels, and one instance of an excavation of the regulation size in a hay stack is on record; another nested in a crevice of an unused chimney for several years; and stranger yet it has been found more than

once occupying Kingfisher's and enlarged Bank Swallow's burrows. It often cuts through the weather boarding of ice-houses, and burrowing in the sawdust lining, lays its eggs, as well as utilizing for the same purpose enclosed cornices, gables, hollow columns, etc., of dwellings and other buildings; not uncommonly in the east and quite frequently in the west. Mr. G. F. Breninger gave an account of the Flicker cutting holes in a 65-foot church tower at Beattie, Kans., and building on the timbers within, six pairs bringing forth young. In response to an inquiry he has given me fuller particulars. The holes were cut through the shingles near the top of the tower and the eggs deposited on the timbers within. The orifice being so small as not to admit of even a small boy getting at them, it was impossible to ascertain whether any cavity was dug into the timber or any material used for nests. He has observed the same trait carried into effect by the California Woodpecker in a church tower at Oreville, Cal. Rev. P. B. Peabody gives some interesting data, showing how it modifies its habits when resorting to localities where the usual nesting conditions are well nigh impossible. In Southwestern Minnesota, where there is very little timber in which it could nest, it has been found resorting quite commonly to the telegraph poles and the railway semaphores. One semaphore contained five holes, one of which was inhabited by a pair of Flickers, and another, just above it, by a pair of Tree Swallows at the time of observation. The holes in the telegraph poles appear very shallow, and generally at a height of not less than two or more than ten feet. Up in northern Minnesota the occupancy of the telegraph poles is quite common and the occupancy of buildings even commoner. For instance, the Church of St. Vincent has Flicker holes in the cornice of both gables. Last year it made a new excavation in the north gable while the Tree Swallows took possession of the south gable. The ice-houses of the Great Northern railroad are perforated with holes, as many as eight in the south end, which is very small. From Ottawa, Kans., comes the particulars of an almost unique nesting site. Mr. Burke H. Sinclair found a nest containing eggs in the garret of the town high school. The birds obtained entrance to this large three-story brick building by means of a displaced brick. As in all infloored lofts it consists

of nothing but the parallel rafters, with attached lath and plaster, which forms the ceiling of the room below. This frail floor is about ten inches below the entrance hole, and the nest was situated about one foot from and directly in front of the entrance. The place had evidently been used for several years, there being at least a peck of wood chippings, some fresh, but a large quantity old and discolored with age. The nest was placed between two of the parallel rafters and composed of these chippings, being about six inches thick by eighteen inches in diameter. This material had been all cut from the rafters on the floor and the roof overhead. There had been an infinite amount of labor, as large as 2×6 rafters, besides a large number of smaller studding, were chipped over half, and others entirely cut through. The birds seem to have been cutting at the rafters for amusement, as well as material, as everything in the immediate vicinity of the nest was strewn with chips. The male spent much of his time sitting in the entrance or demolishing the rafters; the pecking became so vigorous as to disturb classes in session below.

I regard this last instance as a much greater departure from the normal habits than any other known to me, as in all previously related instances it was compelled to cut through an outer shell after the manner natural to it, except in the occupancy of wagon hub, barrels, chimney crevice and the bank burrows, which differ in no material way in interior arrangement from hollows and burrows in trees. At this rate it appears within the range of possibility for it to breed in properly constructed bird boxes if protected and encouraged to do so.

POSITION.

Prof. Lynds Jones voices the general verdict when he affirms that the trunk of the tree is much preferred, but the main limbs are sometimes used. It seldom if ever carves out for itself a home in a perfectly sound hardwood tree. Soft punky stubs and trees that are entirely dead or have decayed portions are almost invariably selected. If the tree chosen is a large one, the excavation is confined to that side of the trunk in which the entrance is made. It excavates with the grain of the wood, so that if the trunk of the tree is slanting

the excavation will have the same slant. When the tree is leaning the entrance will be made on the under side, otherwise the rain would enter and fill the excavation. Once he found a nest in the horizontal branch of a tree not more than two feet from the main stem. The hole was bored in the side of the branch and carried at right angles toward the tree bole. The next year the same entrance was used, but the burrow dug out of the opposite side, the old cavity not being used at all. Natural cavities are sometimes chosen and the entrance enlarged. Once such a nest came to grief during a heavy rain, when it filled with water, ruining the eggs. As to distance from ground, he says it would be impossible to state any usual or preferred height, for there are none. Mr. Chase once found a nest in a willow post with entrance but twenty-two inches above the ground, and extending down until level with the surface. The height probably varies almost if not quite as much in one section as the other, but apparently averaging higher in the North and South Atlantic than in the Central Western States from data at hand :

South Atlantic States—	Maximum, 100 feet.	Minimum, 12 feet.
Middle & Eastern “ — “	60 “	“ 2 “
Central Western “ — “	90 “	“ 0 “

EXCAVATION.

House hunting begins shortly after the female has chosen her mate. The female leads, assiduously seconded by her partner, in a tour of inspection of all available sites, which often furnishes occupation for days. The following jottings from my note book for '96 are pertinent: April 15th, 9 A. M.—A female flew to old swamp willow, close to creek, and ran up main stem, examining some old cavities on the way; male arrived a minute later and went through the same performance, the female retiring meanwhile; both silent. At 9:30 the female flew directly to the top of the hollow stub, male followed directly after, uttering his love or scythe-whetting song upon alighting, in which the female occasionally joined, but soon left. At 10 o'clock the pair returned, singing common song on the top, apparently decided upon exact spot. Another pair went through the same ceremony on a tree further up the creek at 1:30 P. M. April 21st, three individuals

busy excavating nest cavities, very quiet; until May 16th constructing nests and depositing eggs, rather silent. When business of so much importance is under way there are no more loud rappings, cries or songs, but silence usually prevails in the immediate vicinity of its labors. If love notes are indulged in they are subdued in tone, and the bird stealthily chiseling at its dwelling will quietly creep around to the opposite side of the tree upon the approach of an intruder. Rarely a pair will appear bold and indifferent to observation. With its feet close together, holding on by its claws, and its body well braced by means of the stiff tail feathers, it swings backward and forward, showering yeomanlike blows on the spot selected. The circular hole, just large enough to admit the bird, but scarcely as neat and true as the best work of many others of the tribe, is tunneled in straight for about six inches, then turned down at right angles, and enlarged rapidly to the maximum diameter, which is, as Prof. Jones says, about twice the diameter of the entrance. Often it will chip out several inches above the entrance hole, for what purpose I am unable to more than conjecture. Maurice Thompson is authority for the statement that all of our Woodpeckers construct their nests in the form of a gradually widening pocket or gourd shape, except the Ivory-billed, which drills a jug-shaped cavity. Mr. Robert Windsor Smith describes a bird building her nest thirty feet up in an old post oak on June 10th, '93. The location was close to a public road, and the Georgia railroad, near Duckwood, Georgia. In the formation of this nest the female did all the work; in fact the male did not make his appearance. At the time of the discovery she had already made an excavation almost large enough to conceal her entire body. Often during the operations she would sink into the hole leaving about half her form exposed, remaining in that position but a moment when she would back out and resume her work as before. When a neighboring tree was rapped with a stick, she would creep around to the opposite side remaining there several minutes and peering around as if to learn the cause; if no other effort was made to disturb her she would again resume her place and continue the work unmindful of prying eyes as long as no demonstration was made against her. Wagons and other vehicles passed beneath her and several

freight trains went lumbering along, but she seemed unmindful of what was going on around her. Mr. Smith watched this bird for two days, when he was unavoidably called away for some ten or twelve days and on his return found that the tree had been cut down and carted away. Nearly all agree that both sexes assist in the work. Mr. Angus Gaines mentions a pair in particular, near neighbors and good friends of his, selecting a well seasoned snag, hard and tough, both birds working with a will, turns about, in constructing the nest hole, and returning to the same upon succeeding years. Mr. Francis R. Cope, Jr., says that in one nest he watched construction during the spring of '92, all the chips were carefully carried away some distance into a neighboring meadow; but in all other cases this precaution was not taken, the ground immediately around the foot of the tree being plentifully besprinkled with chips. In the first instance the male would work at the hole for about five minutes and then after carrying away all the chips, his place would be taken by the female, who in turn would labor diligently for another five minutes or so, always carefully carrying away every chip she made. In Iowa, Mr. Jones finds that it does not carry the chips from the excavation any distance from the nest, the chips being scattered broadcast, some falling at the foot of the tree. Mr. J. H. Bowles states that it will sometimes desert its nest when half finished and begin a new one, a trait so common with many of our Woodpeckers. Mr. Stephen J. Adams has found that it requires from one week to twenty days to complete this work and it is often carried on after the eggs are laid, enlarging and smoothing up the cavity, which accounts for the eggs found buried in "saw dust" now and then. Mr. James B. Purdy's experience has been that it takes about two weeks to complete the nest. On April 22nd a Nebraska bird was scared from her nest in a box alder when the cavity was ten inches deep, and on May 4th seven fresh eggs were collected from the hole, now twenty-two inches deep. Allowing a week for deposition, the additional twelve inches must have been hewn out in five days or less—something over two inches daily. When a pair has been robbed, Mr. J. Warren Jacobs finds that in most cases the hole is dug an inch or so deeper before another set of eggs is deposited; and Mr. C. H. Morrel reports

the depth of a cavity in an ash tree as but ten inches in '95, and deepened to twenty inches in '97, in both cases containing eggs.

An old nest is frequently used, thereby escaping days of hard labor, it being not uncommon for a pair to return year after year to the same cavity. Some years ago the late Dr. Willard L. Maris found it nesting in a hole in a tree situated in an open field near Melford, Penna., where for three or four years it successfully reared its broods, and after an interval of some three or four years he again examined the nest—May 10, '94—and was not disappointed in finding it occupied, but whether by the same pair it is of course impossible to say. This is but one of many instances of the kind. Messrs. James B. Purdy, J. N. Clark, James Savage and others have also made note of it.

Many of our birds owe to the Flicker their cozy homes in its deserted and oft times partly demolished breeding chambers. It occasionally furnishes nesting sites to at least one species of Ducks—Bufflehead (*Charitonetta albeola*); all of our smaller cavity nesting Hawks and Owls—Pigeon (*Falco columbarius*) and Sparrow Hawk (*F. sparverius*) and sub-species, Saw-whet (*Nyctala acadica*) and Screech Owl (*Megascops asio*) and sub-species; several Woodpeckers—Downy (*Dryobates pubescens*) and Red-head (*Melanerpes erythrocephalus*); one Flycatcher—Crested (*Myiarchus crinitus*); one Sparrow—European House (*Passer domesticus*); at least two Swallows—Tree (*Tachycineta bicolor*) and Purple Martin (*Progne subis*); our only cavity nesting Warbler—Prothonotary (*Protonotaria citrea*); many of our Wrens—Baird's (*Thryothorus bewickii bairdi*), House (*Troglodytes aedon*) and sub-species; Nuthatches—White-breasted (*Sitta carolinensis*), Red-breasted (*S. canadensis*) and Brown-headed (*S. pusilla*); Titmouse—Tufted (*Parus bicolor*), Black-capped (*P. atricapillus*) and Carolina (*P. carolinensis*); and Bluebird (*Sialia sialis*).

Composition. The lining or bed upon which the eggs are placed has been found to consist invariably of fine chips, probably the last made in smoothing up the chamber. If the wood is extra soft and punky, few if any fragments may be present, at other times some of the eggs will be almost buried

in the saw-dust-like chippings. No extraneous material is ever employed.

Dimensions. The data at hand is so incomplete as to admit of no constant comparison between different parts of the country, or living and dead trees, and hard and soft grained woods; but the depth of excavation appears to be least in the Southern states (6 to 14 inches), and greatest in New York and New England (10 to 36 inches), Illinois (14 to 24 inches), Pennsylvania (10 to 18 inches), and Minnesota (9 to 18 inches). The averages in general, together with the maximum and minimum measurements for the United States, are given in inches and hundredths. The difference in the methods of measuring are so great that much data other than the entrance diameter could scarcely be relied upon, but undoubtedly the depth of cavity depends in no small degree upon the quality of the wood.

	MIN.	MAX.	AVER.
Diameter of Entrance.....	2.20	5.00	3.28
Diameter of Cavity near Bottom.....	4.50	10.00	7.67
Depth of Cavity from Entrance.....	6.00	36.00	15.79
Total Length of Cavity.....	9.00	40.00	18.50