Feathered Tree Cleaners

By E. LAURENCE PALMER

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This is the eightieth in NATURE MAGAZINE'S *series of educational inserts.*

WE have had inserts dealing with birds of the sea, birds of our shores, of our farmyard, with game birds, with birds of prey, and with birds of particular groups, like the sparrows, warblers and so on. This time, while we stick to birds, we are trying to get you interested and acquainted with birds that have certain habits in common; species that glean their living from the bark and twigs of woody plants.

In earlier inserts we neglected to mention woodpeckers as common, everyday birds. We were saving the woodpeckers for this number. While the American Ornithologist's Union "Checklist" of birds lists 10 North American genera, 22 species and 64 subspecies of woodpeckers, we prefer not to limit ourselves to woodpeckers but to introduce some other birds that behave or function according to the accepted woodpecker patterns. Accordingly, you have help here on two titmice, two nuthatches, a creeper and a warbler. It is probable that few of you will see and recognize more than a dozen woodpeckers anyway, unless you travel widely and observe extensively.

The study of any group of organisms involved in performing a common function leads to some interesting observations, and in this our feathered tree cleaners are no exception. We cannot honestly claim that we believe that wherever a need exists in Nature it is sure to be met. Even granting that this might be the case, we find ourselves challenged by the facts that there are apparent needs for control of organisms affecting adversely our woody plants, and there are birds that seem admirably suited to do the job of meeting these needs. Ecologists speak of niches, or the status or place an organism occupies in its environment. In this sense we are writing here about a particular niche association, mainly with the surfaces of woody plants.

Before we discuss this point further, let me suggest that you go *outdoors* and look closely at the bark and twigs of the most convenient woody plant available. Then come back and let us talk over what you have noticed.

RED-BELLIED WOODPECKER

WHITE-HEADED WOODPECKER

GILA WOODPECKER

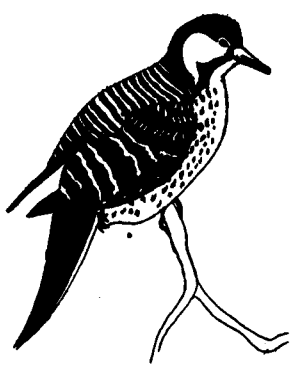
I am reasonably sure that you found that the outside of the woody plant was covered with bark. It may have been close-fitting, as on a beech tree; roughly furrowed, as on an elm; peeling off in loose fragments, as on a hickory, sycamore or birch. If you looked closely at this bark you would recognize that it seemed to provide excellent hiding places for many small creatures that, under the loose bark, could find protection from their enemies, the heat of the sun, the beating of the rain, or even a covering of ice. Many of the creatures that find shelter in the outer covering of our woody plants also find food there. Some eat the loose outer bark. Others make their way inward to the fresh-growing tissue beneath the bark. Still others burrow into the heartwood and there find themselves relatively free from enemies, and completely surrounded by food. Small wonder, under these circumstances, that these creatures make the most of their opportunities. Small wonder, also, that, unless some control enters the picture, their appetites may lead them to eat themselves out of food and lodging.

One cannot remove the bark from a living tree and expect it to live. Neither can one kill the bark on the tree and expect the tree to prosper. Many insects either remove or kill the bark of trees.

Here are a few of the things you might well find on the bark and twigs of woody plants. The twigs may bear egg masses of common cankerworms, tent caterpillars, or aphids and other harmful insects. If left undisturbed, these eggs may hatch into caterpillars that will feed on the leaves and possibly destroy the food manufacturing part of our tree. In the coarser bark will be found the crawling, wingless, female cankerworms that emerge from the ground and climb to the tree tops to lay their eggs. On the way up they may mate with the winged males or they may be eaten by some hungry bird. It is important to the tree which of these events takes place. Also, in the bark, may be hid-

PILEATED WOODPECKER

FLICKER



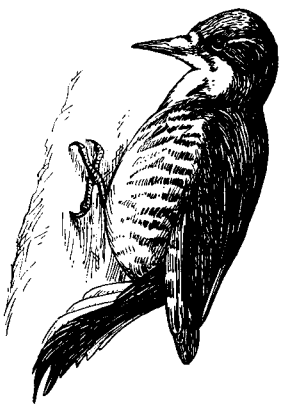
RED-COCKADED WOODPECKER

den the cocoons of tussock moths, or tent caterpillars and the like. These may be destroyed by the marauding bird. Beetles of many kinds, aphids, bugs and other small animals may occur in swarms over the bark of our tree. Some, like the snowy tree crickets and the ladybird beetles, may be useful as destroyers of other insects, but even some of our ladybird beetles are destructive of some plants. Spiders and mites may be found hiding under the loose bark of trees, and some of these help the trees, while others harm them. In other words, I am trying to point out to you that in and on the loose bark of twigs and trunks of woody plants is a little world in itself.

If you tear off the loose bark on a dead tree you may find that just beneath it remain the burrows made by many insects. Engraver beetles and other wood-boring larvae, about which we told you in an earlier insert on beetles, seem to enjoy girdling and killing our trees. Of course we know that they do not do this deliberately, but live according to the pattern established by their ancestors. You may never see the creatures that ruin the inner bark of trees but usually you can see their work without much difficulty.

Should you break open an old dead stump, or split the wood in an old tree trunk, you frequently will find that our wood-boring insects have made their way into the innermost recesses of the tree. You may be fortunate and find the cause of these injuries, but the chances are that you will see only a few burrows and recognize that the tree has been killed.

Thus we have a job to do if our woody plants are to be protected. The twigs must be wiped free of the eggs of insects that may eat the leaves. The bark must be



ARCTIC THREE-TOED WOODPECKER

CALIFORNIA WOODPECKER

BLACK-CAPPED CHICKADEE

cleaned of insects that destroy it. The inner bark must be cared for by the destruction of the insects that bore in that area, and the inner wood must also be cared for in some way. It should be obvious that the same creature that can be effective in removing insect eggs from a twig could do little to destroy an insect buried inches deep in wood. Fortunately it is not necessary that any one of these creatures do every kind of work that needs to be done.

In our illustrations, and in the chart section of this unit, we have tried to help you understand more about some of the birds that do these different jobs in their own particular ways.

The task of clearing the twigs of insect eggs calls for small, active birds that are satisfied with food of small volume. They must be so light in weight that they do not injure the twigs on which they work. To meet this situation we call your attention particularly to the chickadees and tufted titmice. Already, in an earlier insert, we introduced many of the warblers that are past masters in giving help of this sort, and pointed out that the time of year when they are likely to be present in greatest abundance frequently is the very period when their assistance is most needed.

The bark surface of the coarser parts of our trees calls for birds that can crawl about freely on the upper and under side of limbs, and up or down on the trunk. Ideal for this sort of activity are the black and white warblers, the nuthatches, the chickadees and the downy woodpeckers. Ants, particularly of the wood-boring type, are frequently the most serious enemies of woody plants and so it is fortunate that we have birds like the flicker which seem to have an insatiable appetite for ants. To

YELLOW-BELLIED SAPSUCKER

HAIRY WOODPECKER

BLACK AND WHITE WARBLER

RED-BREASTED NUTHACH

get these they haunt the openings made by an ant colony, either on the tree or on the ground, and the job they do should be genuinely appreciated.

When it comes to tackling the elimination of the insects that bore deeply into the trees we must look for a creature powerful enough to get to where the enemy may be. Downy woodpeckers may burrow in a bit. Flickers are powerful enough to dig in still farther, but when a real job is needed the pileated woodpecker comes into the picture. Fortunately pileated woodpeckers seem to be on the increase. Unfortunately their larger relatives, the ivory-billed woodpeckers, are becoming or are now actually extinct.

One could wax poetic about the ways in which most of these birds are fitted to do the job they do. Their appetities usually demand that they eat what we want destroyed, although this is not always the case. Their feet are suited for clinging to the bark or twigs of our trees. In many cases their tails are stiff-feathered and provide a staunch support for a bird that has vigorous work to do. Added to this are bills as well suited to the doing of particular jobs as are the fixtures on the best vacuum cleaner. There are the fine curved bills of the creepers, suited to probing under loose bark; small pointed bills of the chickadees suited to picking fine insect eggs from small twigs; reasonably stout bills on the smaller woodpeckers suited for probing the loose outer bark, and even chisel-like bills of some woodpeckers that seem to be used to pry loose pieces of bark apart rather than to drill holes. Most spectacular of all are the substantial bills of the larger woodpeckers that make it possible for them to dig great holes in reasonably solid wood and remove the insects damaging the interior of our trees.

Not only are the feathers, feet and beaks of our tree gleaners suited to these particular jobs, but in many cases the birds have long tongues, sometimes with spike-bearing tips that may be thrust deep into small holes and capture the insects that are needed for food. Sometimes these tongues are particularly sticky and therefore are exceptionally efficient in bringing to the surface insects that might well do great harm.

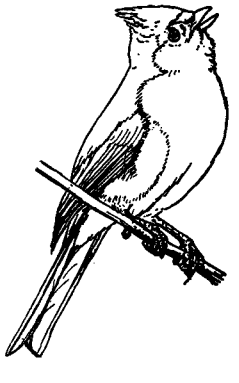
I hope that you will note that I have avoided saying that the woodpeckers and other birds are particularly adapted to do the jobs they do. To me adaptation infers an intelligent, possibly studied, modification to meet a need. I doubt if any of these birds, even over long periods of years, made any intelligent effort to change their structures to meet a particular need, or that they chose mates that they felt sure would provide them with young that could do better jobs than did the old folks. They developed these queer structures and used them, to be sure, but I doubt if there was ever the slightest bit of adaptation in the process. Once they had the structures it was only natural that their habits changed to meet the limitations provided by their morphology. No one can deny that the structures are suited to do particular jobs. I, at least, can object to saying that the birds adapted themselves to meet these needs.

But why worry about semantics when we still have not exhausted the interesting possibilities presented by our subject? The food problem, so far as these birds are concerned, is not adequately covered by the preceding paragraphs. If a redheaded woodpecker had adapted itself to boring into wood for its food, why should it, to its detriment, spend so much time trying to catch flying insects on the wing? If a flicker adapted

(Continued on page 144)

RED-HEADED WOODPECKER

BROWN CREEPER



TUFTED TITMOUSE

COMMON NAME SCIENTIFIC NAME	FLICKER *Colaptes auratus*	PILEATED WOODPECKER *Dryocopus pileatus*	RED-BELLIED WOODPECKER *Centurus carolinus*	GILA WOODPECKER *Centurus uropygialis*
DESCRIPTION	Length, to 13 inches. Wingspread, to 21-1/3 inches. Tail, to 4-4/5 inches. Bill, to 1-2/3 inches. Weight, to 6 ounces. In flight shows conspicuous white rump. Yellow under wings. Tail, black-tipped. Body, barred and streaked with black and brown. Males and sub-adult females show black "moustache."	Length, to 19 inches. Wingspread, to 30 inches. Bill, 1-4/5 inches. Tail, 6-1/5 inches. Weight, to 1 pound. Female, the smaller. Dark brown to black, flashing white in flight. Crest, conspicuously red. Forehead and fore crown of female, gray brown and line along bill black rather than red.	Length, to 10-3/5 inches. Tail, to 3.4 inches. Bill, to 1.1 inches. Back, conspicuously crossed by narrow dark bands, "zebra-backed." Crown of male, red. Nape of female, red. Cheeks, throat-sides, underparts, white. May be faintly reddish about middle of breast and abdomen and bill base. Rump, white. Young, without red.	Length, 8-10 inches. Tail about 3 inches. Bill, about 1 inch. Midway in size between robin and towhee. Back, rump and wing coverts, black- and white-barred. Belly, pale yellow. Head, neck and underparts, drab. Adult male, with red crown and pale yellow belly, but adult female, with paler belly and without red crown.
RELATIONSHIP AND RANGE	Order Piciformes. Family Picidae. Two subspecies, the Northern and the Southern. Breeds from tree limit in Alaska south to Nevada and east through northern and central United States. Winters south to Gulf Coast and southern Texas. Subspecies, 4, extend range to Alaska and Lower California, east to Missouri.	Order Piciformes. Family Picidae. Three species in the genus and 2 subspecies, Northern and Southern in the species. Northern resident from central Mackenzie to New Brunswick and Nova Scotia and south to Minnesota, Pennsylvania and farther in Alleghanies. Southern, south to Gulf Coast and Texas.	Order Piciformes. Family Picidae. Five American species in the genus include the Gila Woodpecker, the Cardon, the Brewster's and the Golden-fronted. This species ranges through eastern and southeastern United States from southeastern South Dakota through southwestern Ontario to western New York and western New England, and south to Florida and Texas.	Order Piciformes. Family Picidae. Southeastern California along Colorado River, in extreme southeastern Nevada through southern Arizona to southwestern New Mexico favoring low desert areas, extends range south into Lower California and Jalisco.
REPRODUCTION	Nests in a hole in a dead tree, telephone pole or nesting box. Hole, to 3 inches wide, to 2 feet deep and to 60 feet up. Violent courtship. Eggs, 3-20, white, with high gloss, ¼ ounce, 1-1/6 by ⅞ inch. Incubation, by both sexes, 11 to 16 days, with 1-2 broods a year. Male recognizes female by sight.	Nests in hole in large tree 12 to 60 feet up; a cavity to 30 inches deep, with 3-4 inch entrance, chip-lined. Eggs, 3-6, glossy, white, 1½ by 1 inch. Incubation, by both sexes, 18 days, mostly in May. Young, naked when hatched but develop plumage in nest. Adults molt late summer, not in spring.	Nests in hole in tree or pole, from 15-50 feet above ground, with 1¾ inch entrance and 1 foot deptn, in May and June. Eggs, 3-5 or more, 1 by 2/3 inches, dull white. Incubation by both parents, for two weeks. Young, helpless when hatched, resemble female the first winter although precocious males may develop red on head.	Makes nest hole in giant cactus. Flowing cactus juice may make hole unusable for a year. Or may build nest hole in cottonwoods, mesquites, willows, sycamores or oaks. Eggs, white, 3 to 5, scarcely glossy, laid in April or May, usually one brood, with both parents helping rear the young.
ECOLOGY	Food largely insects, particularly ants, often collected on ground. One stomach contained 5000 ants. Other insects include crickets, grasshoppers and beetles. Insects about 61% of total food, remainder being wild fruits, cherries and weed seeds. Young molt to adult plumage June to October. Speed, 44 m.p.h.	Flight like that of a swooping crow, with repeated undulations. Digs huge rectangular holes, seeking carpenter ants that make up major portion of food. May also eat caterpillars and cockroaches, or rarely berries and cherries. Calls a loudly repeated *kuk-kuk*, like a loud flicker rising at beginning.	Found in a variety of places where trees grow, either in forests, woodlands, along streets, or where a few isolated stands are to be found. Food, chiefly insects such as beetles, caterpillars, bugs and their larvae. May on occasion eat corn or the sap of trees. Calls a repeated *chad, chad* or a *wicker* when mating.	Field characteristics include white wing patches, showing in flight, with back "zebra-striped" and male with red crown. Food may include eggs of other birds. Late season nest may be for general occupancy rather than for rearing family. Old nests may be used by other birds.
ECONOMY	Highly useful as destroyer of insects particularly ants that may encourage crop-destroying aphids. Also destroys European cornborers, which threaten economy of Corn Belt. Known as high-hole, high holer, yellow-hammer, golden-shafted woodpecker, and, the western form, as red-shafted woodpecker. Males may fight vigorously at mating time.	Undoubtedly useful as a destroyer of wood-destroying ants. Not known to injure common orchard trees. Abandoned nests are used by wood ducks, squirrels and other wildlife unable to duplicate the effort of excavating. The very spirit of the wilderness, but becoming adjusted to living relatively near man.	May injure some fruit trees, such as oranges, in the southern portion of the range, but ordinarily may be considered a highly useful destroyer of injurious insects. May wander north of usual range after the summer breeding season. Erratically migratory.	Flight call a repeated *huit* and ordinary call a coarse *tcheurr*, repeated. May feed on insects of the desert area occupied, but also may be considered as an enemy of birds on whose eggs they may feed. Particularly interesting because of inquisitive nature that seems tireless.

Red-Headed Woodpecker *Melanerpes erythrocephalus*	California Woodpecker *Balanosphyra formicivora*	Yellow-Bellied Sapsucker *Sphyrapicus varius*	Hairy Woodpecker *Dendrocopos villosus*	Downy Woodpecker *Dendrocopos pubescens*
Length, to 9¾ inches. Wingspread, to 18 inches. Bill, to 1⅛ inches. Tail, to 3¾ inches. Female, generally smaller than male. Head and neck of adults, red. In flight, appears to be a red-headed black and white woodpecker with large, square, white wing patches. Head of young, gray. Weight, 2-4/5 ounces. Temperature, 107.2°F.	Length, to 10 inches. Tail, 3 inches. Bill, 1.14 inch. In general, the size of a robin. Female, slightly the smaller. Upper parts, glossy green-black. Rump, upper tail-coverts, white with large, white wing patches showing in flight. Throat, yellow. Lower breast, white with black. streaks. Crown, red but restricted forward in female.	Length, to 8-4/5 inches. Wingspread, to 16 inches. Tail, to 3-1/3 inches. Crown and throat of male, a deep scarlet. Throat of female, white. Back, heavily barred with black and yellow-white. Breast, black. Sides, streaked with black. Belly, pale yellow. Crown is sometimes black in female. Young, much like female.	Length, to 10½ inches. Wingspread, to 17½ inches. Tail, to 4 inches. Bill, to 1-1/3 inches. Weight, to 3 ounces. Male, with scarlet nape. Black above but middle of back white. Mostly barred black and white. Middle tail feathers, black. Outer tail feathers, white. Temperature, 105°F.	Length, to 7-1/6 inches. Wingspread, to 12 inches. Bill, to 4/5 inch. Weight, to 1½ ounce. Black and white streaked in general. White outer tail feathers, obscurely barred or spotted with black. Male, with red nape. Southern subspecies is browner beneath. Temperature 108°F.
Order Piciformes. Family Picidae. But one species in the genus and no subspecies. Ranges from southeastern British Columbia, central Alberta, Manitoba and southeastern Ontario to central Montana and central Wyoming and Colorado to New Mexico, Texas, the Gulf Coast and southern Florida. Becoming reduced.	Order Piciformes. Family Picidae. From Oregon to southern California in the Pacific coast ranges in Upper Austral and lower Transition zone areas. A.O.U. checklist gives five subspecies, including the Mearns's, the San Pedro, the Narrow-fronted Woodpecker and the Ant-eating Woodpecker, extending range to Texas and Lower California.	Order Piciformes. Family Picidae. Breeds from central Mackenzie through central Manitoba and southern Quebec to Cape Breton Island and south to Missouri and North Carolina in the mountains. Winters from Iowa to Massachusetts and south to Jamaica, western Mexico and western Panama.	Order Piciformes. Family Picidae. Seven American species in the genus and 13 subspecies in the species. Northern form ranges from Alaska to eastern Quebec and south to central Ontario and North Dakota to British Columbia, with other subspecies extending range through United States south to Florida and California.	Order Piciformes. Family Picidae. Largely resident. Ranges from Canadian and Transition zones in eastern and central North America from southeastern Alberta to Ungava and south to Nebraska and Virginia. Six subspecies recognized that extend range to California, Alaska and Florida. Rarely above 3,000 ft. altitude.
Nests in a hole with a 1¾-inch entrance and 18-inch depth, in a tree or pole, chip-lined. Slightly glossy eggs, 4-6, 1-1/6 by 9/10 inches, white. Incubation two weeks, by both parents. Two or one broods a year. Young lose brown on head after first fall or winter. Complete fall and partial spring molts.	Nests usually in a hole, 6-18 feet above ground, usually in white oaks, but may be in pines, cottonwoods, black oaks and other trees. Eggs, 4-6, white, with little gloss, 1 by 4/5 inch. Incubation, 14 days, by both parents. Sometimes two pairs share a nest. Young blind when hatched. Juvenile feathers molt second fall.	Nests in holes in trees, in mixed or coniferous forests, or even in trees in marshes or mixed farmlands. Hole, with 1-3/5 inch entrance, to 18 inches deep and 12-40 feet above ground. Eggs, white, 5-7, slightly glossy, 9/10 by 2/3 inches. Incubation, for 2 weeks by both sexes. One brood a year. Both parents help.	Nests in hole in a tree, in a woodland or orchard tree trunk or branch. Entrance, 2 inches; depth, to 16 inches. Up to 5-50 from ground. Eggs, 3-5, shining white, 1 by ¾ inches. Incubated 2 weeks by both parents. One brood a year. Young, soon resembling adults.	Nests in a hole in a post, tree trunk or branch in orchards, mixed forest or shade tree. Entrance, 1¼ inches, depth to 10 inches. Nests in May or thereabouts but may use nesting hole for shelter in winter. Eggs, 4-8, white, ¾ by 2/3 inches. Incubation, 12 days, by both parents. One brood a year.
Food, about 1/3 animal matter including grasshoppers, May beetles, ants, weevils, commonly caught in flight and sometimes stored. Rarely eats eggs of other birds. May eat corn, pears, apples, cherries, grapes and other soft fruits, and have been known to kill young chickens. Favors beechnuts and acorns.	Food, chiefly acorns, but may eat fruit or sap. Stores acorns in holes drilled in outside of trees often covering considerable area. Up to 1500 found stored on one telephone pole. Acorns not broken when stored. Calls a repeated *jacob*, or *kerack* or *kerack-tchurrup*. Definitely sociable and found in colonies.	Feeds on sap and inner bark of trees often killing trees by girdling them with closely placed borings. Drillings attract insects, squirrels, chipmunks, humming birds and other wildlife. May establish a circle of feeding spots that are visited regularly. Gives a definitely interrupted drumming.	Food, insects gleaned from bark and wood, or dug from dead branches. Particular enemy of hairy caterpillars and their pupae, including gypsy moths in their range. Also eats ants, grasshoppers, beetles and spiders. About 77% of food is animal matter, the remaining including nuts and seeds.	Food, 76% animal matter, mostly insects and spiders and most of which are pests of plants. Vegetable food includes sap and inner bark of trees and seeds of some plants. Individual range a few acres where food and shelter are available. Calls a repeated positive *peet, peet* or a rattling call.
Probably more useful than injurious and certainly is popular with beginning naturalists because of ease of identification, beauty and conspicuous nature. Habit of flying from telephone poles to capture insects on wing over high-speed highways may have reduced numbers tremendously and may become critical.	Probably of little economic importance but tremendously interesting in part because of food storage habits. Known to mutilate trees, to eat the eggs of other birds, and may make wholesale storage of useful acorns. Rumor that only injured acorns are stored is not well founded.	Fortunately is rarely abundant. May be definitely injurious to trees, particularly orchard and shade trees. Damage estimated at close to a quarter of a million dollars a year. Control not practiced because of small numbers. Interesting of course to ornithologists.	Unquestionably useful as destroyer of wood-destroying insects. Good orchard practice encourages the presence of these birds through the erection of suitable nesting houses. Individual range is but a few acres if food and shelter are available in sufficient abundance.	Highly useful as a destroyer of enemies of fruit and shade trees. It may on occasion injure woody plants by eating sap and inner bark, but this is more than offset by good done in destruction of insects. A welcome and common visitor to feeding stations and occupier of bird nesting boxes.

COMMON NAME SCIENTIFIC NAME	RED-COCKADED WOODPECKER *Dendrocopos borealis*	WHITE-HEADED WOODPECKER *Dendrocopos albolarvatus*	ARCTIC THREE-TOED WOODPECKER *Picoides arcticus*	BLACK-CAPPED CHICKADEE *Parus atricapillus*
DESCRIPTION	Length, to about 8½ inches. Crown, black. Back, black and white barred. Middle of tail, black. Outer tail feathers, black and white barred. Side of head and neck, white. Sides of body and under tail, white, with black spots and streaks. Underparts, pure white. Scarlet feathers on side of head behind eye. Female, without red on head but otherwise like male.	Length, to 9½ inches. Tail, 3-1/3 inches. Bill, 1-1/10 inches. Between robin and towhee in size. Head and neck, white with crown sometimes ashy. Male, with red on nape. White wing patches. Most body, legs and feet, rather uniform black. Female without red at nape. Young, like female essentially.	Length, to 10½ inches. Wingspread, to 16 inches. Yellow crown patch of male is lacking in female. Appears chiefly as a bird with a solid black back, with white on breast and narrow transverse black and white stripes on the sides. Bill, about ½ total head length. Two front toes and one hind, no fourth.	Length, to 5¾ inches. Wingspread, to 8½ inches. Tail, to 2-2/3 inches. Entire crown, throat and back of neck, black. No crest. Side of head and underparts, white. Back, gray. Outer margins of wing coverts, whitish in Black-capped Chickadee, but not white in Acadian Chickadee. Sexes, alike.
RELATIONSHIP AND RANGE	Order Piciformes. Family Picidae. In south Atlantic and Gulf States north to Virginia, Tennessee, Kentucky and Missouri and accidentally into New Jersey and southeastern Pennsylvania. Found primarily in open pine woods, and rather unusual in other types of woodland. May range west into Texas.	Order Piciformes. Family Picidae. Northern and Southern subspecies, with the northern the larger. Range from western Idaho, southern British Columbia and western Nevada in Transition Zone through southern California in San Gabriel, San Bernardino, San Jacinto, Santa Rosa and Cuyamaca ranges.	Order Piciformes. Family Picidae. Two species in the genus, with 3 subspecies of *P. tridactylus*. *P. arcticus* ranges from central Alaska through northern Mackenzie, northern Manitoba and northern Quebec to central California, Wyoming, Montana, northern Minnesota, Michigan, Ontario, New York and Maine.	Order Passeriformes. Family Paridae. Seven American species in the genus and 4 subspecies in the species. Subspecies include Black-capped, Oregon, Yukon and Long-tailed. Black-capped ranges from northern Ontario to Newfoundland and south to Indiana and North Carolina. Others range westward.
REPRODUCTION	Nests in living pine, in hole, 20-70 feet above ground. Nests in April and May. Nest may be used year after year. Hole may be dug to depth of one foot. Eggs, 3 to 5, glossy white, .9 by .68 inches. Family may stay together until late in the season and both parents assist in rearing the young.	Nests in June or thereabouts, with nest at rather low height, in hole in live or dead cone-bearer. Eggs, 3-7, pure white, .95 x .71 inches, often covered with pitch from the body of the incubating bird. Usually one brood, with both parents assisting in rearing young.	Nests in evergreen forests, in a hole to 2 inches in diameter, to 18 inches deep, widened at base and chip-lined. Eggs, 4-6, 1 by 4/5 inches, white with moderate gloss. Nests May and June. Incubation, 2 weeks by both sexes. One brood a year. Young, helpless when hatched. Noisy in breeding time.	Nest in trees, or nest boxes, or hollow stub, in a hole, with a 1-inch entrance and a depth of to 1 foot, 1-50 feet above ground. Eggs, 3-15, white, spotted and speckled with brown, 2/3 by ½ inch. Incubation, by both sexes 11-13 days. 1-2 broods a year, with both parents helping at all times.
ECOLOGY	Food is largely larvae of wood-boring beetles and interestingly enough of the larvae that bore into the ears of corn. May be found feeding in groups, most frequently in the higher parts of trees. May work its way down a trunk rather than up as do most woodpeckers.	Food, largely ants and spiders gleaned from the rough bark of cone-bearing trees for the most part. Bill used as a pry to loosen bark rather than as a device for digging a hole ordinarily. Call, somewhat like that of downy woodpecker, a repeated *chick-ik*.	Food, about 75% insects with balance of wild fruits, nuts and inner bark of trees. Seems to listen for movements of prey inside trees. Works almost exclusively on dead trees, often working for a long time and repeatedly on one tree. Drills hole for food.	Food, primarily insects and insect eggs gleaned from bark and twigs of trees or food gathered from feeding stations. About 68% animal matter including eggs of plant lice, weevils, bark beetles, flies, scale insects, ants, wasps and spiders. May defend a home territory 100 yds. across.
ECONOMY	Valuable as a destroyer of enemies of cone-bearing and other trees, and particularly of corn ears. Not shy. May be noisy, sounding like a downy woodpecker that is off key, or sounds a bit more rasping than the downy. Best field character is the white side of the head.	Undoubtedly useful as destroyer of insects that might be injurious to trees. Easily identified because of the contrasting white head and white wing patches with the otherwise apparently black body.	Useful check on wood-destroying insects, it being estimated that one bird may in a year destroy to 13,000 wood-destroying grubs. With the disappearance of dead timber from an area this bird may also be expected to disappear. Similarly, with the reduction of its food supply it vanishes.	Highly beneficial as destroyer of insects harmful to plants and a most enjoyable companion particularly for those who get their nature through a window. Is the State Bird of Maine. Song pitch, 3027-3700 c.p.s. Love song a high-pitched *phoeebe* often confused with that of the phoebe.

TUFTED TITMOUSE *Parus bicolor*	WHITE-BREASTED NUTHATCH *Sitta carolinensis*	RED-BREASTED NUTHATCH *Sitta canadensis*	BROWN CREEPER *Certhia familiaris*	BLACK AND WHITE WARBLER *Mniotilta varia*
Length, to 6½ inches. Wingspread, to 10¾ inches. Tail, to 3-1/6 inches. Hen, smaller than the cock bird. High crest makes bird so conspicuous that it cannot be easily missed. Almost uniformly sooty gray with basal half of tail feathers whitish. Sexes colored alike and young resemble their parents.	Length, to 6-1/6 inches. Wingspread, to more than 11 inches. Tail, to 2¼ inches. Bill, to 1/3 inch. Female, smaller than male. Black capped. Back, blue gray. Breast, white. Female, duller on top of head than male usually. Young, only slightly different from adults. Brown on lower underparts.	Length, to 4¾ inches. Wingspread, to 8½ inches. Bill, to ½ inch. Tail, to 1-3/5 inch. Female, smaller than male. Much smaller than the common white-breasted nuthatch, with broad black eye-band and rusty beneath. Top of head of male, black with bluish gloss. In female, this area is gray to the rear. Young, like adults of same sex.	Length, to 5¾ inches. Wingspread, to 8 inches. Tail, to 3 inches. Bill, 11/16 inch. Inconspicuous, slender, brown-streaked bird, dark brown above and gray beneath. Tail feathers, stiff and used as a prop. Sexes, colored alike and young more light colored than the adults. Bill, slender and curved downward slightly.	Length, to 5½ inches. Wingspread, to 9 inches. Weight, to 1/3 ounce. Almost completely covered with longitudinal black and white stripes with heavier black areas on tail, wings and head and white areas at base of tail. Female, smaller than male. Acts like a nuthatch in many ways.
Order Passeriformes. Family Paridae. Ranges from Maine to Nebraska and south to central Texas and the Gulf Coast. Sometimes found in Wisconsin, Michigan, New York, Ontario and Connecticut but usually is further south. Resident in occupied area. Formerly a woodland bird, but now found in parks and on streets.	Order Passeriformes. Family Sittidae. Resident from southern Manitoba to central Quebec and south to northern Texas and South Carolina for the typical form. Seven subspecies extend range to Lower California, northern Mexico and Florida and northwest into British Columbia.	Order Passeriformes. Family Sittidae. No subspecies. Migratory. Breeds from upper Yukon area to Newfoundland and south to Massachusetts, Michigan, New Mexico and in mountains farther south. Winters from southern Canada to the Gulf Coast and southern California.	Order Passeriformes. Family Certhidae. Five subspecies extending range over most of North America where there are trees and north of northern Mexico. Typical form breeds from central Manitoba to southern Quebec and south to eastern Nebraska and North Carolina. Winters over most of breeding range and south to Texas and Florida.	Order Passeriformes. Family Compsothlypidae. Breeds from central Mackenzie through northern Ontario to Newfoundland and south to Texas and Georgia and casually westward. Winters sometimes in border states to the south, but more commonly down to Venezuela, Colombia and Ecuador.
Nest, in a natural hole or woodpecker hole in a tree, post or stub. May nest in a bird box, usually 40-60 feet above ground. Eggs, 5-8, 2/3 by ½ inch, white to creamy brown, with brown or lavender spots. Incubation, chiefly by hen bird. In South, may be 2 broods a year; in North, one.	Nests in a hole or abandoned woodpecker's nest or in a bird house, 2-60 feet above ground, with fine lining. Eggs, 5-10, white or pink with brown or lavender spots at larger end, 5/6 by 5/8 inches. Incubation, 13 days by the hen. One brood a year. Nests in late spring or early summer.	Nests commonly in evergreen forest in a cavity in a dead branch or trunk, with 1-inch entrance, with pitch smeared around entrance, 5 to 70 feet above the ground. Eggs laid May and June, 4-8, 2/3 by 9/16 inches, white or cream, heavily blotched or dotted with brown. Incubation, 12 days by hen.	Nests usually in a swampy, wooded area. Nest usually hidden under a loose piece of bark on a tree, or in an old hole. Nest, of twigs, feathers, hair and cobwebs. Eggs, 5-9, white to gray, with some spots of reddish or purplish brown, 5/8 by ½ inch. Incubation, about 2 weeks, by female. 1-2 broods a year. Male helps.	Nest is commonly on ground in woodlands, at the foot of a tree or shrub. Nest, a mere depression in leaves. Eggs, 4-5, creamy white, abundantly spotted with brown, chestnut and lavender, ¾ by 7/12 inches. Weight, 1/25 ounce. Incubation, by female, 13 days. One brood a year.
Animal matter usually is about 2/3 the total of the food, and includes tent caterpillars and their eggs, saw-fly larvae, scale insects, tree hoppers, spiders and similar creatures. The plant food includes wild berries, acorns and nuts of many varieties and in winter plant food ranks higher than in summer.	Food in winter 25% animal matter, in spring 80%. One stomach reported to have had 1629 cankerworm eggs in it. Insects eaten may be injurious or helpful, but on whole bird is considered as being useful. Particularly useful in destroying caterpillars in orchards. Codling moth pupae popular winter food.	Works head up or down on large parts of tree, gleaning food from small animals in and on the bark. Beetles seem to rank high in popularity. Seeds of spruce and balsam are stored for use as food. May store food, particularly in the vicinity of man-made feeding stations.	Food, insects and insect eggs gathered from bark of trees and branches of trees. Included are moths, caterpillars, leaf hoppers, ants, spiders and some pine seeds. On occasion, may feed on suet found at feeding stations. Nest is built almost wholly by the hen bird but male brings food to mate and young.	Food, insects found chiefly on the bark of trees and including caterpillars, scale insects, gypsy moths, click beetles, plant lice, forest tent caterpillars. Call is a thin, wiry sound inaudible to many, 5300-8050 c.p.s. May feed head up or head down, and work up or down a tree trunk.
Essentially beneficial as a destroyer of insect enemies of trees and similar plants. Popular with naturalists because of vigorous whistling call and because of friendliness and apparent lack of fear. It is the State Bird of West Virginia, and would rank high elsewhere if its range were greater.	The *yank yank* nasal call is reasonably well known by the average bird watcher. The behavior of feeding on a tree trunk, head up or head down has given rise to many common names, such as "upside down bird" and "devil twirl around the twig." One of the commonest visitors to bird feeding stations in range.	Surprisingly tame and may feed close to a man in the field. Highly useful, obviously, as a destroyer of insects that infest the bark of trees. Because of its small size and general appearance is frequently overlooked by the careless bird watcher, but it is usually welcomed on a bird list.	Probably wholly valuable. Also probably more common than most persons appreciate because its habits make it inconspicuous. Has the habit of working from bottom of a tree to top, then dropping to bottom of next and beginning all over again. Its fine call cannot be heard by many because of its high pitch.	Undoubtedly of value as a cleaner of tree trunks and in the destruction of harmful insects. The habit of nesting on the ground at the foot of a tree makes it doomed in areas in which house cats are abundant and there are those who definitely favor this bird to any cat.

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itself to digging in wood for its livelihood, why should it spend so much of its time on the ground catching ants as they come from their burrows? We might go on in this vein, but I hope that we have made our point.

It is true that most, if not all, of our woodpeckers require burrows in wood to make a nest and rear a family, but there are many animals with similar needs that could not dig a hole if their lives depended on it. Chimney swifts, wood ducks, bluebirds and many other species manage to survive by using holes on rotting parts of trees, or by using the holes in chimneys. Why should woodpeckers be called upon to dig most of the holes for other birds?

DOWNY WOODPECKER

WHITE-BREASTED NUTHATCH

If you ever watch a woodpecker at work you may notice that it frequently pauses in its operations and appears to listen to what is going on in the wood before it. There seems to be little doubt but that they do use a sense of hearing to help them locate an active supper. I once talked with a teacher in far-off New Zealand who told me that he did not believe that birds listened to things moving in the ground. He said that he had seen birds poise on the ground before catching earthworms, and that, while the birds seemed to listen, he had put his ear down at the same spot and had heard nothing. He forgot that hearing by birds and hearing by mammals may be a different sort of thing, and that even the sensitivity to sound waves of different human beings varies greatly, and that it varies with age, even in a single human being. As a younger man I could always readily hear the calls of blackpoll warblers and the high-pitched calls of brown creepers. Now I am lucky if I am able to detect these sounds and yet I can hear quite well. To me it seems obvious that woodpeckers, at least, use their sense of hearing to help them locate a meal. Some, as with those that catch insects on the wing, use highly developed sight and aerial skillas well.

It might be easy to say that, since these birds do such a wonderful job in controlling tree-destroying insects, that they are entirely useful. Some of them, however, have developed good appetites for sweet corn, for cherries, for nuts, for peaches, and for the young of other birds, even including young chickens. We can hardly appreciate their satisfying these appetites. Some of them, like the California woodpecker, store acorns in telephone poles and in live trees to such an extent that they have been accused both of injuring the acorn crop and of injuring the wood in which the acorns are stored. Surely the hole-digging ability of some of the woodpeckers does not increase their popularity. I have had two grape arbors riddled by woodpeckers that dug winter resting holes in them. I know a friend who had the siding of a relatively new house punctured by woodpeckers. He does not like woodpeckers at all. I once slept on a sleeping porch that had a metal drain pipe that was selected by a flicker as a sounding board with which he told the world what a big guy he was. I did not appreciate his activity at 4:30 on an early summer morning when I had been out the night before. And so, you see, we can if we wish find many things that woodpeckers do that we do not appreciate. I rather think that this is common to all living things, including ourselves. Somehow to me it is difficult to bring any serious indictment against a chickadee or a black and white warbler that may come into our picture of feathered tree dusters.

We have mentioned the fact that many of our woodpeckers dig nesting burrows in trees to help in bringing up their families. While a nest may help a family survive it may also contribute to the extinction of a race. Some have suggested that one of the reasons the ivory-billed woodpeckers may have become extinct is due to their nesting habits. With the spread of lumbering operations, the number of suitable nesting sites for these marvelous birds has become reduced. This may mean that a bird, which would normally build a new nest burrow every year or so, is forced to use the same nest year after year. In some ways it would appear to be sensible to use a nest hole for more than one year, but this may not be the case. A nest hole used one year may become badly infested with the natural parasites of the bird. If the nest is not used every year these parasites may die out because they cannot get their food. However, if a nest is used frequently the parasite population may build up to such a point that it is practically impossible for a bird to use the nest for rearing its helpless young. I am not saying that this is the deciding factor in the disappearance of the ivory-bill, but it may well have been a contributing factor.

With the disappearance of superior environment, the ivory-billed woodpeckers vanished, but you cannot say that because the woodpeckers vanished the suitable forests disappeared. Similarly, while it may sound reasonable to suggest that our little downy woodpeckers do help out orchards, it would be dangerous to say that we cannot develop good orchards without the help of downy woodpeckers. Stories about tree sparrows destroying tons of weed seeds in Iowa may suggest that, but for the tree sparrows, Iowa would be wholly weeds. As a matter of fact, it is doubtful if the work of the tree sparrows has much effect on the weed population of Iowa. Similarly it is probably doubtful if the presence of woodpeckers has much effect on our orchards. In spite of these arguments pointing to the possible idea that these birds are not necessary to the economy of our woody plants, I still would hate to think of a world without them. If we admire workers as I do, we must admit that most of these birds really earn their living. Maybe trees can do without woodpeckers, nuthatches, creepers and titmice, but I cannot.