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ARE RINGS OF HOLES IN TREE BARK MADE BY DOWNY WOODPECKERS?

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The late Mr. E. H. Forbush published in his "Useful Birds and their Protection" (1907) and in his "Birds of Massachusetts" (vol. II, 1927) certain evidence tending to show that the circular rings of holes, found especially in apple trees in middle and southern New England where the Yellow-bellied Sapsucker (*Sphyrapicus varius varius*) is merely a migrant, are made by the Downy Woodpeckers (*Dryobates pubescens medianus*), here resident birds. Similar conclusions were arrived at by Grinnell and Storer in their "Animal Life in the Yosemite" (1924) in which they attributed rings of holes in apple trees to the resident Willow Woodpeckers (*Dryobates pubescens turati*) and not to the migrant Red-breasted Sapsucker (*Sphyrapicus varius daggetti*).

First let us take up the evidence presented by Mr. Forbush. He quotes the older ornithologists, Wilson and Nuttall. They believed that the circular rings of holes seen so commonly in orchards in middle and southern New England and in the Middle States were made by Downy and, occasionally, by Hairy woodpeckers; but it is important to bear in mind that the older ornithologists did not know that the Yellow-bellied Woodpecker, as they called it, was a sapsucker and made peculiar drill patterns in living bark. Nuttall, in referring to the drills, says: "These perforations, made by our *Sap-Suckers*, as the present and preceding species [Downy and Hairy] are sometimes called, are carried round the trunks and branches of the orchard trees in regular circles . . .".

In Samuels' "Birds of New England", formerly the universal reference book here, first published in 1867, the author quotes in full Wilson's detailed account of the rings of holes which he naturally assumes were made by the Downy Woodpecker, the resident species, as he has no knowledge of the habits of the true sapsucker in this regard. It is evident, therefore, that most New Englanders were brought up with this belief.

Coues, on the other hand, in his famous "Key", first published in 1872, says of *Sphyrapicus*: "This is the true sapsucker, which injures the orchardist, and brings the beneficial species of *Dryobates* into disrepute." Baird, Brewer and Ridgway in their "North American Land Birds", published in 1874, say of girdling and sapsuck-

ing by *Sphyrapicus*: "These habits, so well known to most of our Western farmers, appear to have entirely escaped the notice of our old ornithologists." Finally, Bendire, 1895, writing also of these habits of the latter bird, says: "Indirectly it also causes the death of many a Hairy and Downy Woodpecker (the best friends the fruit grower has), these species being frequently shot through ignorance of their habits or because they are mistaken for Sapsuckers." These references from Coues, Baird, Brewer and Ridgway, and Bendire are not quoted by Forbush, but, on the other hand, he quotes J. A. Allen as asserting that these rings of holes "are chargeable also to Downy and Hairy Woodpeckers."

Mr. Forbush does not give any observations of his own on this matter, and, in the "Birds of Massachusetts", he modifies a positive statement previously made in "Useful Birds and their Protection" as to the authorship of these numerous rings of holes in apple trees by the following: "I had seen the bird [Downy Woodpecker] apparently working at these holes in a region where thousands of such perforations could be seen . . . but I could not be certain that the Downy was the original maker of them."

Although a few of the observations from correspondents quoted by Mr. Forbush are positive, many leave one in considerable uncertainty as to whether the correspondents actually saw the Downy Woodpecker making the rings of holes, or merely tapping in the same region, or drinking the sap, or eating cambium from holes whose origin was not ascertained. It may be that some of the correspondents were unable to distinguish the true species of woodpecker.

There is one observation, however, which should be quoted here, as it is of considerable interest in this discussion, an observation made by a capable observer with great care. Forbush says, *loc. cit.*, vol. II, p. 268: "The first trustworthy evidence, however, that I obtained regarding the tapping of trees for sap by the Downy Woodpecker was in 1899, when my assistant, the late Charles E. Bailey, on April 6 watched one for several hours. His report reads: 'At 12:30 I found a Downy Woodpecker, and watched him till 2:45; he took three larvae from a maple stub, just under the bark. He next tapped two small swamp maples, four and six feet from the ground, and spent most of the time taking sap. He tapped the tree by picking it a few times very lightly; it looked like a slight cut, slanting a little. The bird would sit and peck the sap out of the lower part of the cut. The cut was so small the sap did not collect very fast. The bird would go and sit for a long time in a large tree and not move, then it would come back and take more sap. It did this three times while I was watching it. It did not care to take any food but the sap.' . . . Mr. Bailey cut off and brought me the limb, the bark of which was perforated by the bird. . . . The perforations passed through the bark to the wood, but did not enter it and they do not in the least resemble in shape those made by the Yellow-bellied Sapsucker." Here is just what we should expect in a woodpecker not specialized as a sapsucker.

Grinnell and Storer, "Animal Life in the Yosemite", 1924, found, as in eastern apple orchards, many circles and rows of holes in the trees of an orchard and they found a pair of Willow Woodpeckers, a western subspecies of the Downy, regular tenants there. They say, "We watched a bird at work; moreover bits of inner bark fibres were found adhering to the bristles around the bill of a bird shot" and they conclude that this pair "or their ancestors had evidently worked there for some years with the result that most of the one hundred and fifty trees in the orchard showed marks of their attention."

Owing to criticism of these conclusions by Mr. and Mrs. Charles W. Michael, who for many years have worked as nature guides in the Yosemite, Dr. Grinnell pub-

lished (Condor, 30, 1928, pp. 253-254) an article in which he reviews the notes previously made by Dr. Storer and himself and states, "The facts are precisely as recorded, the chief of which are that two birds of the latter species [Willow Woodpecker] were watched at certain fresh pits. One of these birds shot subsequently the same day, as per my notes, showed 'bits of inner applebark adhering to bristles around base of bill, showing [seemingly to me at the time] that he had excavated the pits'."

Dr. Grinnell quotes from Mr. Michael's letters: "For several years now the apple orchard has been under observation, and during this time many Red-breasted Sapsuckers have been seen drilling sap-pits, but never once have we seen Willow Woodpeckers doing work of this sort." They once watched for thirteen consecutive days a single sapsucker at work drilling holes and they believe that the observation made by Grinnell and Storer was of Willow Woodpeckers "merely looting the honey-pots of a Red-breasted Sapsucker and that they themselves had done no actual work in excavating the pits"; and Mr. Michael concludes with the shrewd remark: "Months go by when no sapsuckers are present, but there is never a month when Willow Woodpeckers are not present. It is hard to believe that Willow Woodpeckers drill holes in the bark only when there is a Red-breasted Sapsucker present in the orchard!" And he adds, "I think that inferences made by Grinnell and Storer were absolutely wrong."

All of this in a spirit of scientific fairness is published by Dr. Grinnell, who calls for further close observation and asks, "Were or were not the inferences made by Grinnell and Storer likely to have been 'absolutely wrong'?"

Before giving my own observations in Massachusetts it may be well to consider the theoretical view of the matter, although it is always to be remembered that theoretical objections are often overcome in nature and that it is well not to be too dogmatic. Actual unbiased observation should solve the problem. Bearing this in mind and not allowing these theoretical considerations to influence our conclusions unduly, several facts may be stated. In the first place, the genus *Sphyrapicus* has evolved as a specialized sapsucker. Its tongue differs from that of *Dryobates* and other woodpeckers in that it can be extended only a third of an inch beyond the bill, while the tongues of other woodpeckers are very extensible for the purpose of drawing insects out of burrows. The short tongue of the sapsucker is also provided with brush-like fringes so that it answers well the purpose of a sapsucker, but is not adapted to drawing out insects from deep burrows.

Careful and thorough studies such as those of Frank Bolles (Auk, 8, 1891, pp. 256-270) showed clearly that sap is the chief object of *Sphyrapicus* and its most important food in spring and early summer. The inner bark or cambium is also eaten, as well as insects attracted to the sap. Bolles found that other birds such as hummingbirds, chickadees and Downy Woodpeckers, take advantage of this food supply and drink of the sap; but this is a far different matter from the actual drilling of holes in the characteristic patterns of the sapsucker in order to obtain the sap. There is no reason why a Downy Woodpecker might not make some irregular cuts, as noted by Mr. Forbush, for the sap, or even drill a hole or two for the purpose, but we should not expect it to adopt the ring, or gridiron pattern of the sapsucker, an instinct undoubtedly of long duration in the latter bird. Actual observation would be necessary to prove this.

Many birds, when circumstances arise, eat various foods outside of their especial dietary, just as many birds depart from their usual custom of picking up insects on bark and leaves by at times catching them in the air like flycatchers. This is com-

monly seen among the warblers. The Cedar Waxwing is a well known, although awkward flycatcher, and even Yellow-bellied Sapsuckers at times indulge in the gentle art of flycatching. It is natural that a bird that is chasing an insect on the ground or in a tree should follow in pursuit when the insect takes to the air, or it even might dart out from a tree after a flying insect. The difference in habit is slight and not fundamental, but we would not expect an Eave Swallow to excavate a hole in a bank for a nest, or a Bank Swallow to build a retort-shaped nest of mud, or any but a sapsucker to make circles or vertical patterns of holes in the bark of trees for the purpose of obtaining the sap.

As to my own observations, I may state that, although I have long watched Downy Woodpeckers gleaning insects on and in the bark and wood of trees at all seasons of the year, I have never seen them dig circles of holes in the bark. This, of course, is negative evidence, but negative evidence over a long series of years is valuable, especially as it is borne out by all other ornithologists with whom I have spoken. Even Mr. Forbush admitted this in his own case as quoted above. Like the Michaels, I have never found fresh rings of holes except during the time of the sapsucker migrations.

I have, however, several positive observations, recorded at the time in my notes, as regards these activities in the Yellow-bellied Sapsucker. The first of these is dated Ipswich, October 2, 1904, and Mr. Ralph Hoffmann was with me at the time when I stated that we watched "an immature sapsucker drilling a ring of holes in an apple tree. No sap apparent." This is my first positive observation.

The next record is of considerable significance in this discussion, and had I seen only the latter half of the drama, my conclusions might have been different. In the Wenham swamp on May 11, 1906, my notes state that Glover M. Allen and I found a Yellow-bellied Sapsucker drilling holes in a white pine. His movements were slow and he paid little attention to us standing below him at the foot of the tree. When he departed, a female Downy Woodpecker visited the holes. I would add here that this is the only time in the spring migrations I personally have seen a sapsucker at work in eastern Massachusetts. Mr. Wendell Taber tells me that he watched a sapsucker boring and drinking sap at a hawthorn tree in the Public Gardens in Boston in May, 1931. I visited this tree a few days later and saw that considerable damage had been done by the numerous large holes and that the sap was still flowing. The spring migration of the Yellow-bellied Sapsucker here is generally under a month in duration, while the autumn migrations extend to two months.

In the next record, made on October 1, 1916, at Ipswich, I note "Fresh orange-colored pits of sapsucker in rings around the large trunk of an old sweet apple tree; no sap exuding from the holes. Many old rings of holes made in previous years to be seen. The sapsucker which was seen near had probably eaten the cambium." Although the inference that the holes were made by a sapsucker is a probable one, it is, in absence of direct evidence, only an inference. Two years later, on November 3, 1918, I elaborate on this note as follows: "The sweet apple tree on the corner of the driveway is encircled with holes of the sapsucker on the trunk and limbs. Every fall, as now, I find fresh ones, perfectly dry. Either the birds are practicing drilling holes or are eating the inner cambium layer—they get no sap." A second positive observation was made on October 3, 1920: "Disturbed a Yellow-bellied Sapsucker at work making rings of holes in my sweet apple tree. No Downy near."

Another favorite tree for circular rings of holes is a Japanese walnut tree close to my house at Ipswich, and although I have a number of times seen a sapsucker near I have never actually caught him in the drilling act.

My last record was made at Ipswich on October 6, 1927, when in company with Dr. Tracy Storer of California, who was staying with me. We watched a sapsucker pounding on the trunk of an apple tree, and moving and drawing back its head as if eating or tasting. The bird then flew away and we found five fresh characteristic holes arranged in an irregular horizontal line, each hole about three millimeters deep. These slowly filled with sap as we examined them. We each tasted of this sap, found it slightly sweet and slightly bitter, the latter due, perhaps, to the bark. The next day I noted that the holes were dry.

As a result of all this, I have come to the conclusion that these well known and characteristic circles of holes are made by true sapsuckers and not by Downy or Hairy woodpeckers.

A few reflections may be added. Mr. Forbush, Dr. Grinnell and others have referred to the harmless character of these autumnal perforations, while the destructive effect on the trees of the sapsuckers' work when the sap is running in the spring and early summer is well known and admitted. I am inclined to think that my suggestive notes under November 3, 1918, may have much truth in them: "Either the birds are practicing drilling holes or are eating the inner cambium layer." In fact, both of these may be the correct reason, and, as shown in my note of October 6, 1927, they may also get a little sap.

Courtship display, song and gathering of nesting materials—all connected with the amatory instinct—have recrudescences in the autumn. May not such a specialized instinct as that of the sapsucker for acquiring food, a habit which is best pursued in the spring and early summer, have also an autumnal recrudescence?

Ipswich, Massachusetts; read October 22, 1931, at the meeting of the American Ornithologists' Union, Detroit.