THE WOODPECKERS OF OKLAHOMA*

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INTRODUCTION

This paper was begun with the idea of monographing the woodpeckers of Oklahoma in the hope that when published it would be a means of acquainting nature lovers, ornithologists, teachers, farmers and others with adequate description of these birds and their economic status. Since my notes on the occurrences of birds in the forty-eight counties of the State in which I collected specimens and data were nearly all destroyed by fire, in 1915, the distribution of woodpeckers in Oklahoma is not considered at any length in this paper.

The classification, nomenclature, check-list number, range, and historical synopsis of the genera, species and subspecies is that of the 1910 edition of the American Ornithologists' Union Check-List of North American Birds, unless otherwise indicated.

I wish to thank Doctor H. C. Oberholser for identifying specimens, for counsel, and for arranging for a loan of downies; Doctor C. W. Richmond for the loan of these specimens and for searching the National Museum's records for references to Oklahoma species; Mrs. L. B. (M. M.) Nice for the loan of notes and other information; Mr. R. C. Tate for his notes on Lewis woodpecker and Professor A. Richards for valuable suggestions and criticisms of the text.

I am also indebted to Mr. W. De W. Miller, of the American Museum; Mr. J. T. Zimmer, Field Museum; Professor D. B. Casteel, University of Texas; Professor T. D. A. Cockerel, University of Colorado; Mr. C. D. Bunker, University of Kansas Museum; and Mr. Elmer Farmworth, Southwestern College, Kansas, for kindly furnishing me all the information on Oklahoma woodpeckers available in the collections of their institutions.

Most of the work on which this paper is based was done while the author was in residence in the University of Oklahoma during the years preceding 1923.

The writer hopes that this work will shed additional light on the home life and habits of our woodpeckers and make clear the economic status of these birds, as well as serve as a means of identifying the Oklahoma species.

Economic Considerations.

With the exception of the genus Sphyrapicus, woodpeckers are beneficial. All the species of Sphyrapicus are more or less detrimental; or to state the case more fairly, the damage which the members of this genus do is more apparent than the good they do. The United States Biological Survey (Beal, 1912:9) found by examining the stomach-contents of 3,453

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woodpeckers, "representing 16 species and nearly twice as many subspecies," that the Williamson sapsucker led all the others, except the genus Picoides in percentage of animal food eaten—seventeen stomachs containing an average of 87.67 per cent of animal matter. In the following table the species are arranged according to the average amount of animal food found in their stomachs (Beal, 1912):

Name of species	*No. stomachs*	*%An. F.*	*%Veg. F.*
*Three-toed woodpecker (*Picoides americanus*)	23	94.06	5.94
*Arctic Three-toed wp. (*P. arcticus*)	28	88.69	11.31
*Williamson sapsucker (*S. thyroideus*)	17	86.67	13.33
Red-cockaded wp. (*Dryobates borealis*)	76	81.06	18.94
*Nuttall woodpecker (*D. nuttalli*)	53	79.41	20.59
Hairy wp. (*Dryobates villosus*)	382	77.67	22.33
Downy woodpecker (*D. pubescens*)	723	76.05	23.95
Pileated wp. (*Phloeotomus pileatus*)	80	72.83	27.12
*Red-breasted sapsucker (*S. ruber*)	34	68.92	31.08
Red-shafted flicker (*Colaptes c. collaris*)	183	67.74	32.26
Flicker (*C. auratus*)	684	60.92	39.08
Yellow-bellied sapsucker (*S. varius*)	313	49.31	50.69
Lewis wp. (*Asyndesmus lewisi*)	59	37.48	62.52
Red-headed wp. (*Melanerpes erythrocephalus*)	443	33.83	66.17
Red-bellied wp. (*Centurus carolinus*)	271	30.94	69.06
*California wp. (*Melanerpes f. bairdi*)	84	22.59	77.41
Total no. of stomachs examined	3453		
Average		64.26	35.74

The following table gives the percentage of ants and beetles that these 3,453 woodpeckers had eaten (Beal, 1912)

	% of ants	*% of beetles*
*Williamson sapsucker (*S. thyroideus*)	85.94	0.13
Red-cockaded woodpecker (*Dryobates borealis*)	56.75	11.2
Red-shafted flicker (*C. c. collaris*)	53.82	6.55
Flicker (*Colaptes auratus*)	49.75	5.14
*Red-breasted sapsucker (*Sphyrapicus ruber*)	42.49	4.02
Pileated wp. (*Phloeotomus pileatus*)	39.91	22.01
Yellow-bellied sapsucker (*S. varius*)	34.31	6.02
Downy woodpecker (*D. pubescens*)	21.36	21.55
Hairy woodpecker (*D. villosus*)	17.10	41.42
Lewis woodpecker (*Asyndesmus lewisi*)	11.87	9.12
*Three-toed woodpecker (*Picoides americanus*)	8.29	71.05
*Nuttall woodpecker (*Dryobates nuttalli*)	8.19	28.96
*California woodpecker (*Melanerpes f. bairdi*)	8.09	2.67
Red-bellied woodpecker (*Centurus carolinus*)	6.45	10.18
*Arctic three-toed wp. (*Picoides arcus*)	6.35	67.66
Red-headed wp. (*Melanerpes erythrocephalus*)	5.17	18.85
Average	28.49	20.39

*Not known to occur in Oklahoma.

Our woodpeckers are primarily allies of the trees; being especially adapted for ridding them of borers and bark beetles which no other birds are able to destroy. For this purpose the hairies and downies are first in importance with us, since they are the most common woodpeckers that habitually specialize in the work of excavating boring insects, and too they are not as destructive to the tissues of green trees as are the larger species and the sapsuckers. Enos Mills ("Spell of the Rockies": 197) followed

a Bachelder woodpecker all day long and found that it inspected 827 trees during the day. The yellow-bellied sapsucker is the least beneficial, since it injures green trees by puncturing and girdling them to secure the sap and cambium, thus causing the tree to develop swollen places or knots, if the wounds heal, and if the cambium has been removed from an area encircling the tree, the overlying layer of conducting phloem will have been removed also, and the tree will usually die.

Secondarily, woodpeckers injure trees and wooden structures, at least to a slight extent. In excavating for boring insects in green trees these birds injure the cambium layer. The hole itself, through which the borer was extracted, may become a seat of injury by harboring fungi, ants, etc. which contribute to the decay of the wood. The real injury is problematical, for as a rule the wounds heal; indeed most of those made by hairies and downies heal within a year. Man can appreciate the work done by woodpeckers more fully when he is brought to realize his futile efforts to rid apple and other trees of the flat-headed and other borers, and is then compelled to recognize these birds as the only potent vertebrate enemies of such insects. Ecstorm (1901) believes that the woodpecker's wonderful accuracy in locating a borer is due to the slight noise made by the grub's gnawing.

The great ivory-bill and pileated woodpeckers make large excavations in trees in digging out borers and thus may have been responsible for an appreciable amount of damage to forest trees, but we have nothing to fear from these birds for the former is already extinct in this State, and the latter is rapidly becoming so.

The real damage which woodpeckers, other than those belonging to the genus Sphyrapicus, do concerns wooden structures such as telephone and telegraph poles, churches, school houses, railway water tanks, barns and occasionally dwellings. In Oklahoma, flickers and red-headed woodpeckers are the only ones that are often guilty of this offence. The hairies and downies occasionally excavate nesting cavities in fence posts, but this is really an insignificant matter since the holes are comparatively small and are not numerous. That woodpeckers do not damage telegraph poles to the extent usually supposed is shown by a series of tests, (MacAtee, 1911), in which a block and tackle was attached to the top of the pole and to a dynamometer so that the poles could be broken. Of twelve poles that these birds had excavated, nine broke at the ground line and not at the excavations. Some of these poles resisted over 3300 pounds strain before breaking. One having ten excavations between ten and twenty feet from the ground, each hole being about three inches in diameter, gave way at the ground under 1,100 pounds strain.

Some of the telephone and telegraph companies have tried to prevent woodpeckers from damaging their poles by creosoting them, but with little or no effect. Texas pine poles, burnetized, seem to do better than the white cedar creosoted poles. (MacAtee, 1911). The Edison Electric Company reinforced a number of bored line poles near Ann Arbor, Michigan, by filling the woodpecker holes with mortar.

It seems that comparatively little has been done to protect trees, wooden structures and fruits from woodpeckers by furnishing them with ready-made nests and by planting wild fruits and berries for their benefit.

Artificial woodpecker holes made in sections of natural limbs and fastened to trees and posts have proven quite successful in Germany. 'All the breeders in holes. . . . have inhabited them. . . . Ninety per cent of the 2,000 boxes in the wood at Kammerforst. . . . and nearly all of those at Seebach and of the 2,100 near Cassel were occupied. . . . The Prussian board of agriculture has caused extensive experiments to be made with these boxes, with excellent results. Of the 9,300 boxes hung up by the Government in the State and communal woods of the Grand Duchy of Hesse, 70 to 80 per cent were used the first year, and all have been inhabited this year (1907).' (MacAtee, 1911, from Heisemann, How to Attract and Protect Wild Birds, pp. 45-46, 1908).

Order PICI

The WOODPECKERS, WRYNECKS, etc.

Common characteristics of the order are the same as those of the family, since there are no other families of this order in North America.

Family PICIDAE

The WOODPECKERS

All Oklahoma species of Pici have zygodactylous feet, with the second and fourth toes usually about equal in length; nails strong, much curved, compressed, sickle-shaped, acuminately pointed and of a horn color. The tarsi are scutellate in front, reticulate on sides and behind and are an obscure brewster to plumbous green color. The tail has twelve rectirces (only ten of which are functional), acuminately pointed with enlarged shafts and vanes stiffened and bristly at the end; while the first pair or extreme laterals are rudimentary, nearly functionless, and the vanes are not bristly as in the others; first pair much the shortest, while the other five pairs are graduated in length to the middle pair, which is the longest. The bill is chisel-shaped, except that in Colaptes it is more like a pick.

Woodpeckers build no true nests, but habitually excavate nesting cavities in trees or wooden structures, in which the nearly spherical glossy white eggs are deposited and the altricial young reared. The adult males are usually larger and have more red in the plumage than the females, although this is not always true of females in immature or juvenile plumage.

Ridgway (1914: 6) states that with the exception of the Australian region and Madagascar, "Woodpeckers are found in all the wooded portions of the world," and that the western hemisphere has about 22 genera and 225 species and subspecies; while the eastern hemisphere has 26 genera and over 200 species and subspecies.

The A. O. U. Check-List (1910) limits the Picidae of North America to 100 genera and 46 species and subspecies. The number of species and subspecies occurring in each genus is as follows:

Campephilus 1, Dryobates 19, Xenopicus 1, Picoides 4, Sphyrapicus 5, Phloeotomus 2, Melanerpes 4, Asyndesmus 1, Centurus 3, Colaptes 6.

In the present case the writer has definitely referred the following genera, species and subspecies to Oklahoma, either as residents or migrants.

The identification of these forms is based wholly upon skins collected within the State:

MEASUREMENTS

The following explanations of the method of taking the most important measurements will help clarify the writer's descriptions as well as assist in the identification of specimens that may fall into the hands of the reader.

The *length* is the distance from the tip of the bill to the end of the longest rectrix, taken as follows: Lay the bird flat on its back on a rule, on the table, then grasp the head with the left forefinger and thumb, placing the ring finger against the end of the bird's bill in such a way that you can, without even looking, hold the tip of the bill even with the end of the rule. This, of course, requires some practice, or else errors will creep into the length measurements of specimens. Now grasp the feet of the bird with the right hand and pull gently, but firmly, holding the tip of the bill at the end of the rule; the tip of the tail will indicate the length of the bird.

The *extent* is the maximum distance from tip to tip of the extended wings. The bird must be lying on its back on a flat surface, preferably on a rule. Now grasp the left wing at the carpals with the right hand and gently stretch the bird out. The figure indicated by the longest primary of the left wing is the extent of the bird. If the rule is too short the next best thing to do is to mark the extent of the bird on the table and then measure the distance between the marks. Simple as this seems, few beginners are able to measure the same specimen twice and get even approximately the same results.

The *wing length* is the greatest distance from the outside of the bend of the wing (carpals) to the tip of the longest primary taken with dividers or on the underside with a rule, as follows: Lay the specimen on its stomach and grasp the wing near the bend, (preferably the right wing) with the left hand, placing a finger at the bend so that the end of the rule,

when placed under the wing, will just touch the finger. Thus the tip of the longest primary will indicate the wing length. The primaries must not be bent in the least as this will make the wing length appear abnormally great.

The *tail* length as recorded in this paper is in reality the length of the longest tail feather—from the tip to the end of its root. In small birds I simply blow the feathers aside so as to expose the oil duct, and then I can easily place the point of the dividers at the root-tips of the rectrices. Place one point of the dividers at the roots of the tail feathers and the other point at the end of the longest feather; then apply the dividers to a rule to get the distance between the points in inches which will be the length of the bird's tail.

The *bill* length is taken with dividers. I always place one point of the dividers on the merging line of the feathered soft skin and horny covering at the dorso-posterior end of the bill, (which is readily noticeable as a fold of skin) and then place the other point at its tip. I have adhered to this method in my descriptions. Many ornithologists measure only from the point where the ends of the feathers touch the bill, and designate the measurement when taken as I have directed, the exposed culmen.

The *tarsus* is the length of the tarso-metatarsal ("shin") bone, and is taken with dividers. The toes and tibia ("drum stick") should be bent forward and the points of the dividers placed, from the front side, in the bends of the toes and heel in such a way as to give the distance between these two joints.

The *third* toe length is the length of the extended middle toe, not including the nail. I use dividers in taking this measurement, but by placing the corner of the rule in the joint of the middle toe and tarsus, from the bottom side of the foot, one may obtain accurate results in the larger specimens.

The *third* toe and *claw* length is taken as is that of the third toe except that the length of the claw is included.

The sex of the bird should be determined only by examination of the gonads.

THE WOODPECKERS OF OKLAHOMA

Genus CAMPEPHILUS Gray

Campephilus Gray, List Gen. Birds, 1840, 54. Type by orig. desig., *Picus principalis* Linnaeus.

CAMPEPHILUS PRINCIPALIS (Linnaeus.)
IVORY-BILLED WOODPECKER. 392.

Picus principalis Linnaeus, Syst. Nat., ed. 10, 1, 1758, 113. (*Carolina*).

Range.—Formerly South Atlantic and Gulf States from Texas to North Carolina, north in Mississippi Valley to Oklahoma, Missouri, southern Illinois, and southern Indiana; now restricted to the lower Mississippi Valley and Gulf States, and of local distribution.

Although the occurrence of the ivory-bill in Oklahoma is very doubtful, the writer feels that it should be considered in this work.

The generic name, Campephilus, is a combination of two Greek words, "kampe," a caterpillar; and "philos," a friend, or loving; hence a genus of caterpillar loving woodpeckers. The specific name, principalis is a pure Latin word which means first or most important; hence the first in rank among the woodpeckers.

Description of Species

Since the specimens which are in our museum are all from Mexico I can do no better than to quote Coues, (1896):

"Male and female: Glossy blue-black; a stripe down side of neck, one at base of bill, the scapulars, under wing-coverts, ends of secondaries and of inner primaries, the bill, and nasal feathers white; feet grayish-blue; irris yellow. A long pointed crest, in the male scarlet faced with black, in the female, black. Length 19.00-21.00; extent 30.00-33.00; wing 9.75-10.75; tail 7.00-8.00; bill 2.50; tarsus 2.00. Varies much in size; female smaller than the male. Nests high in the most inaccessible trees; eggs about 6, 1.35x1.00."

The pileated woodpecker is often mistaken for the ivory-bill by those who note only the size of the bird. Several residents of the eastern and northeastern counties who had reported the occurrence of ivory-bills in that part of the State admitted that they had mistaken the pileated woodpecker for the ivory-bill when shown specimens of the two species.

Dr. D. W. O'Hern told me that he saw an ivory-bill in McIntosh County in 1915, and Woodhouse possibly saw this bird along the Arkansas River in 1853 (Nice and Nice, 1924). In 1913-15 the writer collected birds in all the counties east of Grant, Noble and Grady, except Haskell, McIntosh, Okmulgee and Creek, without seeing an ivory-bill or talking with anyone who really had seen one. A Mr. Ledbetter, in Pittsburg County, remembered having seen flocks of Carolina paroquets, but was quite certain he had never seen the ivory-bill although he had killed pileated woodpeckers in this part of the State.

Harrington (1914) states that parts of woodpeckers were commonly used in Sac and Fox personal amulets, hunting, medicine and war bundles. "The dried head of an ivory-bill woodpecker within the sacred medicine

bundle is supposed to give the man the woodpecker's power of seeking out and capturing his concealed prey, no matter how well hidden. The bird can by his own efforts cut a hole in the tree where the raccoon is hiding, and the hunter may share this power also" (p. 226). "Woodpeckers are very skilful in finding their prey, even when well concealed—a quality which made their skins desirable as amulets, for either hunting or war, as by this aid the Indian believed he could locate his enemy or even a deer, just as the bird can locate the larvae hidden away beneath the bark of a tree. Besides this, as one Indian put it, "The bird can peck a great hole in a tree in a short time; the warrior who wore the skin could do the same thing—it did not take him long to make a great hole in the enemy," (p. 169). A peace pipe in the Public Museum of Milwaukee, from the Iowa Indians of Oklahoma, is ornamented with six bills and crests of the ivory-bill woodpecker.

Genus DRYOBATES Boie.

Dryobates Boie, Isis, XXI, 1826, 977. Type by monotypy *Picus pubescens* Linnaeus.

According to Ridgway (1914) this genus has been known by nine other names.

General characters: Medium to small in size; back black or dusky brown, spotted, barred or otherwise marked with white; bill quite chisel-pointed, nearly straight, acute, rather than ovoid, dorsally, with lateral ridges or nasal grooves extending nearly to the tip. Lateral rectrices whitish, sometimes lacking black bars; under parts whitish, often presenting a soiled appearance. Adult males with red nuchal crescent, or other parts of the head red. Red, or reddish, present or absent in immature females, but always absent in adult females.

DRYOBATES VILLOSUS VILLOSUS (Linnaeus)

HAIRY WOODPECKER. 393.

Picus villosus Linnaeus, Syst. Nat., ed. 12, vol. 1, 1766, p. 175. (New Jersey).

Range: Transition and Upper Austral zones of northeastern United States from Nebraska, eastern Colorado, and Oklahoma east to middle and northern parts of eastern States.

Locally a fairly common resident; common winter resident.

Local names: Speckled woodpecker, spotted woodpecker, speckled "sapsucker," spotted "sapsucker," chib-chab, guinea woodpecker, etc.

The present generic name, Dryobates, comes from the Greek "druas" an oak, or more probably, "drus," a tree, plus "bates," which comes from the Greek verb "baino," I step or go; villosus comes from the Latin intact, and means shaggy, hairy or rough-haired. (It has been said that the stiffened nasal tufts of the hairy suggested this name as opposed to the less bristly nasal tufts of the downy). Thus the scientific name of this bird comes to mean "a shaggy one walking up a tree."

Calls: The call of the hairy woodpecker is a plaintive "Chenk-chenk," sometimes a coarse "Cherr-rr-r-r."

Description of Species

Male: Length, 9.00; extent, 14.50; wing, 4.65; bill, 1.25; tail, 3.25; tarsus, 0.88.

Female: Length, 8.75; extent, 15.00; wing, 4.75; bill, 1.15; tail, 3.50; tarsus, 0.88.

Male: The general color of the upper parts of the male is black, with a broad, white zone extending nearly the full length of the back. When sitting, the wings appear to have eight white bands across them, but in flight these bands become only rows of white spots. The throat, breast, belly and under tail coverts are white.

The bill has a length equal to that of the head; nearly straight; width of base 0.25; depth 0.30, length of gonys 0.87; nostril near the head and hidden by nearly white hair-like nasal feathers.

The head is black and has a conspicuous red occipital crest; light brown iris; and white superciliary line confluent with the white post occular patch. An infraorbital line extends across the malar region and joins the broad white patch on the side and base of the head.

Hempel (1922: 260) cites an unusual color variation in a specimen which may have been an immature male: "This individual was an exception; the band was *white,* and in the center of the black of the head, were two oval red spots, so accurately and perfectly proportioned, that they seemed to have been painted there. These were separated by a black line."

The wing is less than twice the length of the tail; third primary longest; ventral surface spotted when extended.

The tail is typical of the family; second pair of rectices soiled white, usually with a large black spot about the middle of the inner vane; fifth and sixth pair longest.

Female: The plumage of the female is like that of the male except that it lacks the red nuchal crescent. There seems to be no decided difference in the measurements of the two sexes, other than that the female is usually smaller.

Young: Fledgelings acquire a plumage similar to that of the female, while immature males may be found in all graduations from the female plumage through stages in which the head is partly red, to the full red crescent and mature plumage of the male. Oberholser (1911: 596) states that "the juveniles of both sexes closely resemble the adults, except that nearly the whole top of the head is red." An immature male, collected June 17, 1901, in Pottawatomie County has 14 feathers on its crown and forehead tipped with pale brick-red; while the occiput is entirely black as in the female. Just how long it takes the young males to acquire adult plumage is a mooted question.

The hairy woodpecker, or one of its subspecies, is found wherever trees grow in North America, and is one of the trees' best friends, since it is largely dependent upon boring insect pests for food. It is found in the deep woods, in orchards and even in the shade trees along streets of our cities, for it does not avoid populous districts.

This species, like most woodpeckers, progresses by short hops or hitches, using its tail and both feet very much as if its tail were a third foot and both its legs were tied together. In this way it hops sidewise around or hitches itself up or down the tree trunk and larger limbs with equal facility in searching for food. This bird is sometimes seen securing its food from among the roots of bunches of grass. While thus engaged it braces itself with its tail just as if it were perched on the side of a tree. Its walking on the ground is, however, very limited as well as apparently very awkward, for it takes short hops, bracing itself with its tail as if in

fear of falling backward. The hairy seldom perches cross-wise on a limb as the flicker often does.

Migrations of the hairy seem to be influenced by the presence or absence of food rather than by seasonal changes. It is generally supposed that there are more hairy woodpeckers here in the Fall, Winter and early Spring than in the Summer. However, I am of the opinion that this apparent increase in numbers is due to the fact that during these seasons the trees are bare, thus causing the birds to become conspicuous, whereas in the summertime the leaves conceal them. In this opinion I find that I am in accord with Beal (1912: 17) and others.

These birds are among the few that have not lost confidence in man, but continue their solitary search for insects in trees along the sidewalks, allowing a person to approach within a few feet of them. More than one or two of these woodpeckers is seldom seen in the same vicinity, for the hairy is a very busy fellow and does not have time to take care of the social side of life, but is usually seen industriously searching the trunk and larger limbs of the trees for woodboring larvae and bark beetles during all seasons of the year. They seem to prefer the vicinity of man's habitation to the freedom of the deep woods; and the University campus is a favorite place for them.

The hairy roosts in a cavity in dead wood. It seems immaterial whether the cavity was excavated by the one in possession of it or by another of his tribe; whether it is one month, or two or three years old, just so that it is in good condition. I have never seen an instance nor read of one in which the bird roosted in a natural cavity. It always excavates a cavity if it is unable to find one that is entirely satisfactory. I have never observed two birds roosting in the same hole.

The nesting habits of the hairy are quite a puzzle, for it may be seen making an excavation any time of the year, and since we know that some of these holes are intended for sleeping quarters only, it is very difficult to make observations on the preparations for its brood. The nest cavity is in a fence post. The bird selects the under side of the snag for the site of its home so that driving rains or dripping water will not enter the doorway. At the first thought one would expect to find the nest cavity opening to the south, to avoid the cold wind, however, this is not always the case. The slant of the snag seems to account for most of the excavations that have the opening to the north.

On the 21st of February, 1914, I found a hairy digging a cavity in a maple on the campus. The hole was just well started at this time, but it was not finished until March the 5th, some twelve days later. This fellow was evidently in no hurry to complete his task, for I have an instance on record of a hairy having excavated a nesting cavity in an apple snag during a single afternoon. The nesting cavity in the maple was eight inches deep, when completed. The excavation is usually about two inches in diameter at the entrance and continues toward the heart of the snag for from one to two inches, then downward six to nine inches. Most of the cavities are ten to fifteen feet from the ground. I have occasionally found them twenty-five to forty feet from the ground in snags of limbs that were so small that surely little other than bark surrounded the nest cavity. This is not the case in New York, according to Eaton, (1914: 141-142) who states that the nest cavity is usually thirty to sixty feet from the ground and is

sometimes dug into living trees. He also states that the cavity has a diameter of about two inches at the entrance and continues inward two or three inches, then downward eight to sixteen inches. The difference in the general run of timber and in the climate probably accounts for the difference in height of the nest from the ground and in the greater depth of the cavity.

The cavity is considerably enlarged at the bottom where a pad of fine chips, which is sometimes sparingly covered with feathers or moss, is prepared for the four to seven, usually five, glossy white eggs. The eggs of *D. villosus villosus* and those of *D. villosus auduboni* seem to be almost identical for five eggs of the latter measure ".97x.70; 98x.70; 1.00x.70; and 1.00 x.69" (Davie, 1900) while Coues (1896) gives 1.00x.75 as the average size of the eggs of the former species.

These birds feed singly, but are not infrequently found in pairs. Their food consists chiefly of animal matter which is eaten during all hours of the day, from sunrise until about half an hour before dark. The stomachs of a male and female collected December 22, 1913, contained weed seeds, wild grape seeds, dogwood berries, and several woodboring larvae. One of these birds had eaten nine flat-headed woodborers in addition to some dogwood berries. A heavy, wet snow had fallen the night before, and at the time these specimens were taken the limbs and branches, as well as the trunk, were heaped over with snow, so that it made the matter of finding the morning meal a very difficult task for the half frozen birds. Handicapped as it was by the snow, this woodpecker deserves considerable credit for having found nine borers.

The call of the hairy is a rather plaintive metallic "Chenk-chenk." Usually both syllables are plainly audible, but at times they become very numerous, and are repeated so rapidly as to be indistinct; or it may be a coarse "Cherr-rr-r," or "Trriii, trriii," which is very similar to the call of the red-bellied and red-headed woodpeckers. Sometimes while flying it utters a whirring "Chenk-a-lenk-lenk," which suggests the notes of the yellow-bellied sapsucker. It has been known to utter a "loud, piercing, *quavering* whistle" (Hempel, 1922: 259) when frightened and enraged. Although the hairy has several call-notes, its real musical instrument is a resonant limb or snag, on which it beats a lively tattoo. This music is often made just from sheer joyousness of heart, especially on bright sunny mornings in winter and early spring. I have often heard and seen these birds tattooing to each other in the woods, and once on the street in Norman. In this instance one was on a telephone pole, while the other was about two blocks away on a locust tree. The one on the pole would rat-a-tat-tat, then listen, cocking his head on first one side and then on the other, for the other's answering rat-a-tat-tat. The two males kept up this strange duet for some time. The females are also adepts at this sort of communication.

Several farmers living in Pushmataha and Choctaw Counties complained that "spotted woodpeckers" were damaging their corn while it was "in the milk," therefore, I visited the scene of the "depredations" in the summer of 1914, and shot several of the "culprits" in the act of pecking the ears of corn. These birds were our friends, the hairies; and here they had been caught "red-handed"; but examination of their stomach contents failed to convict them. Some bits of husk of the grain were found, but

the bulk of the stomach was composed of the skin and heads of corn worms (larvae) which eat the grain before it ripens. The bits of husks were probably taken accidentally. One stomach contained several larvae. In one instance in particular, a farmer and I found that considerable damage had been done to a cornfield which was on newly cleared land, with many standing dead trees in it, and bordered on three sides by green timber. Here we found indications that squirrels, raccoons, crows, and black birds had helped themselves freely; nevertheless we were unable to secure sufficient evidence to convict the hairies, and even the farmer who owned the cornfields was convinced that "spotted woodpeckers" were not guilty of damaging his corn to any appreciable extent.

The hairy woodpecker has been accused of girdling trees, as has the downy, to secure the sap; but I have never seen this accusation verified. I have, however, seen this bird refuse to taste the sap of a tree which had been freshly punctured by a yellow-bellied sapsucker. In all probabilities these woodpeckers were eating insects which had been attracted by the flowing sap, and the observers noticing that the birds were busy feeding at the punctures concluded that they were drinking sap.

Beal (1912: 13) examined 382 stomachs of the hairy woodpecker, collected in 33 states and territories, and the District of Columbia and Canada. The stomachs were taken during every month of the year and probably embrace every subspecies of the hairy. Animal matter composed 77.67 per cent, while vegetable composed only 22.33 per cent of the contents of these stomachs. The animal food consisted chiefly of insects, a few spiders and millipeds; while the vegetable part was composed of fruits, seeds, and miscellaneous matter. In June the maximum amount of animal food is consumed, reaching 90 per cent of all foods eaten. Seasonal changes do not gradually change the ratio of animal to vegetable food, as is the case with birds that subsist upon flying insects and ripening fruits, but it remains fairly constant throughout the year; because the food of this bird consists chiefly of wood-boring larvae and vegetable material which may be obtained at all times of the year. Plant lice and cherry scales were found in a few stomachs. Spiders and their eggs and millipeds constitute 3.50 per cent of their annual food. Snails and other unexpected forms have also been found in the stomachs of these birds. Grasshoppers, crickets, and cockroaches are rarely eaten in the adult stage, however, their eggs swell the percentage of Orthoptera eaten to about 2 per cent of the annual diet.

Although cambium was identified in 23 of the 382 stomachs, it was probably ingested accidentally while digging wood borers, and should not be considered as food, since bits of dead wood, leaves and other rubbish having no food value whatever are commonly found in the stomach contents of various birds. Mast, composed chiefly of acorns, beechnuts, etc. cambium and rubbish constitutes more than 10 per cent of the contents of these 382 stomachs.

The hairy woodpecker does do a very small amount of damage to corn as I have already shown, but since this damage is slight as compared with the benefit the corn receives from the bird by its destroying the corn worm we should not think of it as even just toll. About the only economic charges which can be lodged against this woodpecker are that it eats a few grains of corn and makes small holes in trees in extracting destructive wood borers. However, these pests can be destroyed in no other

practical way; and since the nest excavation is usually in a dead tree or fence post, the hairy cannot be considered harmful to wooden structures. In short the damage which this bird does to trees and wooden structures is negligible in itself, and when compared with the good it does should be entirely overlooked.

Dryobates villosus audubonii

southern hairy woodpecker. 393b.

An immature specimen was collected by Dr. L. B. Nice, July 1, 1923, McCurtain County, Oklahoma and kindly loaned to me.

Length of tail, 2.89 (74 mm.); (Average for males, Ridgway, 1914, 65.2 mm.); wing, 4.49 (114 mm.); (Average for males, Ridgway, 1914, 113.8); bill, 1.15 (29 mm.); (Average for males, Ridgway, 1914, 28.1). Anterior edge of nostril to tip of upper mandible 0.94 (24 mm.).

The only red exhibited by this specimen is confined to the distal half of the most of the feathers of the dorso-frontal part of the head.

Tail: Spurious and second rectrices nearly white; third rectrix with distal two-thirds of outer vane nearly pure white, proximal two-thirds of inner vane dusky. The tips of the second and third feathers are soiled-white, probably due to stain more than to a natural coloration.

Depth of closed bill at anterior end of nares, .32 (53 mm.).

Adult females average slightly smaller than males (Ridgway, 1914).

Dryobates pubescens (Linnaeus).

southern downy woodpecker. 394.

Picus pubescens Linnaeus, Syst. Nat., ed. 12, 1, 1766, 175. (Carolina).

Range: Austroriparian Zone of South Atlantic and Gulf States from North Carolina to eastern Texas.

South Atlantic and Gulf States, from South Carolina to Texas. (Oberholser, 1895).

A fairly common resident.

Local Names: Little guinea woodpecker, "sapsucker," little speckled woodpecker, little spotted woodpecker, and chib-chab.

The specific and subspecific name, *pubescens*, is a Latin word, which means covered with soft hair as opposed to villosus or shaggy. A free translation of its name means a "soft-haired, downy one going up a tree."

The most common call of the downy is a sharp "Chink-chink," sometimes reiterated so rapidly that it sounds like "Chink-er-r-link-link." This species is not so much given to tat-tooing on resonant objects as is the hairy.

Description of Species

Male: Length, 6.45 (average of seven specimens); extent, 11.52 (av. of nine); wing, 3.60; bill .74; head, 0.75; tail, 2.40; tarsus, .65; 3 toe and claw, 0.65; 4 toe and claw, 0.69.

Female: Length, 6.49 (av. of five); extent, 11.52 (av. of six); wing, 3.55; bill, 0.74; head, 0.75; tail, 2.50; tarsus, 0.64; 3 toe, 0.40; 3 toe and claw, 0.53; 4 toe, 0.40; 4 toe and claw, 0.65.

The measurements of this bird are quite variable due to geographical variation and to wearing away of the ends of the tail and wing feathers, which is often considerable, especially in the case of the tail feathers. In three specimens, collected in February, I estimated that their lengths have

been reduced at least 0.10, 0.25, and 0.35 inches respectively by this much having been worn off the ends of the rectrices. This estimate is based on comparison of the worn with similar unworn feathers of other individuals, and is very conservative.

Eight Oklahoma males of *D. p. pubescens* have an average wing length of 3.56, with a minimum of 3.50, and a maximum of 3.75; while five Oklahoma females have an average wing length of 3.56 with a minimum of 3.54 and a maximum of 3.60 inches. Of these thirteen specimens six males have an average length of 6.45, with a minimum of 6.25, and a maximum of 6.65 inches; while three females have an average length of 6.48, with a minimum of 6.30, and a maximum of 6.65. These measurements were taken from the specimens before they were skinned, and do not represent birds having considerably worn tail feathers.

Tabulating the wing measurements of 36 males and 37 females, collected in Kansas, Virginia, South Carolina, Texas, Oklahoma, Louisiana, Mississippi, Georgia, Florida, Indiana, and Illinois, as recorded by Ridgway (1914: 230-231), shows that the wing length of *D. p. pubescens* decreases from Virginia (six males 91.7 mm., or 2.45 in. and three females 92 mm.), Illinois and Indiana (eight females 92.4 mm.) to Florida (ten males 88.3 mm., or 3.49 in., and ten females 88.5 mm., or 3.50 in.) and Georgia (four males 89.2, and three females 89. mm.).

Of twelve specimens of *D. p. medianus* collected in Virginia, and loaned to me for study by the U. S. National Museum, the males have an average wing length of 3.76 with a minimum of 3.66 and a maximum of 3.90 inches. The four females have an average of 4.82 with a minimum of 3.70 and a maximum of 3.90 inches. In seven specimens of *D. p. pubescens* (also of this loan), collected in Indiana, four males have an average wing length of 3.61, with a minimum of 3.40 and a maximum of 3.80 inches; while three females of the same lot have an average of 3.80, with a minimum of 3.75 and a maximum of 3.85 inches.

Ornithologists may consider these measurements a dangerous comparison, since they indicate the need of a third subspecific division of the downies to take care of our Oklahoma forms which are neither *D. p. pubescens* nor *D. p. medianus,* or the need of abolishing one or both of the accepted subspecies.

The general coloration of the male is the same as that of the male hairy woodpecker, even to the red nuchal band.

The bill is straight like that of the hairy, with nostrils well concealed by soiled white nasal feathers.

The head is about the same length as the exposed bill and has a black crown. The broad white superciliary line is confluent with the white suborbital and soiled white nasal feathers in front of the eyes. The superciliary line extends backward along the side of the head, while the suborbital line extends over the malar region, including most of the auriculars, to the back of the neck where it broadens and may even merge with its fellow of the opposite side. This leaves a broad black postorbital zone parallel to and between the white superciliary and suborbital lines. The lower malar region has a black line which rapidly broadens as it extends along the neck and connects with the black back. The throat is soiled white in color.

The wing when extended is black and shows five rows of white spots.

The proximal row is hidden by the black and white coverts, while the distal, which is very narrow and poorly defined, is the terminus of the remiges. The white spots on each remix are in apposible pairs, arranged to form the three conspicuous rows of white spots, confined chiefly to the margins of the vanes, and almost or quite merging on the proximal two or three feathers. The feathers of the upper coverts are black, while those of the middle are mostly white, marked with black in the form of an irregular band or broad lateral scallop on either vane. The feathers of the lower coverts are black, usually with one pair of white spots midway the length and a single white spot near the tip.

In the prepared specimen before me all the rectrices, except the middle pair, have white on them, graduating in extent from the nearly pure white first, or spurious pair, to the nearly pure black fifth pair. Each feather is black basally enclosing a small patch of white, which is confined chiefly to the medial vanes. Distally the black is arranged in from one to three irregular and incomplete bars on the first four pairs; but the fifth pair is entirely black, save for the white tips and marginal part of the lateral vane which invades the black at two points thus forming irregular and deep crescents.

Female: Plumage like that of the male, except that the red nuchal band is replaced by white.

Young: In the young male red predominates over the whole top of the head, but the nuchal crescent is white, as in the adult female, instead of red as in the adult male.

The A. O. U. Check-List recognizes only one species and two subspecies of downies in North America. The downies in this State are intermediate between the downy, *D. p. medianus,* and the southern downy, *D. p. pubescens*. Although all the specimens in our museum are the southern form, it is probable that the northern form, *D. p. medianus,* occurs also; for it is a common resident in Kansas (Bunker, 1913: 148), and G. Dallas Hanna secured six specimens during November, December, and January, at Van Buren, Arkansas (Howell, 1911). Two specimens were collected near Minco, Oklahoma, May 31, 1905, by Wetmore (1918), concerning which he says: "These two birds, while intermediate in measurements between *pubescens* and *medianus* are nearer the latter form. The underparts are much stained, but the color is that of *medianus*. The breast and abdomen are clearer white than in specimens of *D. p. pubescens* from Christ Church Parish, South Carolina, and from Florida, examined in the United States National Museum. The immature bird is in juvenile plumage, with the black of the upper parts tinged with red. The nuchal band is rarely indicated."

On the other hand Oberholser (1895) states: "Birds at hand from North Carolina, Tennessee, Indian Territory, Southern Illinois, and extreme Southern Virginia, appear to be intermediate between *D. pubescens meridionalis* (*D. p. pubescens*) and *D. Pubescens* (*D. p. medianus*), and these, although not above included, are perhaps without impropriety referable to *D. pubescens meridionalis* (*D. p. pubescens*)."

I wrote to Dr. Oberholser about this difference in scientific names and he replied: "You are quite right in referring your Oklahoma birds to the southern downy woodpecker; and also in your view that *D. p. pubescens* of current use is the same as the *D. p. meridionalis* of my first paper."

Through the kindness of Doctors Oberholser and Richmond, twelve specimens of *medianus* and seven of *pubescens,* belonging to the National Museum, were loaned to our museum so that I might study them. The specimens of *medianus* were collected in Virginia and the *pubescens,* in Indiana. I carefully compared these specimens with some in our museum which seem to be fairly typical of Oklahoma southern downies and found no appreciable difference in size or shape of the spots.

The downy is a more or less sociable little fellow; or is it that other birds simply ignore him? One often finds this little woodpecker busily pecking away in the same tree with creepers, tom-tits, and others; and his mate is usually nearby. On one occasion I saw a downy in a pecan tree with a yellow-bellied sapsucker; each was hitching his way up a separate limb, but only a few feet from the other. On a field trip, January 6, 1923, 10 downies were found, and of these only two were alone; all the others being in twos.

This little woodpecker is not as shy as the hairy, and often allows one to approach within a few feet while it is probing out a borer, or feeding on aphids or other small insects that may be hiding in the crevices of the bark. The warblers and bluebirds come and go, but the downy never leaves us; twelve months in the year he walks up the trunks and limbs of our orchard, shade and forest trees digging out wood borers and catching other insects that frequent them.

The downy is often called a "sapsucker" but this appelation is a misnomer and should be applied only to members of the genus Sphyrapicus, for downies never puncture trees for the purpose of obtaining the sap. Although the downy, for no apparent reason, sometimes bores holes in the bark of apple trees it does not return to drink the sap, as it is often credited with doing, and the punctures seldom penetrate the inner bark, hence seldom damage the tree.

Bird lovers seem to leave the impression that the downy is found only in orchards or among shade trees, at least that it is seldom seen in the woods. This is a mistake and is probably due to the fact that they may be observed in shade trees along the street as one casually passes. In the woods there are many things to detract from the search for downies. The great trees, with trailing grape vines, the undergrowth and the noise made by walking through the dead leaves are conditions which make it difficult to find the little fellows. Many times, have I searched the woods in vain for downies, then sat down for a few minutes and heard the gentle tapping, and guided by this sound found one without difficulty. Occasionally, however, the author of this sound has proved to be a titmouse instead of a downy.

Each individual excavates a "winter bed" during the fall in which it passes the cold nights. Whether these "winter beds" are often used for nesting purposes the following spring and summer, and whether the birds roost in cavities or in the open while not on duty at the nest, are some of the questions that I am not prepared to answer. My observations, however, lead me to believe that very few "winter beds" are used for nesting purposes and that the parent makes no preparations for a "summer bed" but sleeps out. A "winter bed" which was excavated October 14, 1915, was not tenanted the following nesting season. This excavation was in a soft maple snag, about eight feet from the ground, and the orifice had a diameter of

one and three-eights inches, the cavity a depth of four and one-half inches, and the diameter of the bottom was two and one-half inches, thus giving the cavity somewhat the shape of a gourd. The entrance was on the north side of the snag, a fact which I am unable to account for, since the snag was almost perpendicular and could have been bored from any side.

The downy is easily recognized by its small size, black and white spotted plumage and undulating flight. It seldom feeds on the ground, and I have never seen one perch cross-wise on a limb.

This bird is a resident wherever found, and I dare say that cases are rare in which individuals ever stray more than a hundred miles from their birthplace. I believe that this is largely the reason for Oklahoma forms being intermediate between *D. p. pubescens* and *D. p. medianus.*

The nesting and breeding habits are very much the same as those of the hairy woodpecker. Davie (1900) says: "The nest is excavated in the trunk of a small dead tree, often in the dead limb of an apple tree, in a post or rail of a fence, seldom more than twenty feet from the ground, usually between ten and fifteen feet. The eggs are four or five, rarely six; they are pure glossy-white, and nearly elliptical in shape. There is considerable difference in the size of the eggs; a set of four measure respectively, .75x.62, .77x.62, .73x.62; another set containing four, .84x.58, .78x.59, .83x.58, .82x.56."

The Biological Survey has published an exhaustive account of the feeding habits of the downy woodpeckers. In investigating the food of this woodpecker 723 stomachs were examined. "They were collected in 33 states, the District of Columbia, and Canada. They are quite regularly distributed over the 12 months of the year, and probably represent fairly the average annual food. This is made up of 75.05 per cent of animal matter to 23.95 per cent of vegetable." (Beal, 1912: 18). He also shows that of the vegetable matter contained in these 723 stomachs, *Rubus* fruits, blackberries, etc., formed 5.85 per cent; the poison Rhuses (*R. radicans, R. vernix, R. diversiloba* and *R. toxicodendron,* found in 86 stomachs) formed 5.95 per cent and acorns, smaller seeds, etc. 8.20 per cent of the food of this bird.

It is shown in this report that beetles compose the largest item in the food of the downy, amounting to 21.55 per cent for the year, of which 14 per cent are wood-boring larvae. It also shows that this woodpecker eats weevils, ants, grasshoppers (especially their eggs), cecropia pupae, caterpillars, flies, and a few millipeds, spiders, snails, etc. In this account the writer cites an unusual instance in which scale insects composed 93.10 per cent of the stomach contents of 10 downies collected in Maine during the month of March and concludes: "This would seem to indicate that where these insects (scales) abound, the birds collect and feed upon them exclusively."

Barber (1925) considers woodpeckers, especially the downy, the principal natural check on the ravages of the European corn borer. This imported pest winters in corn, sunflower, cocklebur and other weed stalks where it is safe from most other birds, as well as man.

The real reason that downies are sometimes found at recent sapsucker punctures is that they are catching the insects that visit the punctures to drink the flowing sap. I recorded an instance in which I shot a yellow-bellied sapsucker while it was at work on a walnut tree, and returned in

time to see a downy alight where the sap was flowing. It did not attempt to drink the juice and after visiting the punctures hopped up the trunk, out on a limb to the small branches and flew away. While I was making notes of this incident another downy alighted at the same place and did almost exactly the same. I suppose that the conspicuous wet place on the tree, caused by the flowing sap, drew the downies' attention as they were flying past, and they alighted expecting to find ants, flies, and other insects feeding there. Many species of insects feed on the sweet sap of certain kinds of trees; but insects were not feeding in this instance.

"In more than fifty orchards which I, myself, have carefully examined, those trees which were marked by the woodpecker (for some trees they never touch, perhaps because not penetrated by insects) were uniformly the most thriving, and seemingly the most productive. Many of these were upwards of sixty years old, their trunks completely covered with holes, while the branches were broad, luxuriant, and loaded with fruit." (Reference lost; probably occurred in an old number of the Wilson Bulletin.)

I have often seen rings of old punctures on the trunks of apple trees which were supposed to be the work of the downy woodpecker, but I have never noticed any material injury or disfiguration as a result of these punctures. I regret the number of recorded instances in which "the downy was observed drinking the sap from punctures which it, or some other species of woodpecker, had made in trees," for I believe that the observers were either biased or hasty in determining just what the birds were doing. In this connection McAtee (1911: 94-95) says: "The writer has observed the downy woodpecker at work in suspicious proximity to fresh drills resembling those made by sapsuckers. But upon examination these were found to go barely through the outer bark and not to the sapwood as is true of sapsucker holes. Hence the punctures were not injurious. Whether or not the downy and other woodpeckers seek sap, it is beyond question that they are not important consumers of cambium since on the average much less than 1 per cent of this substance has been found in the stomach contents of any other woodpecker than the true sapsucker (*Sphyrapicus*)."

The contents of the 723 stomachs examined by the Biological Survey, to say nothing of the other data and testimony cited, show that the southern downy woodpecker is a most useful bird. Indeed, the only real fault to find with this bird is that, like the hairy, it is a disseminator of poison oak and poison ivy seeds. However, the farmer can cope with these noxious plants much more easily than he can destroy the borers and other harmful insects which make up nearly half the downy woodpeckers' food.

Dryobates pubescens medianus (Swainson).

DOWNY WOODPECKER. 394c

Picus (*Dendrocopus*) *medianus* Swainson, Fauna Bor. Am., II, 1831 (1832), 308. (New Jersey).

Range: Canadian and Transition zones of northern and central parts of eastern North America from southeastern Alberta, Manitoba, and southern Ungava south to eastern Nebraska, Kansas, and Potomac Valley, and in mountains to North Carolina.

The distribution of the downy woodpecker in this State is very uncertain. Since I have no specimens at hand, and I am therefore basing its

occurrence upon specimens collected near Minco, by Wetmore (1918), two taken by Linsdale in Creek County, Dec., 1921 (Nice and Nice, 1924), and other references, cited in the general discussion of the occurrence of downies in Oklahoma and adjoining States in connection with the description of the southern downy, I no not feel justified in discussing this subspecies any further. However, this is an appropriate time to state that I am in accord with Dr. A. Richards in believing scientific breeding would show that *D. p. pubescens* is our only form of the downies. If it were practical to take a pair of *D. p. medianus* and breed them in one flying cage and also breed a pair of *D. p. pubescens* in another cage, with food and all other circumstances equal, I think that the F_2 generations would be so nearly identical that any "hair splitter" would gladly refer them to a single species.

Dryobates borealis (Viellot).

RED-COCKADED WOODPECKER. 395.

Picus borealis Viellot, Ois Amer. Sept., II, 1807 (1809?), 66 pl. 122. ('Dans le nord des Etats-Unis.' Southern States.)

Phrenopicus borealis Viellot was used by Dr. Oberholser when he identified a specimen which I sent to him, and by Ridgway (1914: 269).

Range: Austroriparian Zone of South Atlantic and Gulf States north to Southwestern Virginia, Tennessee, and southern Missouri, and casually to New Jersey.

Reported only from the eastern part of the State, where it is probably an uncommon resident.

The specific name, *borealis,* is derived from the Latin adjective *borealis,* northern. Dr. Coues, (1896) points out that this term is "inappropriate for a U. S. species."

Calls: "Their notes are harsher than those of the downy and have more nasal quality, like those of the nuthatches." (Reed, 1911).

Description of Species

Male: "Length (skins), 181-203 (192); wing, 94.5-126 (118.7); tail, 69.5-81 (75.5) [mm.].

Female: "Length (skins), 174-203 (192); wing 114-126 (118.9); tail, 70-81 (75.5) [mm.]. . . . " (Ridgway, 1914).

Male and Female: "Length 8.00-8.50; extent 14.00-15.00; wing 4.500; tail 3.25-3.75" (Coues, 1896).

A female collected by the writer, in Pittsburg County, has the following measurements: Length, 8.63; extent, 16.00; wing, 5.12; bill, 0.85; head, 0.95; tarsus, 0.85; tail, 3.50.

Male: The colors of the male are said to be essentially the same as those of the female, except that in the former there is an obscure red streak between the white of the side-head and the black crown.

Female: The following description is of the Pittsburg County female and in all respects it is in accord with the descriptions of this species. This individual resembles the ladder-backed woodpecker more than any of our other forms, but it is larger and has the white of the underparts reduced by being spotted anteriorly and finely barred posteriorly with dark brown. The back lacks the broad white zone of the hairy, and the entire

upper surface of the body and wings is dark brown to black, barred and otherwise marked with white.

The whole top of the head, lores, back of the neck, and malars are jet-black. The black of the malars extends along the side of the neck and fuses with the black of the hind-neck, then spreads over the sides of the breast in the form of irregular elongate spots, which in turn merge with the irregular bars of the flank and belly. The auriculars and sides of the hind-head, a short line above the eye, the chin and throat are pure white, but the pure white of the throat becomes soiled on the breast.

The bill is shorter than the head and is about the same form as that of *D. v. villosus,* but is more pointed than is usually the case in the latter; the upper mandible is slightly longer than the lower (as often occurs Sphyrapicus), and the soiled white nasal feathers are softer than in *D. v. villosus.*

The head is longer than the bill, and has the whole top, malars and side of the neck jet-black; the auriculars and part of the loral region are included in a broad silky-white band which broadens on the neck and side of the head and is lost in the black occiput; the chin and throat are white. The black of the malars continues down the sides of the neck where it becomes brownish-black and is then scattered into irregular spots on the sides of the fore breast, and merges with the bars on the flank and belly.

The wing is pointed by the third true primary and is a brownish-black color with white markings which take the form of irregular spots on the coverts and primaries and of true bars on the secondaries.

The tail is black and has the three outer feathers more or less white. The first, or rudimentary pair is white with an irregular black basal blotch, which is mostly the inner vanes; second pair with outer vanes mostly white and inner vanes mostly black; the third pair is black with only a lateral streak of white on the outer vanes near the ends. The others are entirely black.

Young: Ridgway (1914: 269) states that the young male is essentially like the adult female, but has a red spot in the center of the crown and narrow streaks of white on the forehead. The young female is similar to the young male, but has no red on the crown.

This is probably the "ladder-back" woodpecker which has been reported from the southeastern part of the State occasionally. The red-cockaded woodpecker surely is not common even in the eastern counties, for the writer spent most of the spring, summer, and fall of 1914 collecting birds in those counties which lie south of Haskell and east of Grady and Stephens and saw only two of these birds, one of which he collected. These two were seen in Pittsburg County, during March and on different days, in the pine timber. It seemed, from my meager observations, that this bird is primarily a pine-woods dweller, although I observed it feeding in oak trees. In one instance I saw one of these individuals fly from a pine to an oak tree, where it continued feeding.

Dr. L. B. Nice seems to have good grounds for quite a different opinion as to the occurrence of this woodpecker in Oklahoma, for Mrs. Nice informed me that on July 5, 1920, he observed six of these birds in one flock, near Nashoba, in Pushmataha County, and a single bird near Cedar Creek, on this same day. Mrs. Nice saw one in Leflore County five

days later. (Cf. Nice and Nice, 1924: 51). She also advised me of a specimen in the National Museum, number 87, which was collected September 10, 1892, by E. A. Preble, near Red Oak, Latimer County, Oklahoma. Ridgway, in Birds of North and Middle America, includes "one adult female from Indian Territory" in a list of these woodpeckers from different localities. This is probably the specimen which Mr. Preble collected.

Like the downy, the red-cockaded woodpecker usually alights low on a tree and walks up as it feeds. Its flight is more like that of the yellow-bellied sapsucker than that of the downy or hairy.

Audubon (Davie, 1900: 265) "found these birds mated in Florida as early as January, and engaged in preparing a breeding place in February. The nest, he states, is not unfrequently bored in a decayed stump. In Georgia and other localities this bird excavates a nesting cavity in tall pine trees, living or dead. The eggs range from three to four in number, rarely more, glossy-white; size 0.9x0.68."

It is probable that from an economic point of view the red-cockaded woodpecker ranks about the same as the hairies and downies, although its food and feeding habits have not been investigated as thoroughly as have those of these birds. The stomach of the female collected in Pittsburg County contained only animal matter, mostly coleoptera and ants.

The Biological Survey (Beal, 1912) found that ants compose 56.75 per cent of the animal diet of this woodpecker. Seven of the 76 stomachs examined contained useful beetles (carabids), but only to the extent of 0.53 per cent; while other beetles and wood-boring larvae amounted to 10.49 per cent of the annual diet. These woodpeckers had eaten scales, a few grasshoppers, termites, caterpillars, crickets, oötheca of cockroaches, and spiders.

"In the investigation of this bird's food 76 stomachs were available, taken in the four States of Alabama, Florida, Louisiana and Texas. They were collected in every month except June and July. Of the total food 81.06 per cent was composed of insects, and the remainder, 18.94 per cent, of vegetable matter, mostly seeds of conifers."

Although Beal (1912) reports the finding of fruit pulp in 5 and a small amount of cambium in 4 of 76 stomachs examined, it is highly probable that the fruit pulp (which was not further identified) was of wild species, hence of little or no ecomomic importance. It is also probable that the cambium had been swallowed accidently during the process of excavating and devouring ants and wood-boring larvae. The record does not show whether these 4 stomachs contained injurious insects, as well as cambium.

Dryobates scalaris symplectus Oberholser.

CACTUS WOODPECKER. 396

Picus bairdi Malherbe, Monogr. Picidées, 1861?, 118, pl. 27, figs. 7, 8. (Mexico).

Range: Lower Sonoran desert region from southeastern California to central Texas and from southern Nevada, Utah, and Colorado south to northern Mexico.

Known to occur only in western part of this state, not common.

Description of Species

The following description is of a pair of specimens which were col-

lected in Greer County, July 22, 1901, by Van Vleet and Bunker, and identified by Dr. Oberholser in 1921-22 as *D s. symplectus* (*D. s.* cactophilus):

Male: Wing 4.00; tail 2.65.

Female: Wing 3.80; tail, 2.25 (About half an inch of the tail feathers have been worn off.)

The general color of the ventrum is soiled white with the lateral feathers splotched or barred with dusky. The back is alternately and irregularly barred with white and dusky. The crown is red in the male and black in the female. The tail feathers of this female are worn off about half an inch, while those of the male are only slightly worn.

The bill nearly equals the head in length and resembles that of the hairy woodpecker more than that of the downy, though intermediate in length and basal depth.

The head has the auriculars and post-occular region and a broad line, low on the malars and extending backward, which joins the post-occular on the side of the neck, blackish; thus forming a blackish triangle with a white center. The chin, throat, malars, and superciliary are soiled white. The superciliary extends backward along the side of the neck, where it broadens abruptly and joins the "ladder-back."

The feathers of the crown and forehead are dusky basally, then white and tipped with red, which is about the shade of that on the head of a red-bellied woodpecker. This gives the crown a red speckled appearance, with red predominating. The feathers at the base of the upper mandible and the nasal feathers are faded brown. The base of the head bears a broad, black inverted triangle which has its apex on the neck.

The wing is very dark brown in color, profusely marked with white spots which are most numerous on the outer margins of the covert and flight feathers and are arranged so that they form broad white lines across the spread wings. These spots are obscure on the tips of the primaries, especially on the first true primary where they are entirely wanting on the distal third of the feather.

The tail has the four middle feathers entirely black, outer four nearly white, barred and basally marked with black; the other pair is black with the narrow margin of white on the outer vanes extending to the tip.

The plumage of the female is essentially the same as that of the male, except that the top of the head is black instead of red.

The identity of the ladder-backed woodpecker which occurs in Oklahoma is uncertain in all literature prior to about 1912. This perplexing situation is largely due to the confusion of names, which was not remedied until the decision of the A. O. U. Committee on Nomenclature was published in the July number of the "The Auk," 1912. Oberholser (1912) describes fifteen forms of the ladder-backed woodpeckers (*Dryobates scalaris*) (Wagler) extending from Utah, Colorado and southern Kansas south to Honduras. Of these fifteen forms only one, *D. s. sympectus* (*D. s. cactophilus* should be found anywhere along the western and southern edges of Oklahoma according to Oberholser's chart, in which its range extends from Oklahoma southward well into Coahuila, Mexico, thence southeast to the Gulf of Mexico. Now, since the range of *D. s. simplectus* (Oberholser, 1912) well includes the locality from which the specimens used by Coues (1896) in writing the description of his Texan woodpecker, *Picus scalaris*,

were collected and since the range of *D. s. symplectus* (A. O. U., 1912) includes all the U. S. territory attributed to *D. s. cactophilus* and *D. s. symplectus* in Oberholser's chart and agrees fairly well with that of *Picus scalaris* (Coues, 1896), the writer considers these three names synonymous, and understands *D. s. cactophilus* to have been discontinued in the 1912 Check-List.

Van Vleet (1901-02) lists the "Texan woodpecker (*P. scalaris*)" as having been collected in this State, while Stevens (1912) lists the "ladder-back (*D. bairii*)" as an Oklahoma bird. Both of these citations are referable to *D. s. symplectus*. Tate (1923) states that it is a "year around resident, more numerous in summer. Nest with three eggs and one young bird seen June 29, 1913, on C. F. Rowan ranch." Mrs. Nice told the writer she saw a female cactus woodpecker at Kenton, Cimarron County, May 30, 1922; and that R. C. Tate reported a pair nesting, June 1916, 18 miles east of Kenton.

Since we have only a single pair from Oklahoma and only two other specimens from Old Mexico in our collection, I shall quote Coues (1896) for a more complete description of the species:

"Entire back, from nape to upper tail-coverts, barred across in black and white stripes of equal width; a narrow space on the back of neck, upper tail-coverts, and 4 middle tail-feathers, entirely black; wing-coverts with a round white spot at end of each feather, and hidden spot or pair of spots farther along the feather. Primaries regularly marked with white spots in pairs on the edges of the webs, those on the outer webs small and angular, on the inner webs larger and more rounded; on the secondaries these spots change to broken bars; so that primaries and coverts are spotted alike, the secondaries and back barred alike. Crown black, speckled with white, in the male extensively crimson; the feathers being black, specked with white, finely tipped with red, which becomes continuous on the hind head, where the white specks cease. Side of head white, with a long black stripe from bill under eye, widening behind, there joining a black post-ocular stripe and spreading over side of neck. Nasal feathers smoky-brown. Under parts ranging from soiled white to smoky-brown, with numerous black spots on sides, flanks and crissum; lateral tail-feathers perfectly barred with black and white in equal amounts. Female lacking red on crown. Small: length 7.00-7.50; extent 13.00; wing, 3.50-4.50; tail 2.75-3.00; bill, 0.66-0.87. . . . It is obviously impossible, in the cases of these profusely spotted woodpeckers, to frame a description which will meet every case without being too vague, or going into tedious particulars. The foregoing taken from Rio Grande specimens, covers the usual style of the species as found along our southern border; but the student must not be surprised if I fail to account for every spot of the particular specimen that he has in hand."

The Biological Survey examined the stomach contents of 14 cactus woodpeckers and found that 92.07 per cent was animal food. "The Texan woodpecker shows the ruling characteristic of the genus in its food, for the largest item is wood-boring beetle larvae. Caterpillars are second in importance, and include a number of cotton worms (*Alabama argillacea*) which were found in some stomachs collected in Texas. Ants are next in rank, and these items make up the bulk of the food." (Beal, 1912: 63).

Genus SPHYRAPICUS Baird.

Sphrapicus Baird, Re. Expl. & Surv. R. R. Pac., IX, 1858, 101. Type, by orig. desig., *Picus varius* Linnaeus.

General Characters: Rather smaller than the hairy; bill often with upper mandible longer than the lower, and not so stout as in the hairy; tongue not so extensile as in *Dryobates* and has the tip bushy instead of spear-pointed.

SPHYRAPICUS VARIUS VARIUS (Linnaeus).

YELLOW-BELLIED SAPSUCKER. 402.

Picus varius Linnaeus, Syst. Nat. ed., 12, I, 1766, 176, (Carolina).

Range: Eastern North America. Breeds in Canadian and upper part of Alleghanian Zone from southwestern Mackenzie, central Keewatin, central Quebec, and Cape Breton Island, south to central Alberta, northern Missouri, northern Indiana, northern Ohio, North Carolina (mountains), and Massachusetts (mountains of northern Berkshire County); winters from Pennsylvania and Ohio Valley (casually further north) to the Gulf coast, Bahamas, Cuba, western Mexico (Jalisco), and Costa Rica; casual in Wyoming.

The yellow-belly is a fairly common winter resident in Oklahoma, arriving in October and leaving in April.

Local Names: Squalling woodpecker, red-throated woodpecker, whining woodpecker, yellow-bellied woodpecker, red-throated sapsucker, and sapsucker.

The generic name of this woodpecker, *Sphyrapicus*, is a compound of a Greek word "sphura," a hammer or chisel, and Latin word, *picus*, a woodpecker; while *varius* is a Latin adjective and means variegated. The variegated hammer-woodpecker is a rather presumptuous name for a "cambium-eating, sap-sucking bird."

Description of Species.

Male: Length, 8.50; extent, 15.50; wing, 5.; bill, 1.; head, 1.; tail, 3.25; tarsus, 0.80.

Female: Length, 8.40; extent, 14.50; wing, 5.; bill, 0.95; head, 0.95; tail, 3.15; tarsus, 0.80.

Male: The general color-pattern of the adult male yellow-bellied sapsucker, is as follows: Crown, forehead, chin, and throat bright red; occiput, orbital and malar regions, scapulars, and chest patch blue-black; upper parts black, irregularly tinted with yellowish or brownish-white along the back. Clearer, larger and more pronounced areas of white occur on the side of the head and on the wings; under parts soiled yellowish to brownish-white on the belly, and extending anteriorly as broad yellowish lines along the sides of the black chest patch and fusing with the clearer white naso-auricular line on the sides of the neck. This line cuts off the conspicuous black patch from the black scapular region. The feathers of the sides and under tail-coverts bear more or less triangular pointed, blackish subterminal markings and soiled grayish edgings.

The bill is much more slender than that of the hairy woodpecker, with the culmen nearly straight, gonys tapering upward to form the point, and nasal ridges extending only about half way to the end of the polished beak.

The tip of the upper mandible projects beyond the end of the lower in five of the eleven specimens at hand. The nasal feathers are scanty and scarcely cover the nostrils.

The head of this sapsucker is gayly bedecked with red, black, and white; the red crown, forehead and throat are bordered narrowly laterally and anteriorly, and broadly posteriorly in each case by continuous black lines and black areas. The black lateral border of the top of the head begins in front of the eye where it broadens perceptably and divides, one limb passing above the eye and rapidly broadening medially forms the black nuchal region, while the other after nearly enveloping the eye, continues backward and downward as a broad line just above the auriculars and widening on the neck finally envelops the scapular region and sides of the forebreast. A broad white postocular line separates this line from the black border of the crown and in turn is joined with its fellow of the opposite side by a soiled bar which crosses the nape at the posterior border of the black occiput. Another black line extends from the gonys along the maxillary region down the side of the neck, where it becomes greatly enlarged and extending medially forms the black chestpatch. Thus the red throatpatch like the red crown and forehead, is encircled with black. The white border of the black occiput, continuing posteriorly, loses its identity in the soiled yellowish-white marking on the back and becomes clearer white and more conspicuous on the rump. Another broad white line embraces the nasal feathers and passing backward below the eye and over the lower border of the auriculars broadens on the side of the neck where it is confluent on either side with the yellowish-white border line of the black chestpatch.

The wing is pointed by the third, fourth, and fifth primaries. The third is longer than the fourth, which in turn is longer than the fifth; the second and sixth are about the same length, while the first is markedly reduced. The general color of the wing is black with a broad white patch on the coverts and with round or crescentic white spots along the vanes of the flight feathers. The middle pair of feathers have long slender points and are black and white. These and the next two pairs have the points black. The other two pairs are lightly tipped and partly edged with white, while the rudimentary pair is entirely black.

The hind toe is only about half the length of the inner, while the outer toe is not so long as the middle, as is shown by the following measurements: Third or middle toe 0.64, with claw 0.88; fourth or outer toe 0.59, with claw 0.80 inches.

Ridgway (1914: 275) states than in autumn and winter the plumage of the adult male is "similar to the spring and summer plumage, but the lighter-colored markings of back and scapulars and color of nape light yellowish olive or buffy yellowish brown instead of white, yellow of underparts deeper, and sides light brownish instead of whitish; bill more brownish."

Female: The plumage of the female differs from that of the male in having a white instead of red throat patch, and occasionally in having the red of the forehead and crown partly or entirely replaced with black or dusky brown.

Young: The young of either sex may have the whole of the exterior

part of the body, including the crown, brownish, or in any intermediate stages between this and the adult condition.

A female of the yellow-bellied sapsucker, collected by the writer, February 26, 1921, has the crown, forehead, and even the sides of the head to the nasal feathers, deep irridescent black with only the extreme tips of four feathers of the crown, red. There is a well-defined throat patch, though the black feathers are somewhat obscured by yellowish tips. In all probability, this individual was hatched the previous season. However, the chest patch is brown and is not well defined in three other specimens before me of the same sex, which I collected in January and February, and which have the major portion of the forehead and crown red. Another female, collected October 22nd, has the whole top of the head, the neck, the breast, and sides brownish with no trace of the chest patch, which is so conspicuous in the adults. She has only a few feathers on the top of the head that show any black. The color of the wings and tail, as well as that of the rest of the body plumage is like that of the adults.

From the specimens in hand it is evident that female birds pass through a series of transitional stages in which the top of the head is first brownish, then intermixed with black feathers; then red feathers begin to appear among the black ones on the forehead and crown. After this the black of this region (when present) is replaced by red and the remainder forms the black lines and black occiput of the adult. That this rule is often broken is shown by one of the five immature females collected Jan. 10, 1914, which has the whole forehead and crown brownish sprinkled with red, while some of the feathers of the nuchal region are brownish and others black. Another of this sex, collected October 22, 1914, and referred to in the above paragraph, confirms this rule by having the whole top of the head brownish with only a few feathers that show black, and only four frontal feathers that show even a tint of red.

Ridgway (1914: 275) in speaking of the development of the plumage of the immature male says: "The red of the adult plumage appears in scattered feathers on forehead and crown before any black feathers are acquired on the chest or malar region, and also on the throat. . . . "

The yellow-belly is not known to nest in this State.

The Biological Survey (Beal, 1912: 29) examined the contents of 313 stomachs of the yellow-bellied sapsucker, "collected in 24 states, Canada, and the District of Columbia, and distributed over 12 months of the year. Of this food 49.31 per cent is animal matter and 50.69 vegetable. This is the first species discussed in which the vegetable part of the diet is greater than the animal."

The two principal items of vegetable food are fruit and cambium. Twenty-two species of wild fruit were identified. The total of the fruit is 28.06 per cent of the food but evidently has little economic interest. The apple was probably the only cultivated variety and this was eaten only twice. Cambium or the inner bark of trees, was eaten every month, but mostly in winter and spring. The greatest consumption was in April, 48.85 per cent, and the least in November, 1.53 per cent. It was found in 127 stomachs and comprised the entire contents of 12. The average for the year is 16.54 per cent, which is exceeded by only two items—fruit and ants.

With regard to the damage done to trees by sapsuckers Beal and McAtee (1912: 13) state: "Sapsucker pecking disfigures ornamental trees, giv-

ing rise to pitch streams, gummy excrescences, and deformities of the trunks. Small fruit trees, especially apple, are often killed, and whole young orchards have been destroyed by these birds. Sapsuckers are known to attack no fewer than 258 kinds of trees, shubs, and vines in the United States, 63 of which are often seriously injured and 32 have been killed."

Weed and Dearborn (1903: 191) state that the yellow-belly seems to feed its young with "both sap and insects."

McAtee (1911: 55) states that although all trees which are attacked by sapsuckers do not die many are seriously injured or killed. "The owners of such trees have every right to protect them and should be given legal right to do so." Beal and McAtee (1912: 15) give directions for preparing and applying poison for sapsuckers.

I have seen very few instances of the work of sapsuckers sufficiently serious to threaten the life of a tree in this State, nor have I heard any reports to this effect. However, if these birds become numerous they will surely become as destructive here as elsewhere. The grave danger in declaring war on sapsuckers is that more downies and hairies will be killed than sapsuckers, unless the killing is done entirely by experienced ornithologists.

SPHYRAPICUS VARIUS NUCHALIS Baird.

RED-NAPED SAPSUCKER. 402a.

Sphyrapicus varius var. *nuchalis* Baird, Rep. Expl. & Surv. R. R. Pac., IX, 1858, 103. (Mimores River, New Mexico.)

Range: Western North America. Breeds in Boreal and Transition zones from central British Columbia and southern Alberta south to northeastern central Mexico; casual in Kansas and southern Lower California.

The red-nape is probably an uncommon migrant in the western part of this State. The writer knows of only one instance of its occurrence in Oklahoma.

Description of Species.

Male: The male of this subspecies is about the same size as the male yellow-belly wing, 121-130 (127.5) in the former and 120-130 (124.1) in the latter (Ridgway, 1914: 279). Our Oklahoma specimen has the following measurements: Wing, 4.80 (121 mm.); tail, 3.29 (83 mm.).

Female: The female red-nape is possibly slightly larger than the female yellow-belly. Average wing length in the former, 128.1; in the latter 124.3 (Ridgway, 1914: 279).

Male: The male red-nape differs from the male yellow-belly chiefly in having the narrow white band on the nape, which is also posterior to the black occiput and connects the broad white post-occulars, red. However, Ridgway (1914: 279) states that there is much less white on the back, "under parts less strongly tinged with yellow, and wing and tail averaging decidedly longer; adult male with red of throat more extended, both laterally and posteriorly, covering malar region, except anterior portion, where meeting white sub-auricular stripe."

Female: Ridgway (1914: 279) says: ". . . adult female with at least lower half of throat red (sometimes whole throat red, only the chin being white.)"

Young: Ridgway (1914: 279) states ". . . young much darker above than corresponding stage of *S. v. varius*, the pileum uniform dark sooty slate, white markings on back less brownish gray or grayish brown (instead of buffy brown), and usually less distinctly barred or lunulated with dusky."

The single Oklahoma specimen, a male, of the red-naped sapsucker, which is in the University Museum, is the only specimen of this species that has ever been recorded as having been collected in this State. I secured this specimen March 23, 1914, while collecting birds in Latimer and Pittsburg Counties. Sometime after this I sent the specimen to Dr. Oberholser who identified it as *S. v. nuchalis.*

Goss, (1891: 331) says that it is a rare migrant in the western part of Kansas, and further states: "I have meet with the birds but twice in the State, each time on the south fork of the Smoky Hill River, near Wallace." Bunker (1913) lists the red-nape as a rare migrant in Kansas, but does not give the localities in which it was found.

The red-nape is not known to nest in this State.

The feeding habits and economic relations of the red-nape are about the same as those of the yellow-belly. Its damage to trees is probably not so noticeable or so wide spread because it is more limited in its range in arable country than the yellow-belly.

Genus PHLOEOTOMUS Cabanis & Heine.

Phoeotomus Cabanis & Heine, Mus. Hein., IV, ii, 1863, 102. Type, by orig. desig., *Picus pileatus* Linnaeus.

Size large, decidedly the largest Oklahoma species.

PHLOEOTOMUS PILEATUS PILEATUS (Linnaeus).

PILEATED WOODPECKER. 405.

Picus pileatus Linnaeus, Syst. Nat., ed. 10, I, 1758, 113. (Carolina).
Hylotomus pileatus, (Coues, 1896)

Range: Austroriparion forests of southern United States from North Carolina south and west to middle Texas and western Oklahoma: casual in the Bahamas.

Rare except in the sparsely settled timbered regions.

Local Names: Log cock, wood cock, wood hen, Indian hen, cock-of-the-woods, and in McCurtain and Choctaw counties it is often referred to as a great god, good god, or lord god.

The generic name, "Phloeotomus" is derived from two Greek words "phloios," bark, and "tomos," a cutting, from "temnein" to cut or chop; hence a chopper or bark cutter. Pileatus is an adjectival form of the Latin noun pileus, a festival cap and no doubt refers to the flowing crest.

The call of the pileated woodpecker is a rapidly repeated "Cuck-cuck-cuck-cuk-kuk-kuk."

Description of Species.

Male: "Length, 15.00 to 19.00 inches, usually 17.00 to 18.00; extent, 25.00 to 30.00, usually 26.00 to 28.00; wing, 8.00 to 10.00 usually 8.50 to 9.00; tail, 6.00 to 7.00; bill, 1.50 to 2.00. Female averaging about 2 inches less in length than male, and other dimensions portionately smaller. Northern individuals averaging much larger than southern ones" (Coues, 1896).

An adult male collected in McCurtain County, December, 1922, has the following measurements: Length 17.50; extent 28.25; wing, 8.95; bill, 1.87.

Female: Length, 16.50; expanse, 27.00; wing, 8.63; bill, 1.75; head, 1.75; tail, 6.50; tarsus, 1.35. Three female Oklahoma specimens measure respectively 16.50, 16.50 and 16.00 in length; extent, 27.00, 26.25, and 26.50.

Male: This great woodpecker is easily identified in the field by its size, black and white coloration and conspicuously crested body. One is seldom able to get close enough to one of these birds to identify its color-pattern more than a general coloration of black with a brave show of white across the wings and on the head, which has a high, flaming scarlet crest.

The bill is very heavy and powerful, of a dark lead color (lighter on the mandible), and of about the same general form as that of the hairy woodpecker. The nasal tufts are coarse and rather scanty and lie closely over the nostrils.

The head has the whole top and malar stripe scarlet with the feathers of the occipital region long, thus forming a conspicuous crest. A broad white line extends from the nasal tufts under the eye and down the side of the neck to the fore-breast where it widens and fuses with the sulphur-white of the under wing coverts. The throat, short superciliary and obsolete post-ocular lines are also white. This iris is usually steel-gray, sometimes straw and in immature specimens it is light brown in color.

The wing is dull black with a large white space at the base of the remiges. Its underside is sulphury-white.

The tail is black, with the middle pair of rectrices noticably decurved near the tip.

The feet are ivory black, stout, and have the front of the tarsi and top of the toes covered with large rough scutella; and are said to be "peculiar; outer posterior toe shorter than outer anterior and the tarsus shorter than inner anterior toe and claw" (Coues, 1896).

Female: The plumage of the female is like that of the male, except that the crown and malars are dusky instead of red.

Young: The immature males show variations in the amount of red on forehead and malars.

The pileated is the largest woodpecker found in Oklahoma and is being rapidly exterminated by the westward march of civilization, which destroyed first the wild turkeys and then the pileated woodpeckers. This bird requires a wild woods with great trees for its nests and feeding range, hence when the timber is destroyed the birds leave without waiting to fall victims to man and his shotgun. Reliable men have told me that this handsome bird was found breeding within four miles of Norman as late as 1910 and 1911, and that the last straggler was seen in 1915.

In 1913-15 I found the pileated woodpecker in several of the eastern and southeastern counties of the State and in Osage, Kay, Pawnee, Murray, and Jefferson counties, but I did not find it farther west.

These woodpeckers are so wary that the writer has never seen more than four of them in a single day's collecting trip even in some of the wildest woods in the State. Even in the early springtime when these giants make the deep wild woods ring with their resonant tat-too-ing lusty cries, it is very difficult to get a good view of one of them. The writer has spent

hours to learn the sex of the noisy birds, and in general why they tat-too to each other; but on account of the extreme wariness of the bird and the fact that one or both of them remained in the place only a few minutes and that they were often half a mile apart, with occasionally a large creek or river between them, the observations were never conclusive. One morning I heard two of these birds calling and tat-tooing to each other from a distance of about 300 yards, and since my position was nearly midway between them I concealed myself and waited. Soon one started toward the other. I could hear its ringing "Cuck-cuck-cuck-kuk" as it flew from tree to tree and I reasoned, therefore, that the bird would pass close by me if it held its present course. In a few minutes it alighted on a tree very close to me, so close that I dared not shoot for fear of mutilating the specimen, which was a female.

The ability of the pileated woodpecker to locate a borer deep in the tissue of a tree is remarkable. In a number of instances I have seen where this bird had bored a comparatively small hole through from one to one and a half inches of solid green wood and then through from two to five inches of dead wood and extracted a borer from the very heart of the tree. Such precision as this is truly remarkable. Not uncommonly, however, these excavations are two inches wide by five long and three to seven deep. These giant woodpeckers simply demolish old rotten logs and stumps in search of the large larvae of stag-horn beetles and do not overlook ants and other insects.

"In the Yosemite National Park where shooting is forbidden the pileated, instead of being one of the shyest of birds, is one of those most in evidence, and as you drive by actually makes itself conspicuous by flying freely among the trees so near that you can see his brilliant red head and the white spots on his wings while he utters his loud ringing Chuck, Chuck, Chuck, Chuck, Chuck, Chuck" (Bailey, 1915).

A nesting cavity excavated in an elm, in Murray County, was about 35 feet from the ground. This cavity had been made in the living wood and its great size was suggested by the quantity of chips which fairly covered the ground.

"The nests of the Cock-of-the-woods show their power more than their borings, for they are cut into the solid trunks of live trees. The cavity goes back about six inches and then down a foot and a half, and the large white eggs rest on a bed of clean fresh chips. The same tree is often used year after year but never the same hole. A fresh one is excavated each year and the old ones left for occupation by saw-whet owls, wood ducks, and flying squirrels" (Bailey, 1915).

Coues (1896) states that "the taking of eggs is something of an exploit;" owing to the height of the nesting cavity which is often as much as eighty feet. He further states that the eggs of the ivory-bill and pileated woodpeckers are relatively smaller than those of the flicker, because the body of the flicker is heavier in proportion to its total length than is the case in the other species, and that the size of the egg bears a relationship to the bulk of the body rather than to the length of the bird. "The three to five eggs are glossy or china-white and average about 1.30x1.00 inches." (Davie, 1900).

"In the laboratory investigation of this bird's food 80 stomachs were available. They were collected in 14 States, the District of Columbia, and

Canada, and are distributed in every month, though May is represented by only 1. The animal food amounts to 72.88 per cent and the vegetable to 27.12. The former consists principally of beetles and ants and the latter of wild fruits" (Beal, 1912: 33).

The stomach of a pileated woodpecker collected November 12, in Osage County, contained 80 per cent vegetable matter, chiefly green-brier or stretch berries (*Smilax* sp.) and 35 per cent animal matter, mostly ants and coleoptera. The stomach of another collected April 2, in Pittsburg County, contained one-half ounce of wood-borers of all sizes, a great number of which were only one-fourth inch in length, and remains of a few Coleoptera. The stomach of one collected in January, in Murray County, contained ants chiefly, and remains of a few coleoptera. These ants were probably *Formica pensylvanica*.

It lies within the power of the pileated woodpecker to wreak considerable damage to timber and wooden structures but since it is a bird of the deep woods, and since it is being rapidly exterminated, it should be encouraged and protected by public opinion as well as by law.

Genus MELANERPES Swainson.

Melanerpes Swainson, Fauna Bor.—Am., II, 1831 (1832), 316. Type, by orig. desig., *Picus erythrocephalus* Linnaeus.

Somewhat larger than the hairy; conspicuously marked with black, white and red.

MELANERPES ERYTHROCEPHALUS (Linnaeus).

RED-HEADED WOODPECKER. 406.

Range: Transition and Austral zones from southeastern British Columbia, southern Alberta, Manitoba, and Ontario south to the Gulf coast, and from central Montana, central Colorado, and central Texas east to valleys of the Hudson and Delaware; rare and local in New England; casual in Arizona, New Mexico, Utah, Novia Scotia, and New Brunswick; irregularly migratory in northern parts of its range.

Common summer resident, and an occasional winter resident, especially in certain parts of the State. I have seen individuals as late as the middle of November in the southeastern part of the State and as late as December in the Wichita Mountains. Howell (1911) states that it is an abundant resident in all parts of Arkansas.

Local names: Tricolor woodpecker, woodchuck, red-headed woodpecker, peckerwood and shirt-tail.

The scientific name of this bird, *Melanerpes erythrocephalus,* is a combination of four Greek words: "melas," black, plus "herpes," creeper; "erythros," red, plus "kephale," head. When all this is put together it means a red-headed black creeper.

The calls of the red-head are chiefly modifications of "Chur-r-r-r-r."

Description of Species

Male: Length, 9.50; expanse, 17.50; wing, 5.50; bill, 1.00; head, 1.15; tail, 3.38; tarsus, 0.88.

Female: About the same size. The length of this bird ranges from 9.25 to 10.00 inches.

"Length, adults, 9.70" (Chapman, 1903); "Length, 8.50 to 9.50; extent,

16.00 to 18.00; wing, 5.00 to 5.50; tail, 3.50; bill, 1.00 to 1.12; whole foot, 1.67." (Coues, 1896).

Male: Under parts white, sometimes lightly tinted with red on the belly; back, scapulars, tertials and lesser wing coverts iridescent blue-black; upper tail coverts white. Black, white and red are the predominating colors.

The bill has a length slightly less than that of the head, and is dark horn in color.

The head and neck are red, the former has no topknot.

The wing is black, excepting that the vanes of the posterior half of the secondaries are white with black shafts; pointed by second, third and fourth true primaries.

The tail is more than half as long as the wing; black and has the outer two true rectrices tipped with white; the first is pure white with a black shaft.

Female: The plumage of the adult female is like that of the adult male.

Young: The plumage of the young is entirely gray when it leaves the nest, but later becomes mottled with dusky, except that the tail is black; middle rectrices have long linear points; the white of the secondaries is more or less barred with black. The tail may be tipped with white. This plumage gradually attains the colors and luster of that of the adult, exhibiting various degrees of mottling and splotching in intermediate age-stages of the bird. This is especially true of specimens collected during August and September. It is generally supposed that the red-head attains its adult plumage when one year old; however, the writer believes that this is not entirely true; rather that a minimum of ten months and a maximum of fourteen months is required to develop the adult plumage. A specimen in our museum, collected March 19, has the head and neck red, forehead and crown gray, and black bars present on the white secondaries.

The red-headed woodpecker is a bird of dead trees, church steeples, telephone and telegraph poles. It is most abundant in the timbered sections of the eastern part of the State where the land has been partly cleared and cultivated, leaving the dead trees standing. These trees do double duty in affording nesting and feeding places for the birds, while the abandoned excavations afford nesting places for blue birds.

A cold snap came the night of October 12, 1914, and continued for four days, and during this time I did not see a red-head, although I saw several on the twelfth and sixteenth of this month. They must have retired to their excavations, for I was in the woods every day observing birds and made a special effort to find woodpeckers.

This bird has some queer habits, for instance it seems to notice so many things that the hairies and downies are oblivious to. When approached, one of these little woodpeckers will either take no notice of the intruder or will fly, but the red-head will often slyly sidle around the tree, or more often a telephone pole, and watch the intruder intently from concealment. This species is often very noisy, especially so when two of them get into an "argument" when they scold and gesticulate as if they were discussing the election of a president of the woodpecker family. Oftimes one will peck away on a resonant object, such as a tin roof, dead limb, or nailhead in a building and listen for his neighbor to reply, often uttering a rolling "Chur-r-r-r-r" between spasms of pecking.

"The red-head is an abundant resident in all parts of the State (Arkansas) and especially favors cultivated lands containing much dead timber. Irregularly migratory in the northern parts of its range, it is found in Arkansas throughout the year, and is perhaps more abundant in winter than in summer." (Howell, 1911).

In feeding the red-head habitually posts itself in the top of a dead tree, on a telephone pole, or in some similar point of vantage, from which he can fly out and seize any insect that may chance by. That this bird exhibits little or no preference in selecting its winged food is shown by the fact that it will often leave its perch and attempt to catch a small pebble which has been thrown near it.

The migrations of the red-head seem to be influenced by the presence or absence of beech nuts and other mast or wild fruits which hang on the trees and bushes during the winter, more than the absence of available insects.

The red-headed woodpecker excavates a hole in dead wood, often in telephone or telegraph poles and wooden structures, especially in agricultural districts where the farmers keep the dead trees pretty well used up for fuel, but normally it nests in dead trees, in dead limbs or in old snags. I know of only one instance in which this bird nested in green wood. This nest cavity was in a limb of a large black locust which from the ground had every appearance of being green and thrifty; however, it is possible that the interior was decayed. Each summer for three years, this excavation was the birthplace of a family of red-heads. The male and female are said to take turns in the labor of excavating the home. This species has been known to nest in the angle formed by the shares of an upturned plow or under house roofs on the treeless prairies (Davie, 1900). The five or six glossy-white eggs average about 0.78x0.99, and are deposited on a bed of fine chips at the bottom of the excavation.

Dr. Merriam has seen the red-head catch grasshoppers on the ground in a pasture, while Dr. A. K. Fisher saw this bird feeding on grasshoppers in the streets of Miles City, Montana, in July 1893, (Beal, 1912).

Dr. G. S. Agersbory, of Vermillion, South Dakota, writes: "One of them which had its headquarters near my house, was observed making frequent visits to an old oak post, and on examining it I found a large crack where the woodpecker had inserted about 100 grasshoppers of all sizes (for future use, as later observation proved), which were put in without killing them but they were so firmly wedged in the crack that they in vain tried to get free. I told this to a couple of farmers, and found that they had also seen the same thing, and showed me posts which were used for the same purpose. Later in the season the woodpecker whose station was near my house commenced to use his stores and today (February 10) there are only a few shriveled-up grasshoppers left" (Beal, 1912).

Besides taking fruit and grain, this woodpecker has been accused of destroying the eggs of other birds and even of killing the young; and from Florida and Ohio reports come that it enters poultry houses and sucks the eggs of domestic fowls. Mr. Charles Aldrich, of Webster City, Iowa, says that a red-headed woodpecker was seen to kill a duckling with a single blow on the head, and then to peck out and eat the brains. In view of such testimony, remains of eggs and young birds were carefully looked for in

the stomachs examined, but pieces of egg shell were found in only 4, (Beal, 1912).

Beal (1912) cites an instance in which the red-head fed so persistently upon the eggs of eaves swallows that no young were raised in a colony of a dozen nests.

Mr. Ben J. Melton, U. S. Biological assistant, in charge of the extermination of the prairie dogs in this State, told me that he has seen red-heads that had died from eating poisoned grain which had been put out to kill these rodents.

One of three stomachs which I examined contained 25 per cent animal matter, chiefly Coleoptera; 65 per cent vegetable matter, chiefly dogwood berries. The other 10 per cent was not identified. The stomachs of the two others contained animal matter only, mostly beetles.

"In the food investigation of the red-head 443 stomachs were examined. They were collected in 27 States, in the District of Columbia, and Canada, and represent every month, though fewer were taken in the colder season, as the bird is inclined to migrate, and remains in the north only when an abundance of food is assured. Of the stomach contents animal matter amounts to 33.83 per cent and vegetable to 66.17," (Beal, 1912).

"As woodpeckers excavate holes in poles and fence posts, it is not surprising that they attack other wooden structures. The usual type of injury of this class is drilling holes into cornices or under eaves of houses or piercing the walls of barns and sheds.

"Buildings that are unoccupied most of the time, as schoolhouses and churches, are frequently defaced, church towers or steeples being favorite points of attack. The red-headed woodpecker is an old offender in this respect, and a case is recorded where in one season 22 of these birds were killed one after another while attempting to make a nest in a church steeple. During the caretaker's absence a pair finally completed a nest and reared their young.

"The prevention of damage by woodpeckers (except sapsuckers) rarely necessitates destruction of these birds. Moreover woodpeckers are so valuable as conservators of trees that the public should not be deprived of their services." (McAtee, 1911).

The writer visited a small country church in northern Texas which had recently been torn down, in which workmen assured him there had been 183 holes made by the red-headed woodpecker. Most of these were in the steeple, especially in the spire which was simply honey-combed with excavations.

Genus ASYNDESMUS Coues.

Asyndesmus Coues, Proc. Acad. Nat. Sci. Philadelphia, 1866, 55. Type, by orig. desig., *Picus torquatus* Wilson—*Asyndesmus lewisi* Riley.

Larger than the red-head; conspicuously colored with black and red; feathers of venter and collar coarse and bristly; wings, unusually long.

ASYNDESMUS LEWISI Riley.

LEWIS'S WOODPECKER. 408.

Asyndesmus lewisi Riley, Proc. Biol. Soc. Wash., XVIII, 1905,225 (Montana, about Lat. 46° N.)

Range: Transition Zone from southern British Columbia and southern Alberta to Arizona and New Mexico and from the inner coast ranges of

California to the Black Hills, South Dakota, and western Nebraska; in winter to southern California, western Texas, and Chihuahua, Mexico; casual in western Kansas.

An uncommon resident, probably restricted to the extreme western counties, possibly to Cimarron alone.

The generic name, Asyndesmus, is of Greek derivation, Latinized; "a," not, plus "syn," with, plus "desmos," bond; thus it means "without a bond," "not yoked," in allusion to the loose hair-like feathers of the ventrum; *lewisi* is the latinized possessive form of Lewis.

Description of Species

Male: Length, 10.50-11.50; wing, 6.50-6.80; tail, 4.40-4.70. Ridgway (1914) gives, wing, 162-180 (av. 173.6 mm., 6.85 in.).

Female: Ridgway (1914) gives, wing 164-175 (av. 169.3 mm., 6.65 in.). Mr. Tate* makes no difference in the measurements of the sexes.

Male: The general coloration is "upper parts, iridescent-greenish black, with the exception of the gray collar; face, dull crimson; throat and chest, gray, changing to a soft rose tint on the belly. The plumage of the lower parts is harsh and hair-like.

"The wide wings and short tail make it easy to distinguish this species at a considerable distance. The expression 'Crow-like' is very appropriate."*

Female: Plumage similar to that of the male.

Young: In the young the head is without red, and the neck is without the gray collar. The under parts are less red than in the adult.* Ridgway (1914) says of the young of both sexes: "Red of head replaced (except in transition plumage) by black or dusky, collar obsolete or wholly wanting, under parts mostly dull pale gray or dull grayish white and dusky (suffused, or intermixed in places with red), the feathers of softer and more blended texture; inner secondaries sometimes tipped with whitish; otherwise like adults."

In a recent letter Dr. Chas. W. Richmond, and Mrs. L. B. Nice called the writer's attention to an article in Sitgreave's "Report of an Expedition down the Zuni and Colorado Rivers," Senate Document. No. 59, Washington, 1853-54, pp. 58-105, in which Woodhouse refers to Lewis's Woodpecker as being "common in the Indian Territory and New Mexico." Goss (1891) states that Lewis's woodpecker was "taken at Ellis (Kansas), by Dr. Watson, May 6, 1878; one specimen was obtained from a flock of eight." Bunker (1913) collected a specimen in Douglas County, Kansas. Mrs. Nice reports having seen a pair about a nest hole near Kenton, June 1, 1922. So far as the writer is aware Mr. Tate is the only person who has even taken specimens of Lewis's woodpecker in this State.

Mr. Tate writes that he has seen seven or eight nesting pairs of Lewis' woodpeckers in Cimarron County, during the last twelve years. In each instance the birds were nesting from the first week in June to about July first to fourth. His measurements of the nest cavity are as follows: "Diameter, 2; depth, 5; and back 3 inches deep." No nest material is em-

*Mr. R. C. Tate, of Kenton, Cimarron County, who has made numerous observations, extending over some 12 years, on Lewis's woodpecker in the Panhandle of this State, generously loaned the writer his notes to use in the description of this species.

ployed, except fine chips, on which usually six to seven white eggs are deposited. Cottonwood trees, which were dead or partly dead, tall cedar fence posts, dead piñon, and willow trees were used as nesting places; usually where a limb had rotted off, though holes were frequently drilled into the trunk where no limb had been. The nest is placed from nine to one hundred feet from the ground.

Mr. Tate found that, ". . . . of a number of this species examined, grasshoppers, ants, beetles, flies, larvae, and crickets, and fruit made up its food in summer, and piñon seeds, larvae, and wood ants in winter. In Colorado I have seen them eat wild berries, and in this locality I have seen them on a few occasions, late in the fall, eating frost-cured wild grapes which had remained on the vines."

Beal (1912) reports that of 59 stomachs of the Lewis's woodpecker, examined by the Biological Survey, 37.48 per cent of the food was animal matter while 62.50 per cent was vegetable matter. Although these figures show the bird to have a low value as an insect destroyer, Oklahoma has little to fear from its fruit-eating habits, on account of its limited distribution.

Genus CENTURUS Swainson.

Centurus Swainson, Classif. Birds. II, 1837, 310. Type, by monotypy, *Picus carolinus* Linnaeus.

Intermediate in size between the hairy and red-head; upper parts conspicuously barred—"zebra pattern."

CENTURUS CAROLINUS (Linnaeus).

RED-BELLIED WOODPECKER. 409.

Picus carolinus Linnaeus, Syst. Nat. ed. 10, I, 1759, 113 (Carolina)

Range: Upper and Lower Austral zones of eastern United States from southeastern South Dakota, southeastern Minnesota, southwestern Ontario, western New York, southwestern Pennsylvania, and Delaware south to central Texas and the Gulf coast; casual north to Colorado and Massachusetts.

Common resident.

Local Names: Big "sapsucker," red-headed "sapsucker," zebra woodpecker, calico woodpecker, "ladder-backed" woodpecker, orange "sapsucker" and orange borer.

The etymology of this generic name shows how far-fetched some of the ideas of taxonomists are—"Centurus" is a combination of two Latinized Greek words, "kentron," a sticker or prickle, and "ouron," tail. One would expect a bird bearing this scientific name to have an exceedingly sharp tail, but on the contrary the tail of Centurus is no more pointed than that of any other normal North American woodpecker. Carolinus indicates that this is the Carolina woodpecker.

Calls: A rapidly repeated "Cha-chur-churr-r."

Description of Species.

Male: Length, 9.50; extent, 15.6; wing, 5.1; bill, 106; head, 1.15; tail, 3.37; tarsus, 087.

Female: Length, 9.25; extent, 16.; wing, 5.05; 3.35; bill, 1.05; head, 1.1; tarsus, 0.86; 3rd toe and claw, 1.05.

Male: The unique color-pattern and size of this woodpecker prevents its being confused with any other common Oklahoma form. The upper parts of the body and wings are black closely barred with white; top of head and nape red.

The bill is nearly straight, with both culmen and gonys tapering to form the point.

The head is grayish to cinerous on the sides and throat; nasal feathers, forehead crown, nape, iris, and often malars red. The breast is grayish or soiled white, obscurely washed with red anteriorly, and deepening on the belly. The tail coverts and crissum are nearly white and are irregularly marked with black, mostly along the shafts, however, these black areas assume the form of lateral bars in some of the feathers. The scapulars, wing coverts, secondaries, and tertials, as well as the back, are alternately banded with black and white; primaries black with white areas near the base. The second, third, fourth and fifth primaries are sinuated on outer vanes, which are white along the sinuated edges for nearly half the length of the feather, and have jet-black shafts. A broad white interrupted zone crosses the primaries just above the sinuations forming a well marked bar on the closed wings.

The tail is black and has the middle and outer feathers boldly marked with white. The rudimentary rectrix is tipped and laterally margined with white. The second rectrix is broadly tipped with white and has a subterminal bar and three or four angular white crescents on the lateral vane. The white tip is much reduced, when present, in the next succeeding feathers. In the middle pair the shafts, six short thick sub-ovate bars on the medial vanes, most of the lateral vanes, and the tips are black.

The feet are a dusky plumbous-greenish color which closely resembles the green of last season's growth on a box elder tree.

Female: The female differs from the male in color chiefly in having the red more restricted and less brilliant. The nape, occipital region, nasal feathers, and belly are red or reddish. The red of the belly and nasal feathers is obscure, while the crown, forehead and breast are dark cinerous and are wholly lacking in red.

Young: The young may be found in stages ranging from those much darker than an adult female, without any trace of red and with quite dusky shaft-lines in the contour, to near the coloration of the adult. In an immature female before me the red of the nape is more yellowish and more restricted than that in an adult female. While another young female, which had recently left the nest and was still dependent upon the parents for food, collected July, 1914, has the back imperfectly banded with black and white; under parts dusky-gray with dusky shaft-lines on the feathers. The area of the head which is red in adults is dusky with some of the nuchal feathers obsoletely tipped with grayish.

The red-belly is the shyest of our woodpeckers, excepting the great pileated, and is seldom seen in orchard or shade trees in Oklahoma. I have, however, occasionally seen and heard this bird among the trees on the University campus.

A pair of these woodpeckers habitually nested in a large oak, which is in the barn lot, at Buffalo Headquarters, in the Wichita National Forest and Game Preserve, where they were not molested. The red-bellied woodpecker is a resident of Oklahoma, and Beal (1912) states that it breeds as

far north as southern Minnesota, Michigan, New York, and southern Ontario, and that it sometimes appears to go north of its breeding range to spend the winter; also that while it seems to prefer deciduous growth in the northern part of its range, it is very common in pine forests in the south.

This woodpecker is an irregular migrant, moving from one locality to another when mast and wild fruits, its principal winter food, become scarce. It stores nuts and acorns in crevices in trees and other suitable places as do red-heads and certain other woodpeckers.

Mr. Frank Rush, then Supervisor of the Wichita Preserve, told the writer of a red-bellied woodpecker that had its nest within a few yards of an oak tree from which sap was flowing, and moths, butterflies, wasps and many other insects were feeding upon the sap and in turn were being fed upon by the woodpeckers. The parents fed the moths and butterflies to their young, but did not catch any of the numerous wasps.

"Prof. D. E. Lantz states that the species in the vicinity of Manhattan, Kansas, exhibits the same familiarity as shown by the Flicker, red-headed and downy woodpeckers. About a dozen nests were observed, the excavations ranging usually less than twenty feet from the ground. One nest in a burrow of a large dead limb of an elm tree was found May 10th. The birds were very much attached to their nests, so much so that in several cases it was necessary to remove them with the hand before the eggs could be secured. The eggs being taken, they almost immediately begin excavating another nest cavity for the second set, always in the vicinity of the first nest, often in the same tree." (Davie, 1900).

"Their nests are excavated in stubs and decaying trunks and branches of trees, ranging from fifteen to forty feet from the ground. Eggs, four or five, occasionally, six. A set of five eggs, collected April 14th, 1878, at Neosho Falls, Kansas, measure; 1.00x0.70, 1.0x0.71, 1.02x0.71, 1.02x0.74; pure transparent white, the air sac or circular spot at larger end chalky white; in form, rather elliptical to oblong oval. They were taken from a nest in the trunk of a small, leaning walnut tree, about thirty feet from the ground; entrance on the under side, a round hole just large enough to admit the birds, enlarged below from four to five inches and twelve inches in depth; a very roomy nest, no lining; eggs laid on the soft, rotten wood." (Goss, 1891).

The stomach of one collected by the writer October 21, contained black walnut kernels, Coleoptera and weed seeds. That of another collected just a month later contained only wild grapes and weed seeds. The stomach of a female collected February 26 contained about 70 per cent seeds and bits of acorns, 10 per cent of coarse sand, and 15 per cent of the remainder was made up of the remains of a spider and some beetles. A specimen, collected October 22, had eaten 90 per cent vegetable matter, chiefly acorns; 5 per cent sand, 3 per cent insects, and 2 per cent of its food was unidentified. Another taken April 17 in Jefferson County had eaten carpenter ants and pecan kernels. Two collected July 20th had eaten corn and insects, while another collected July 3, had eaten corn and a beetle.

This bird does some damage to corn ears in the "milk." This damage, however, is scarcely noticeable except in timbered regions, principally in the eastern part of the state where cornfields are small and are chiefly along the creek and river bottoms and tangent to woods. Beal (1912: 51), after examining 271 stomachs, 39 of which contained corn, is not in accord with

my observations, for he found that no corn was eaten "in the three summer months, April, or November. The great bulk was eaten the three winter months and in March and September." This difference in observations is probably not so important as it may appear, for such circumstances as climatic conditions, the presence or absence of other desirable foods, and the fact that I examined the contents of only 8 stomachs, as compared with the 271 stomach contents which form the basis of Beal's report.

A cornfield on the Kiamichi River bottoms showed plainly that birds as well as mammals had been feeding on the ears. I therefore collected two red-bellies in this cornfield, on July 20, and found quantities of corn husks, bits of kernels, silk, and remains of Coleoptera and other insects in their stomachs. The stomach of another collected July 3 near Hugo, contained corn and remains of one beetle. At this time none of the corn in the field was too hard for roasting ears, while many of the grains had not yet reached the "milk" stage. From my observation it seems that these birds prefer grains in the "milk" to those that are either less or more nearly mature.

"For the investigation of the food of the red-bellied woodpecker 271 stomachs were available. They were collected in 17 states and Ontario, and represent every month in the year, though but few were taken in June and July. In the first analysis the food was found to consist of 30.94 per cent animal matter to 69.96 vegetable. The former consists of insects and spiders, with a few tree frogs and lizards, while the latter may be considered as made up of grain, fruit, and mast." (Beal, 1912: 50).

Some of the important or interesting items noted by Beal (1912) in his analysis of the food of this woodpecker are ants, 6.45 per cent; beetles 3.62 per cent in January and increasing in quantity until May, when they reach the maximum of 27.57 per cent, then decrease in quantity to December when only 1 per cent are eaten. Grasshoppers and their eggs, crickets, oötheca of cockroaches, and one mantis constituted 5.83 per cent of the food. One stomach contained scales. Caterpillars, including a few larvae of wood-boring beetles, form 2.88 per cent of this bird's food. Nine stomachs contained remains of lizards (*Anolis carolinensis*).

The red-bellied woodpecker may occasionally excavate a nesting cavity in a telephone or telegraph pole; indeed, one was killed in the act of drilling the wooden casing of the University's elevated water tank, but the writer is of the opinion that these birds are not sufficiently numerous in Oklahoma to do much damage to wooden structures. In short it is doubtful whether they are of economic importance in this State from any point of view.

Genus COLAPTES Vigors.

Colaptes Vigors, Trans. Linn. Soc. Lond., XIV, Pt. iii, 1825, 457 (Note). Type by orig. desig., *Cuculus auratus* Linnaeus.

Bill, curved, and pick-pointed rather than chisel-pointed, no ridges on sides of bill; nostrils only partly concealed by the nasal feathers; shafts of flight and tail feathers, red, yellow, or intermixed; much larger than the redhead.

COLAPTES AURATUS AURATUS (Linnaeus).

FLICKER. 412.

Cuculus auratus Linnaeus, Syst. Nat., ed. 10, I, 1758, 112. (Carolina).

Range: Austroriparian Zone of South Atlantic and Gulf States from North Carolina and southern Illinois to southern Florida and central Texas.

Local Names: Golden-wing woodpecker, high holder, wickup, yellow hammer, clape, pigeon woodpecker, yellow-shafted woodpecker, yellow-shafted flicker, cuckoo woodpecker, and scythe whetter.

The generic name, Colaptes, is a Greek word, "kolaptes," a chisel or hammer; while the specific name, *auratus*, is a Latinized Greek noun, "aura," gold. Thus the name refers to a golden, or gilded, chisel or hammer.

Calls: The calls of the flicker are varied from "Chee-ah" and "Yuck-ah" to "Whic-ka-ah."

Description of Species.

Male: Length, 12.50; extent, 20.00; wing, 6.10; bill, 1.34; head, 1.50; tail, 4.50; tarsus, 1.25.

Female: Length, 12.25; extent, 19.00; wing, 5.85; bill, 1.25; head, 1.10; tail, 4.50; tarsus, 1.25; nostril, to tip of bill, 1.05.

A female which was identified by Dr. Oberholser, has the following measurements; length, 12.10; extent, 19.25; wing, 5.90; tail, 4.30; tarsus, 105; third toe, 0.85; third toe and claw, 1.06; bill, 1.57. Ridgway (1914) gives, male, wing, 144-154 (av. 149.9 mm., 5.85 inches); female, wing, 137-155 (150.5 mm. 5.86 inches).

Male: The general color of the male flicker is a variable brownish gray or drab; much lighter on the belly and breast where the feathers are profusely marked with large black polka dots and well defined black crescent on the forebreast. This bird is easily recognized while flying by its conspicuous white rump and the golden yellow of the under surface of its wings and tail. The sexes are distinguished by the male having the malars black, thus forming the so-called "moustache."

The bill of the flicker is not so straight and chisel-pointed as that of our other woodpeckers, but it is slightly decurved, more like the form of a coal miner's pick; sharply pointed; dull plumbeous brown in color with nasal feathers that cover the nostrils only scantily. The end of the upper mandible usually extends beyond the tip of the lower.

The head is about the same length as the bill; plumbeous on the forehead, crown and nape; the sides, chin and throat are olive-brownish. The region in front and behind the eyes is more brownish than elsewhere. The malar regions are quite black in "pure bred" individuals. A scarlet crescent is present on the nuchal region.

The wing is pointed by the third, fourth, fifth, and sixth primaries. The first or spurious, is less that half the length of the second or first true primary; the fourth is the longest: the fifth is longer than the third, which in turn is longer than the sixth. The second to seventh primaries are emarginate on the inner vanes. All the primaries are quite dusky above with only traces of grayish-brown on the outer vanes and lightly tipped with white. The secondaries are quite dusky and marked with grayish brown spots on the outer vanes of the outer feathers, but these spots become bars

on the inner feathers. The whole of the underside of the wing is chrome deep-yellow, much brighter on the shafts than on the vanes where it becomes more or less dusky posteriorly and yellow-white on the inner vanes of the secondaries.

The tail is yellowish underneath with bright yellow shafts and black ends on the rectrices. The first, second, and third pairs are usually tipped with yellowish-white with a subterminal zone of black, while the outer vanes are obscurely barred with dusky. Tail coverts and rump, white.

Female: The plumage of the female differs from that of the male chiefly in lacking the black "moustache" on the malars. The red nuchal crescent is present in this species, but absent in *collaris*.

Young: The young are similar to though somewhat duller in color than the adults, but may have more red on the head. The young female often has an indistinct "moustache."

Specimens before me show a great variation in cross coloring. They grade from the pure yellow-shaft with a tint of red in the "moustache" to salmon colored individuals with a suggestion of the red nuchal crescent. Although these individuals suggest that the two species interbreed, I have never seen an instance, nor read of one in which a "full-blood" yellow-shaft and a "full-blood" red-shaft were observed to mate; nevertheless I am willing to join in the popular belief that the two species (if they are true species) interbreed. Ridgway (1914: 21) describes a hybrid flicker under the name of *"Colaptes auratus luteus x cafer collaris."* The measurements of three female specimens before me indicate that they are the result of a cross between *collaris* and *luteus*, rather than *collaris* and *auratus*. The respective measurements of these three individuals are: Length, 12.25, 13.30, 12.85; wing, 6.05, 6.24, 6.25.

"In the West, you will find specimens *auratus* on one side of the body, *mexicanus* (*C. c. collaris Vigors*) on the other—tail gilded on some feathers, rubricated on others, etc." (Coues, 1896).

When feeding on the ground the flicker uses its tail for a prop just as all woodpeckers do while clinging to the side of a tree. This woodpecker is perfectly at home on the ground, though it certainly looks awkward hopping about and frequently rearing back on its tail to survey the country before resuming its search for ants. The flickers' habits of perching cross-wise on the limbs of trees, hopping around on our lawns, and searching for its food on the ground like a robin are not common to any of our other woodpeckers.

Flickers are quite numerous in Oklahoma during the winter and early spring, for many northern individuals winter here, but by the first of April most of these have started northward, and by the middle of April only an occasional individual or pair is seen. In most instances those flickers found here after the middle of April are residents. During the fall and winter we often see them in flocks of three to twenty or more individuals feeding together, very much as the meadow larks do; though usually scattered over more territory. Several sit in trees and idly watch the others feeding and frolicking on the ground. One cold morning in December, 1920, I found eleven flickers sitting in a tree basking in the early sunshine. Most of these birds were yellow-shafted, although some appeared to be red-shafted, but may have been "hybrids." On January the sixth, 1923, I observed the largest flock of flickers I have even seen. There were scores

of them, yellow-shafted, red-shafted, "hybrids," and no doubt northern forms, scattered in a great loose flock over some five acres of bush and tree-grown pasture. Some were in the bushes and trees, some were flying aimlessly about, but most of them were on the ground, where many were intermixed with a flock of meadowlarks.

Flickers, both yellow and red-shafted, habitually roost in cavities in trees or posts or in wooden structures during the winter. In rare instances they roost among the branches or on the lee side of a tree. During a protracted cold spell, December 24, I found a flicker roosting in an elm in a protected niche formed by an unusual, though natural, arrangement of three large limbs. This bird was probably passing through in its southern migration and did not have time to select a more suitable place in which to spend the night. Both of these birds often roost under the eaves and in the gables of houses, barns and other buildings. In many instances I have seen them sitting cross-wise in the ornamental work in the gables of houses. Flickers have roosted in the gables of my mother's home each winter for fourteen years. These birds manifested a decided preference for the north side of the house, and on several occasions I have seen an individual roosting in the north gable and another in the east but I have never seen one roosting in the south gable. The ornamental work in these gables is so constructed that flickers can sit either cross-wise like passerene birds or cling upright in true woodpecker style; but in every instance they sat cross-wise. Some twenty yards from the house there is a boxed and battened work-shop, under the eaves of which one may find from one to four flickers sound asleep on most any winter night. In each instance I noted that the birds clung to the wall in true woodpecker style. The favorite roosting site is under the eaves where they can hook their claws into the ends of the boxing on the lee side of a projecting rafter, and brace themselves by holding their stiffened tails against the wall.

During the winter flickers usually go to roost shortly before sundown; however, they do not seem to have established a very strict bed-time rule as may be seen by the following observations: Some time before sundown, at about 4:30, December 24, 1920, I found one of the two flickers which sleep under the eaves of the old workshop on its roost, while the other was not at home. Just as the sun set I visited the place again and found both birds on their roosts. Each was on the north side of a rafter. The wind was from the south, the temperature was not far above freezing, and the full moon was shining brightly. Later in the evening I visited the roosts with a lantern; both birds were awake and one merely removed its head from under its wing to look at me, but the other flew away, scorning the protection of the neighboring trees. About nine o'clock I visited the remaining flicker again. Its head was completely hidden so that its body resembled a fluffy ball with a bristly tail.

The next day I visited the old workshop at 4:45 in the afternoon. Although the sun was shining brightly; three flickers had already gone to roost, but two of them flew away. At 8:30 I revisited the birds and found that the two which I had frightened away at 4:45 had not returned. During the day I had focused a kodak on the place where one of the birds roosted, and fortunately this one returned. Since flashlight materials were not available I attempted to make the exposure with a lantern. Within

eight minutes the bird apparently became as tired of posing as I did of holding the lantern above my head and flew away.

My observations lead me to believe that flickers roost with the head under the "wing" only during cold weather; also that the bird puts its beak and forehead under the scapulars only, rather than under the wing proper. I have found as many as five flickers roosting under the edge of the roof of this workshop at one time, but although I have found them roosting on the north, east, and west sides, I have never found one roosting on the south end of the building. There are skins in the museum of specimens of *auratus, luteus, collaris,* and "hybrids" which habitually roosted under the roof on the outside of this old workshop.

Flickers are quite noisy during the nesting season. They tattoo on resonant wood, iron flues of buildings, and in fact on anything which will make a noise when tapped. During the courting procedures the male will often bore frantically for a few minutes, then bow and scrape, open and close his wings and tail and at the same time modify his love notes, which sound like "Wee-che" "Wee-che." Most often the female appears to pay no attention to these love signs, but gazes absentmindedly across the country. Although this reception is the one most often given the ardent lover, he is never disheartened and eventually finds the "right one."

The nesting cavity is often excavated in a decayed elm, ten feet or more from the ground, and resembles those of most the other woodpeckers. Six to eight pure white eggs are deposited on a bed of fine chips in the bottom of the cavity. Occasionally the bird deposits its eggs in a natural cavity instead of excavating one. At Buffalo Headquarters, in the Wichita National Forest and Game Preserve, a pair of flickers reared their young in a cavity which had previously been the home of a fox squirrel and her young. A pair of red-bellied woodpeckers excavated this cavity for their home, then the squirrels enlarged the opening and resided there until shortly before the flickers occupied the hole. This accommodating home was dug in a green limb of an oak some twenty-five feet from the ground. Relative to the flicker's eccentric nesting habits Davie (1900) says: "Curious breeding places are sometimes selected. It has been found nesting in an old wagon hub, deserted barns, and outhouses. Mr. Raymond C. Osburn found a nest of the Flicker on May 27, 1894, in Licking County, O., in the natural cavity of a gate-post, only three feet from the ground. Ordinarily from six to eight or ten crystaline white eggs are deposited, but in exceptional cases this bird is known to lay a large number. Prof. Everman took thirty-seven eggs from a single nest between May 4 and June 22, 1885. In this period of time the bird rested fourteen days. The most remarkable instance of the laying capacity of the Flicker of which I am aware, is that recorded by Charles L. Philips of Taunton, Mass. On May 6, 1883, he found a cavity in a large willow tree containing two eggs; he took one, leaving the other as a 'nest egg,' and continued to do so day after day until the female Flicker had laid seventy-one eggs, in seventy-three days. The average size of the eggs is 1.10x0.90, and in a large series a great variation in size and shape is noticeable."

The sunny tempered flicker has a variety of notes. None is especially pleasing from a musical point of view, but each is full of expression. In early spring when this bird wishes to be very noisy it beats a lively tat-too on any resonant object, pausing occasionally to utter a jovial "chee-ah,"

"Chee-ah." When it flies to another tree it will usually utter a series of notes which gave it the name of "scythe whetter" and sound like "Which-ah, Whick-ah." This and "Yu-cah, Yu-cah" seem to form the chief part of a conversation between two or more flickers. When several are together one will get within a foot or two of another and address it in a rapidly reiterated "Wee-chee" or quit-chew."

The flicker frequently eats numbers of ground-dwelling ants which it obtains by dextrous use of its sharp beak and long flexible tongue. I have often observed these birds feeding on ants and have occasionally found them so engrossed in the work and enjoying the meal to such an extent that I was able to approach within a few feet of them. In one instance a female flicker inserted her long tongue under a stone, which formed the roof of an ant nest and drew many of the occupants, both adults and young, out and leisurely swallowed them. It was amusing to watch her peck and prod and pry, then straighten up, swallow, and blink her eyes knowingly, and insert her beak under the stone to repeat the performance. It seemed that she was quite successful and thoroughly enjoyed the dainty morsels. After finishing her breakfast she flew to the old squirrel hole which was soon to be the cradle and home of her brood.

The stomach of a female flicker, collected December 22, 1916, contained 14 seeds, which closely resembled the seeds of beggar lice, and two large smooth caterpillars. The crop of a male, collected December 24, contained only wild grapes. This flicker probably ate the grapes more from necessity than from choice, for unusually cold weather had prevailed for the last three days. The ground was frozen during this time, and the wind was so violent that it was impossible for the bird to obtain insects. Since this flicker was killed shortly before sunset with its crop nearly full of whole grapes, it seems that the bird prefers to feed just before retiring. Another stomach contained only insects, chiefly beetles and ants.

"For the investigation of the food of the eastern flicker, 684 stomachs were available. They were collected in 35 States, the District of Columbia, and Canada, and are very evenly distributed through the year. The food consists of 60.92 per cent of animal matter to 39.08 per cent of vegetable matter. In addition the stomachs contain considerable fine sand which is probably not taken to aid digestion, but is swallowed accidently with some kinds of food, notably ants. Quite a quantity of vegetable rubbish is taken in the same way." (Beal, 1912).

Among the many interesting facts disclosed in the investigation of the contents of the 684 stomachs by Beal (1912) are: Carabidae amounted to 1.62 per cent of the annual food, reaching their maximum monthly percentage during August, 3.79. Other beetles amount to 3.52 per cent, for the year. Ants probably form the most important item in the flicker's diet. 524 stomachs contained these insects, while 98 contained ants only; with only 62 of the 648 that contained no ants. "In one case a stomach and crop were both filled with very small ants (*Cremastogaster* sp.). The whole mass was divided into 16 parts as nearly equal as possible, and in one part 315 ants counted giving 5040 in one meal of one flicker. In addition there were at least 100 pupae. Two other stomachs and crops examined in the same way gave a little over 3,000 ants. Probably each of 100 stomachs in the collection contained nearly as much ant food as these, but the number of ants was less because they were of larger species. A large proportion

of ants eaten are of species that live in the earth and these appear to be the principal food the flicker obtains on the ground. In every case where the stomach held a quantity of these small ants, a lot of fine sand revealed their source. Fly, larvae (crane and March flies), spiders, myriopods, crustaceans, (sow bugs), and snails formed 1.49 per cent of the food for the year.

The gravest charges that can be brought against the flicker are that it damages wooden structures. Elevated water tanks probably suffer more than any other one particular kind of structure. In recent years, however, these tanks are built mostly of iron, thus limiting the flicker's borings to the wooden casing around the pipes. The damage to farm buildings, residences, and other structures is more serious because of the difficulties encountered in using other than wooden materials in constructing them.

Farmers would do well to leave a few clumps of dogwood, chitam, wild grapes and such other wild fruits as remain on the vine or shrub after frost falls, for the benefit of the birds when other food is covered with snow and ice. The flicker would appreciate this, for much of its food, under normal circumstances, is gleaned from the ground; and the farmer would never regret his donation since these fruit-bearing vines and shrubs would most likely be on soil which would otherwise be waste land.

COLAPTES AURATUS LUTEUS Bangs.

NORTHERN FLICKER. 412a.

Colaptes auratus luteus Bangs, Auk, XV, April, 1898, 177. (Watertown, Mass.)

Range: Northern and eastern North America. Breeds from tree limit in northwestern Alaska, northwestern Mackenzie, central Keewatin, southern Ungava, and Newfoundland south, east of the Rocky Mountains, to northern edge of Austroriparian Zone; occasional on Pacific slope from California northward; accidental in Greenland; migratory through most of Canada but more or less regularly resident within the United States, except the extreme northern parts; south in winter to the Gulf coast and southern Texas.

Probably a winter resident of uncertain numbers, and occasionally a resident.

The subspecific name of the northern flicker, *luteus*, is a Latin adjective and means yellow or saffron-yellow, also mud-color, but probably refers to the yellow of the shafts and under side of the wings and tail of this bird.

Description of Species.

Ridgway (1914) gives "male, wing, 154-165 (156.3 mm.), 6.27 inches; female, wing, 149-159.5 (155 mm.)" 6.25 inches. A female specimen collected by the writer, near Yukon, Oklahoma, and identified by Dr. Oberholser, has the following measurements: Length, 12.50; extent, 19.85; wing, 6.20.

The color of *luteus* is like that of *auratus*. The only difference is that *luteus* is slightly larger than *auratus*, as may be seen by comparing the wing lengths.

The northern flicker has been recorded as occurring in this State by Nice and Nice (1920); as a "rare year around resident in the Panhandle" (Tate, 1923); and is reported often by others. However, I attach very little significance to observations in the field, for in most instances I have

been unable to satisfy myself whether a specimen in hand is really *auratus* or *luteus*, even after I have carefully measured it.

The nesting and feeding habits of the northern flicker are essentially the same as those of the flicker, which have been described in considerable detail.

COLAPTES CAFER COLLARIS Vigors.

RED-SHAFTED FLICKER. 413.

Colaptes collaris Vigors, Zool. Journ IV, 1829, 354. (Monterey, California).

Range: Rocky Mountains and Pacific coast region from central British Columbia, central Alberta, and southwestern Saskatchewan south to northern border of Mexico; west to coast ranges of Washington and Oregon and to Pacific coast from northern California south to Lower California and northwestern Mexico, and east to western Texas, Kansas, Nebraska, and South Dakota; casual in northern Alberta and Manitoba.

The red-shafted flicker is a resident of Oklahoma, but like the yellow-shaft, numbers of migrants winter here also. In the Wichita Mountains I found red-shafted flickers as numerous as flickers; they, however, diminish in numbers eastwardly, so that one sees more of the latter than of the former species near Norman. Howell, (1911) states that the red-shafted flicker occurs only casually in Arkansas.

Description of Species.

Male and Female: The measurements of *collaris* are about the same as those of *auratus* and *luteus*. Ridgway (1914) gives for the male, wing, 156-174 (av. 156 mm., 6.50 in.): female, wing, 152-173 (av. 163.2 mm., 6.45 in.). An unusually large female collected by the writer, near Norman, October 17, 1913, has a length of 13 and an extent of 20.75 inches.

Male: The general coloration of the body of *collaris* is similar to that of *auratus* except that by close comparison one can see that the back and upper surface of the wings, and the under parts of the body are more brownish. The under surface of the wings is rich salmon-red and the brownish and plumbeous regions of the head and neck are reversed from that in *auratus*. In flight this species is easily distinguished from *auratus* by the red on the under side of the wings and tail.

The crown and forehead are rufous brown (resembling the throat and side-head of *auratus*), while the sidehead and throat are plumbeous gray (like the forehead of auratus), and a red "moustache" is present on the malars (black in *auratus*). "Full-blood" individuals do not have the red nuchal crescent, which is characteristic of *auratus*.

Female: The female is like the male except that the "moustache" when present, is brown instead of red. The presence of a "moustache" in the female is probably an indication of immaturity. A female specimen which shows traces of hybridism, has the "moustache" clearly defined, but of the same shade of brown as the local region.

The nesting habits of this species are essentially the same as those of the flicker, so far as I have been able to learn.

The Biological Survey (Beal, 1912) examined the contents of 183 stomachs of the red-shafted flicker and found the food to consist of 67.74 per cent of animal matter and 32.26 per cent of vegetable matter. The stomachs were collected in "10 states and in British Columbia, but more

than three-fourths of them came from California." Ants and Coleoptera form almost the whole of the list of insects identified in the food. Ants are represented by 8 genera, which include 15 species.

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