

**JOHN
BURROUGHS**

WAYS OF
NATURE

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Ways of Nature

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Ways of Nature

PREFACE

My reader will find this volume quite a departure in certain ways from the tone and spirit of my previous books, especially in regard to the subject of animal intelligence. Heretofore I have made the most of every gleam of intelligence of bird or four-footed beast that came under my observation, often, I fancy, making too much of it, and giving the wild creatures credit for more "sense" than they really possessed. The nature lover is always tempted to do this very thing; his tendency is to humanize the wild life about him, and to read his own traits and moods into whatever he looks upon. I have never consciously done this myself, at least to the extent of willfully misleading my reader. But some of our later nature writers have been guilty of this fault, and have so grossly exaggerated and misrepresented the every-day wild life of our fields and woods that their example has caused a strong reaction to take place in my own mind, and has led me to set about examining the whole subject of animal life and instinct in a way I have never done before.

In March, 1903, I contributed to "The Atlantic Monthly" a paper called "Real and Sham Natural History," which was as vigorous a protest as I could make against the growing tendency to humanize the lower animals. The paper was widely read and discussed, and bore fruit in many ways, much of it good and wholesome fruit, but a little of it bitter and acrid. For obvious reasons that paper is not included in this collection. But I have given all the essays that were the outcome of the currents of thought and inquiry that it set going in my mind, and I have given them nearly in the order in which they were written, so that the reader may see the growth of my own mind and opinions in relation to the subject. I confess I have not been fully able to persuade myself that the lower animals ever show anything more than a faint gleam of what we call thought and reflection, – the power to evolve ideas from sense impressions, – except feebly in the case of the dog and the apes, and possibly the elephant. Nearly all the animal behavior that the credulous public looks upon as the outcome of reason is simply the result of the adaptiveness and plasticity of instinct. The animal has impulses and impressions where we have ideas and concepts. Of our faculties I concede to them perception, sense memory, and association of memories, and little else. Without these it would be impossible for their lives to go on.

I am aware that there is much repetition in this volume, and that the names of several of the separate chapters differ much more than do the subjects discussed in them.

When I was a boy on the farm, we used to thrash our grain with the hand-flail. Our custom was to thrash a flooring of sheaves on one side, then turn the sheaves over and thrash them on the other, then unbind them and thrash the loosened straw again, and then finish by turning the whole over and thrashing it once more. I suspect my reader will feel that I have followed the same method in many of these papers. I have thrashed the same straw several times, but I have turned it each time, and I trust have been rewarded by a few additional grains of truth.

Let me hope that the result of the discussion or thrashing will not be to make the reader love the animals less, but rather to love the truth more.

June, 1905.

I WAYS OF NATURE

I was much amused lately by a half-dozen or more letters that came to me from some Californian schoolchildren, who wrote to ask if I would please tell them whether or not birds have sense. One little girl said: "I would be pleased if you would write and tell me if birds have sense. I wanted to see if I couldn't be the first one to know." I felt obliged to reply to the children that we ourselves do not have sense enough to know just how much sense the birds and other wild creatures do have, and that they do appear to have some, though their actions are probably the result of what we call instinct, or natural prompting, like that of the bean-stalk when it climbs the pole. Yet a bean-stalk will sometimes show a kind of perversity or depravity that looks like the result of deliberate choice. Each season, among my dozen or more hills of pole-beans, there are usually two or three low-minded plants that will not climb the poles, but go groveling upon the ground, wandering off among the potato-vines or cucumbers, departing utterly from the traditions of their race, becoming shiftless and vagrant. When I lift them up and wind them around the poles and tie them with a wisp of grass, they rarely stay. In some way they seem to get a wrong start in life, or else are degenerates from the first. I have never known anything like this among the wild creatures, though it happens often enough among our own kind. The trouble with the bean is doubtless this: the Lima bean is of South American origin, and in the Southern Hemisphere, beans, it seems, go the other way around the pole; that is, from right to left. When transferred north of the equator, it takes them some time to learn the new way, or from left to right, and a few of them are always backsliding, or departing from the new way and vaguely seeking the old; and not finding this, they become vagabonds.

How much or how little sense or judgment our wild neighbors have is hard to determine. The crows and other birds that carry shell-fish high in the air and then let them drop upon the rocks to break the shell show something very much like reason, or a knowledge of the relation of cause and effect, though it is probably an unthinking habit formed in their ancestors under the pressure of hunger. Froude tells of some species of bird that he saw in South Africa flying amid the swarm of migrating locusts and clipping off the wings of the insects so that they would drop to the earth, where the birds could devour them at their leisure. Our squirrels will cut off the chestnut burs before they have opened, allowing them to fall to the ground, where, as they seem to know, the burs soon dry open. Feed a caged coon soiled food, – a piece of bread or meat rolled on the ground, – and before he eats it he will put it in his dish of water and wash it off. The author of "Wild Life Near Home" says that muskrats "will wash what they eat, whether washing is needed or not." If the coon washes his food only when it needs washing, and not in every individual instance, then the proceeding looks like an act of judgment; the same with the muskrat. But if they always wash their food, whether soiled or not, the act looks more like instinct or an inherited habit, the origin of which is obscure.

Birds and animals probably think without knowing that they think; that is, they have not self-consciousness. Only man seems to be endowed with this faculty; he alone develops disinterested intelligence, – intelligence that is not primarily concerned with his own safety and well-being, but that looks abroad upon things. The wit of the lower animals seems all to have been developed by the struggle for existence, and it rarely gets beyond the prudential stage. The sharper the struggle, the sharper the wit. Our porcupine, for instance, is probably the most stupid of animals and has the least speed; it has little use for either wit or celerity of movement. It carries a death-dealing armor to protect it from its enemies, and it can climb the nearest hemlock tree and live on the bark all winter. The skunk, too, pays for its terrible weapon by dull wits. But think of the wit of the much-hunted fox, the much-hunted otter, the much-sought beaver! Even the grouse, when often fired at, learns, when it is started in the open, to fly with a corkscrew motion to avoid the shot.

Fear, love, and hunger were the agents that developed the wits of the lower animals, as they were, of course, the prime factors in developing the intelligence of man. But man has gone on, while the animals have stopped at these fundamental wants, – the need of safety, of offspring, of food.

Probably in a state of wild nature birds never make mistakes, but where they come in contact with our civilization and are confronted by new conditions, they very naturally make mistakes. For instance, their cunning in nest-building sometimes deserts them. The art of the bird is to conceal its nest both as to position and as to material, but now and then it is betrayed into weaving into its structure showy and bizarre bits of this or that, which give its secret away, and which seem to violate all the traditions of its kind. I have the picture of a robin's nest before me, upon the outside of which are stuck a muslin flower, a leaf from a small calendar, and a photograph of a local celebrity. A more incongruous use of material in bird architecture it would be hard to find. I have been told of another robin's nest upon the outside of which the bird had fastened a wooden label from a near-by flower-bed, marked "Wake Robin." Still another nest I have seen built upon a large, showy foundation of the paper-like flowers of *antennaria*, or everlasting. The wood thrush frequently weaves a fragment of newspaper or a white rag into the foundation of its nest. "Evil communications corrupt good manners." The newspaper and the rag-bag unsettle the wits of the birds. The phoebe-bird is capable of this kind of mistake or indiscretion. All the past generations of her tribe have built upon natural and, therefore, neutral sites, usually under shelving and overhanging rocks, and the art of adapting the nest to its surroundings, blending it with them, has been highly developed. But phoebe now frequently builds under our sheds and porches, where, so far as concealment is concerned, a change of material, say from moss to dry grass or shreds of bark, would be an advantage to her; but she departs not a bit from the family traditions; she uses the same woodsy mosses, which in some cases, especially when the nest is placed upon newly sawed timber, make her secret an open one to all eyes.

It does indeed often look as if the birds had very little sense. Think of a bluebird, or an oriole, or a robin, or a jay, fighting for hours at a time its own image as reflected in a pane of glass; quite exhausting itself in its fury to demolish its supposed rival! Yet I have often witnessed this little comedy. It is another instance of how the arts of our civilization corrupt and confuse the birds. It may be that in the course of many generations the knowledge of glass will get into their blood, and they will cease to be fooled by it, as they may also in time learn what a poor foundation the newspaper is to build upon. The ant or the bee could not be fooled by the glass in that way for a moment.

Have the birds and our other wild neighbors sense, as distinguished from instinct? Is a change of habits to meet new conditions, or the taking advantage of accidental circumstances, an evidence of sense? How many birds appear to have taken advantage of the protection afforded by man in building their nests! How many of them build near paths and along roadsides, to say nothing of those that come close to our dwellings! Even the quail seems to prefer the borders of the highway to the open fields. I have chanced upon only three quails' nests, and these were all by the roadside. One season a scarlet tanager that had failed with her first nest in the woods came to try again in a little cherry tree that stood in the open, a few feet from my cabin, where I could almost touch the nest with my hand as I passed. But in my absence she again came to grief, some marauder, probably a red squirrel, taking her eggs. Will her failure in this case cause her to lose faith in the protective influence of the shadow of a human dwelling? I hope not. I have known the turtle dove to make a similar move, occupying an old robin's nest near my neighbor's cottage. The timid rabbit will sometimes come up from the bushy fields and excavate a place for her nest in the lawn a few feet from the house. All such things look like acts of judgment, though they may be only the result of a greater fear overcoming a lesser fear.

It is in the preservation of their lives and of their young that the wild creatures come the nearest to showing what we call sense or reason. The boys tell me that a rabbit that has been driven from her hole a couple of times by a ferret will not again run into it when pursued. The tragedy of a rabbit pursued by a mink or a weasel may often be read upon our winter snows. The rabbit does not take to her hole; it would be fatal. And yet, though capable of far greater speed, so far as I have observed, she

does not escape the mink; he very soon pulls her down. It would look as though a fatal paralysis, the paralysis of utter fear, fell upon the poor creature as soon as she found herself hunted by this subtle, bloodthirsty enemy. I have seen upon the snow where her jumps had become shorter and shorter, with tufts of fur marking each stride, till the bloodstains, and then her half-devoured body, told the whole tragic story.

There is probably nothing in human experience, at this age of the world, that is like the helpless terror that seizes the rabbits as it does other of our lesser wild creatures, when pursued by any of the weasel tribe. They seem instantly to be under some fatal spell which binds their feet and destroys their will power. It would seem as if a certain phase of nature from which we get our notions of fate and cruelty had taken form in the weasel.

The rabbit, when pursued by the fox or by the dog, quickly takes to hole. Hence, perhaps, the wit of the fox that a hunter told me about. The story was all written upon the snow. A mink was hunting a rabbit, and the fox, happening along, evidently took in the situation at a glance. He secreted himself behind a tree or a rock, and, as the rabbit came along, swept her from her course like a charge of shot fired at close range, hurling her several feet over the snow, and then seizing her and carrying her to his den up the mountain-side.

It would be interesting to know how long our chimney swifts saw the open chimney-stacks of the early settlers beneath them before they abandoned the hollow trees in the woods and entered the chimneys for nesting and roosting purposes. Was the act an act of judgment, or simply an unreasoning impulse, like so much else in the lives of the wild creatures?

In the choice of nesting-material the swift shows no change of habit. She still snips off the small dry twigs from the tree-tops and glues them together, and to the side of the chimney, with her own glue. The soot is a new obstacle in her way, that she does not yet seem to have learned to overcome, as the rains often loosen it and cause her nest to fall to the bottom. She has a pretty way of trying to frighten you off when your head suddenly darkens the opening above her. At such times she leaves the nest and clings to the side of the chimney near it. Then, slowly raising her wings, she suddenly springs out from the wall and back again, making as loud a drumming with them in the passage as she is capable of. If this does not frighten you away, she repeats it three or four times. If your face still hovers above her, she remains quiet and watches you.

What a creature of the air this bird is, never touching the ground, so far as I know, and never tasting earthly food! The swallow does perch now and then and descend to the ground for nesting-material; but the swift, I have reason to believe, even outrides the summer storms, facing them on steady wing, high in air. The twigs for her nest she gathers on the wing, sweeping along like children on a "merry-go-round" who try to seize a ring, or to do some other feat, as they pass a given point. If the swift misses the twig, or it fails to yield to her the first time, she tries again and again, each time making a wider circuit, as if to tame and train her steed a little and bring him up more squarely to the mark next time.

The swift is a stiff flyer: there appear to be no joints in her wings; she suggests something made of wires or of steel. Yet the air of frolic and of superabundance of wing-power is more marked with her than with any other of our birds. Her feeding and twig-gathering seem like asides in a life of endless play. Several times both in spring and fall I have seen swifts gather in immense numbers toward nightfall, to take refuge in large unused chimney-stacks. On such occasions they seem to be coming together for some aerial festival or grand celebration; and, as if bent upon a final effort to work off a part of their superabundant wing-power before settling down for the night, they circle and circle high above the chimney-top, a great cloud of them, drifting this way and that, all in high spirits and chipping as they fly. Their numbers constantly increase as other members of the clan come dashing in from all points of the compass. Swifts seem to materialize out of empty air on all sides of the chipping, whirling ring, as an hour or more this assembling of the clan and this flight festival

go on. The birds must gather in from whole counties, or from half a State. They have been on the wing all day, and yet now they seem as tireless as the wind, and as if unable to curb their powers.

One fall they gathered in this way and took refuge for the night in a large chimney-stack in a city near me, for more than a month and a half. Several times I went to town to witness the spectacle, and a spectacle it was: ten thousand of them, I should think, filling the air above a whole square like a whirling swarm of huge black bees, but saluting the ear with a multitudinous chipping, instead of a humming. People gathered upon the sidewalks to see them. It was a rare circus performance, free to all. After a great many feints and playful approaches, the whirling ring of birds would suddenly grow denser above the chimney; then a stream of them, as if drawn down by some power of suction, would pour into the opening. For only a few seconds would this downward rush continue; then, as if the spirit of frolic had again got the upper hand of them, the ring would rise, and the chipping and circling go on. In a minute or two the same manœuvre would be repeated, the chimney, as it were, taking its swallows at intervals to prevent choking. It usually took a half-hour or more for the birds all to disappear down its capacious throat. There was always an air of timidity and irresolution about their approach to the chimney, just as there always is about their approach to the dead tree-top from which they procure their twigs for nest-building. Often did I see birds hesitate above the opening and then pass on, apparently as though they had not struck it at just the right angle. On one occasion a solitary bird was left flying, and it took three or four trials either to make up its mind or to catch the trick of the descent. On dark or threatening or stormy days the birds would begin to assemble by mid-afternoon, and by four or five o'clock were all in their lodgings.

The chimney is a capacious one, forty or fifty feet high and nearly three feet square, yet it did not seem adequate to afford breathing-space for so many birds. I was curious to know how they disposed themselves inside. At the bottom was a small opening. Holding my ear to it, I could hear a continuous chipping and humming, as if the birds were still all in motion, like an agitated beehive. At nine o'clock this multitudinous sound of wings and voices was still going on, and doubtless it was kept up all night. What was the meaning of it? Was the press of birds so great that they needed to keep their wings moving to ventilate the shaft, as do certain of the bees in a crowded hive? Or were these restless spirits unable to fold their wings even in sleep? I was very curious to get a peep inside that chimney when the swifts were in it. So one afternoon this opportunity was afforded me by the removal of the large smoke-pipe of the old steam-boiler. This left an opening into which I could thrust my head and shoulders. The sound of wings and voices filled the hollow shaft. On looking up, I saw the sides of the chimney for about half its length paved with the restless birds; they sat so close together that their bodies touched. Moreover, a large number of them were constantly on the wing, showing against the sky light as if they were leaving the chimney. But they did not leave it. They rose up a few feet and then resumed their positions upon the sides, and it was this movement that caused the humming sound. All the while the droppings of the birds came down like a summer shower. At the bottom of the shaft was a mine of guano three or four feet deep, with a dead swift here and there upon it. Probably one or more birds out of such a multitude died every night. I had fancied there would be many more. It was a long time before it dawned upon me what this uninterrupted flight within the chimney meant. Finally I saw that it was a sanitary measure: only thus could the birds keep from soiling each other with their droppings. Birds digest very rapidly, and had they all continued to cling to the sides of the wall, they would have been in a sad predicament before morning. Like other acts of cleanliness on the part of birds, this was doubtless the prompting of instinct and not of judgment. It was Nature looking out for her own.

In view, then, of the doubtful sense or intelligence of the wild creatures, what shall we say of the new school of nature writers or natural history romancers that has lately arisen, and that reads into the birds and animals almost the entire human psychology? This, surely: so far as these writers awaken an interest in the wild denizens of the field and wood, and foster a genuine love of them in the hearts of the young people, so far is their influence good; but so far as they pervert natural history and

give false impressions of the intelligence of our animals, catering to a taste that prefers the fanciful to the true and the real, is their influence bad. Of course the great army of readers prefer this sugar-coated natural history to the real thing, but the danger always is that an indulgence of this taste will take away a liking for the real thing, or prevent its development. The knowing ones, those who can take these pretty tales with the pinch of salt of real knowledge, are not many; the great majority are simply entertained while they are being humbugged. There may be no very serious objection to the popular love of sweets being catered to in this field by serving up the life-history of our animals in a story, all the missing links supplied, and all their motives and acts humanized, provided it is not done covertly and under the guise of a real history. We are never at a loss how to take Kipling in his "Jungle Book;" we are pretty sure that this is fact dressed up as fiction, and that much of the real life of the jungle is in these stories. I remember reading his story of "The White Seal" shortly after I had visited the Seal Islands in Bering Sea, and I could not detect in the story one departure from the facts of the life-history of the seal, so far as it is known. Kipling takes no covert liberties with natural history, any more than he does with the facts of human history in his novels.

Unadulterated, unsweetened observations are what the real nature-lover craves. No man can invent incidents and traits as interesting as the reality. Then, to know that a thing is true gives it such a savor! The truth – how we do crave the truth! We cannot feed our minds on simulacra any more than we can our bodies. Do assure us that the thing you tell is true. If you must counterfeit the truth, do it so deftly that we shall never detect you. But in natural history there is no need to counterfeit the truth; the reality always suffices, if you have eyes to see it and ears to hear it. Behold what Maeterlinck makes out of the life of the bee, simply by getting at and portraying the facts – a true wonder-book, the enchantment of poetry wedded to the authority of science.

Works on animal intelligence, such as Romanes's, abound in incidents that show in the animals reason and forethought in their simpler forms; but in many cases the incidents related in these works are not well authenticated, nor told by trained observers. The observations of the great majority of people have no scientific value whatever. Romanes quotes from some person who alleges that he saw a pair of nightingales, during a flood in the river near which their nest was placed, pick up the nest bodily and carry it to a place of safety. This is incredible. If Romanes himself or Darwin himself said he saw this, one would have to believe it. Birds whose nests have been plundered sometimes pull the old nest to pieces and use the material, or parts of it, in building a new nest; but I cannot believe that any pair of birds ever picked up a nest containing eggs and carried it off to a new place. How could they do it? With one on each side, how could they fly with the nest between them? They could not carry it with their feet, and how could they manage it with their beaks?

My neighbor met in the woods a black snake that had just swallowed a red squirrel. Now your romance-naturalist may take such a fact as this and make as pretty a story of it as he can. He may ascribe to the snake and his victim all the human emotions he pleases. He may make the snake glide through the tree-tops from limb to limb, and from tree to tree, in pursuit of its prey: the main thing is, the snake got the squirrel. If our romancer makes the snake fascinate the squirrel, I shall object, because I don't believe that snakes have this power. People like to believe that they have. It would seem as if this subtle, gliding, hateful creature ought to have some such mysterious gift, but I have no proof that it has. Every year I see the black snake robbing birds'-nests, or pursued by birds whose nests it has just plundered, but I have yet to see it cast its fatal spell upon a grown bird. Or, if our romancer says that the black snake was drilled in the art of squirrel-catching by its mother, I shall know he is a pretender.

Speaking of snakes reminds me of an incident I have several times witnessed in our woods in connection with a snake commonly called the sissing or blowing adder. When I have teased this snake a few moments with my cane, it seems to be seized with an epileptic or cataleptic fit. It throws itself upon its back, coiled nearly in the form of a figure eight, and begins a series of writhings and twistings and convulsive movements astonishing to behold. Its mouth is open and presently full of

leaf-mould, its eyes are covered with the same, its head is thrown back, its white belly up; now it is under the leaves, now out, the body all the while being rapidly drawn through this figure eight, so that the head and tail are constantly changing place. What does it mean? Is it fear? Is it a real fit? I do not know, but any one of our romance-naturalists could tell you at once. I can only suggest that it may be a ruse to baffle its enemy, the black snake, when he would attempt to crush it in his folds, or to seize its head when he would swallow it.

I am reminded of another mystery connected with a snake, or a snake-skin, and a bird. Why does our great crested flycatcher weave a snake-skin into its nest, or, in lieu of that, something that suggests a snake-skin, such as an onion-skin, or fish-scales, or a bit of oiled paper? It is thought by some persons that it uses the snake-skin as a kind of scarecrow, to frighten away its natural enemies. But think what this purpose in the use of it would imply. It would imply that the bird knew that there were among its enemies creatures that were afraid of snakes – so afraid of them that one of their faded and cast-off skins would keep these enemies away. How could the bird obtain this knowledge? It is not afraid of the skin itself; why should it infer that squirrels, for instance, are? I am convinced there is nothing in this notion. In all the nests that have come under my observation, the snake-skin was in faded fragments woven into the texture of the nest, and one would not be aware of its presence unless he pulled the nest to pieces. True, Mr. Frank Bolles reports finding a nest of this bird with a whole snake-skin coiled around a single egg; but it was the skin of a small garter-snake, six or seven inches long, and could not therefore have inspired much terror in the heart of the bird's natural enemies. Dallas Lore Sharp, author of that delightful book, "Wild Life Near Home," tells me he has seen a whole skin dangling nearly its entire length from the hole that contained the nest, just as he has seen strings hanging from the nest of the kingbird. The bird was too hurried or too careless to pull in the skin. Mr. Sharp adds that he cannot "give the bird credit for appreciating the attitude of the rest of the world toward snakes, and making use of the fear." Moreover, a cast-off snake-skin looks very little like a snake. It is thin, shrunken, faded, papery, and there is no terror in it. Then, too, it is dark in the cavity of the nest, consequently the skin could not serve as a scarecrow in any case. Hence, whatever its purpose may be, it surely is not that. It looks like a mere fancy or whim of the bird. There is that in its voice and ways that suggests something a little uncanny. Its call is more like the call of the toad than that of a bird. If the toad did not always swallow its own cast-off skin, the bird would probably use that too.

At the best we can only guess at the motives of the birds and beasts. As I have elsewhere said, they nearly all have reference in some way to the self-preservation of these creatures. But how the bits of an old snake-skin in a bird's nest can contribute specially to this end, I cannot see.

Nature is not always consistent; she does not always choose the best means to a given end. For instance, all the wrens except our house wren seem to use about the best material at hand for their nests. What can be more unsuitable, untractable, for a nest in a hole or cavity than the twigs the house wren uses? Dry grasses or bits of soft bark would bend and adapt themselves easily to the exigencies of the case; but stiff, unyielding twigs! What a contrast to the suitability of the material the hummingbird uses – the down of some plant, which seems to have a poetic fitness!

Yesterday in my walk I saw where a red squirrel had stripped the soft outer bark off a group of red cedars to build its winter's nest with. This also seemed fit, – fit that such a creature of the trees should not go to the ground for its nest-material, and should choose something soft and pliable. Among the birches, it probably gathers the fine curling shreds of the birch bark.

Beside my path in the woods a downy woodpecker, late one fall, drilled a hole in the top of a small dead black birch for his winter quarters. My attention was first called to his doings by the white chips upon the ground. Every day as I passed I would rap upon his tree, and if he was in he would appear at his door and ask plainly enough what I wanted now. One day when I rapped, something else appeared at the door – I could not make out what. I continued my rapping, when out came two flying-squirrels. On the tree being given a vigorous shake, it broke off at the hole, and the squirrels

went sliding down the air to the foot of a hemlock, up which they disappeared. They had dispossessed Downy of his house, had carried in some grass and leaves for a nest, and were as snug as a bug in a rug. Downy drilled another cell in a dead oak farther up the hill, and, I hope, passed the winter there unmolested. Such incidents, comic or tragic, as they chance to strike us, are happening all about us, if we have eyes to see them.

The next season, near sundown of a late November day, I saw Downy trying to get possession of a hole not his own. I chanced to be passing under a maple, when white chips upon the ground again caused me to scrutinize the branches overhead. Just then I saw Downy come to the tree, and, hopping around on the under side of a large dry limb, begin to make passes at something with his beak. Presently I made out a round hole there, with something in it returning Downy's thrusts. The sparring continued some moments. Downy would hop away a few feet, then return to the attack, each time to be met by the occupant of the hole. I suspected an English sparrow had taken possession of Downy's cell in his absence during the day, but I was wrong. Downy flew to another branch, and I tossed up a stone against the one that contained the hole, when, with a sharp, steely note, out came a hairy woodpecker and alighted on a near-by branch. Downy, then, had the "cheek" to try to turn his large rival out of doors – and it was Hairy's cell, too; one could see that by the size of the entrance. Thus loosely does the rule of *meum* and *tuum* obtain in the woods. There is no moral code in nature. Might reads right. Man in communities has evolved ethical standards of conduct, but nations, in their dealings with one another, are still largely in a state of savage nature, and seek to establish the right, as dogs do, by the appeal to battle.

One season a wood duck laid her eggs in a cavity in the top of a tall yellow birch near the spring that supplies my cabin with water. A bold climber "shinned" up the fifty or sixty feet of rough tree-trunk and looked in upon the eleven eggs. They were beyond the reach of his arm, in a well-like cavity over three feet deep. How would the mother duck get her young up out of that well and down to the ground? We watched, hoping to see her in the act. But we did not. She may have done it at night or very early in the morning. All we know is that when Amasa one morning passed that way, there sat eleven little tufts of black and yellow down in the spring, with the mother duck near by. It was a pretty sight. The feat of getting down from the tree-top cradle had been safely effected, probably by the young clambering up on the inside walls of the cavity and then tumbling out into the air and coming down gently like huge snowflakes. They are mostly down, and why should they not fall without any danger to life or limb? The notion that the mother duck takes the young one by one in her beak and carries them to the creek is doubtless erroneous. Mr. William Brewster once saw the golden-eye, whose habits of nesting are like those of the wood duck, get its young from the nest to the water in this manner: The mother bird alighted in the water under the nest, looked all around to see that the coast was clear, and then gave a peculiar call. Instantly the young shot out of the cavity that held them, as if the tree had taken an emetic, and came softly down to the water beside their mother. Another observer assures me that he once found a newly hatched duckling hung by the neck in the fork of a bush under a tree in which a brood of Wood ducks had been hatched.

The ways of nature, – who can map them, or fathom them, or interpret them, or do much more than read a hint correctly here and there? Of one thing we may be pretty certain, namely, that the ways of wild nature may be studied in our human ways, inasmuch as the latter are an evolution from the former, till we come to the ethical code, to altruism and self-sacrifice. Here we seem to breathe another air, though probably this code differs no more from the animal standards of conduct than our physical atmosphere differs from that of early geologic time.

Our moral code must in some way have been evolved from our rude animal instincts. It came from within; its possibilities were all in nature. If not, where were they?

I have seen disinterested acts among the birds, or what looked like such, as when one bird feeds the young of another species when it hears them crying for food. But that a bird would feed a grown bird of another species, or even of its own, to keep it from starving, I have my doubts. I am

quite positive that mice will try to pull one of their fellows out of a trap, but what the motive is, who shall say? Would the same mice share their last crumb with their fellow if he were starving? That, of course, would be a much nearer approach to the human code, and is too much to expect. Bees will clear their fellows of honey, but whether it be to help them, or to save the honey, is a question.

In my youth I saw a parent weasel seize one of its nearly grown young which I had wounded and carry it across an open barway, in spite of my efforts to hinder it. A friend of mine, who is a careful observer, says he once wounded a shrike so that it fell to the ground, but before he got to it, it recovered itself and flew with difficulty toward some near trees, calling to its mate the while; the mate came and seemed to get beneath the wounded bird and buoy it up, so aiding it that it gained the top of a tall tree, where my friend left it. But in neither instance can we call this helpfulness entirely disinterested, or pure altruism.

Emerson said that he was an endless experimenter with no past at his back. This is just what Nature is. She experiments endlessly, seeking new ways, new modes, new forms, and is ever intent upon breaking away from the past. In this way, as Darwin showed, she attains to new species. She is blind, she gropes her way, she trusts to luck; all her successes are chance hits. Whenever I look over my right shoulder, as I sit at my desk writing these sentences, I see a long shoot of a honeysuckle that came in through a crack of my imperfectly closed window last summer. It came in looking, or rather feeling, for something to cling to. It first dropped down upon a pile of books, then reached off till it struck the window-sill of another large window; along this it crept, its regular leaves standing up like so many pairs of green ears, looking very pretty. Coming to the end of the open way there, it turned to the left and reached out into vacancy, till it struck another window-sill running at right angles to the former; along this it traveled nearly half an inch a day, till it came to the end of that road. Then it ventured out into vacant space again, and pointed straight toward me at my desk, ten feet distant. Day by day it kept its seat upon the window-sill, and stretched out farther and farther, almost beckoning me to give it a lift or to bring it support. I could hardly resist its patient daily appeal. Late in October it had bridged about three feet of the distance that separated us, when, one day, the moment came when it could maintain itself outright in the air no longer, and it fell to the floor. "Poor thing," I said, "your faith was blind, but it was real. You knew there was a support somewhere, and you tried all ways to find it." This is Nature. She goes around the circle, she tries every direction, sure that she will find a way at some point. Animals in cages behave in a similar way, looking for a means of escape. In the vineyard I see the grape-vines reaching out blindly in all directions for some hold for their tendrils. The young arms seize upon one another and tighten their hold as if they had at last found what they were in search of. Stop long enough beside one of the vines, and it will cling to you and run all over you.

Behold the tumble-bug with her ball of dung by the roadside; where is she going with it? She is going anywhere and everywhere; she changes her direction, like the vine, whenever she encounters an obstacle. She only knows that somewhere there is a depression or a hole in which her ball with its egg can rest secure, and she keeps on tumbling about till she finds it, or maybe digs one, or comes to grief by the foot of some careless passer-by. This, again, is Nature's way, randomly and tirelessly seeking her ends. When we look over a large section of history, we see that it is man's way, too, or Nature's way in man. His progress has been a blind groping, the result of endless experimentation, and all his failures and mistakes could not be written in a book. How he has tumbled about with his ball, seeking the right place for it, and how many times has he come to grief! All his successes have been lucky hits: steam, electricity, representative government, printing – how long he groped for them before he found them! There is always and everywhere the Darwinian tendency to variation, to seek new forms, to improve upon the past; and man is under this law, the same as is the rest of nature. One generation of men, like one generation of leaves, becomes the fertilizer of the next; failures only enrich the soil or make smoother the way.

There are so many conflicting forces and interests, and the conditions of success are so complex! If the seed fall here, it will not germinate; if there, it will be drowned or washed away; if yonder, it will find too sharp competition. There are only a few places where it will find all the conditions favorable. Hence the prodigality of Nature in seeds, scattering a thousand for one plant or tree. She is like a hunter shooting at random into every tree or bush, hoping to bring down his game, which he does if his ammunition holds out long enough; or like the British soldier in the Boer War, firing vaguely at an enemy that he does not see. But Nature's ammunition always holds out, and she hits her mark in the end. Her ammunition on our planet is the heat of the sun. When this fails, she will no longer hit the mark or try to hit it.

Let there be a plum tree anywhere with the disease called the "black-knot" upon it, and presently every plum tree in its neighborhood will have black knots. Do you think the germs from the first knot knew where to find the other plum trees? No; the wind carried them in every direction, where the plum trees were not as well as where they were. It was a blind search and a chance hit. So with all seeds and germs. Nature covers all the space, and is bound to hit the mark sooner or later. The sun spills his light indiscriminately into space; a small fraction of his rays hit the earth, and we are warmed. Yet to all intents and purposes it is as if he shone for us alone.

II BIRD-SONGS

I suspect it requires a special gift of grace to enable one to hear the bird-songs; some new power must be added to the ear, or some obstruction removed. There are not only scales upon our eyes so that we do not see, there are scales upon our ears so that we do not hear. A city woman who had spent much of her time in the country once asked a well-known ornithologist to take her where she could hear the bluebird. "What, never heard the bluebird!" said he. "I have not," said the woman. "Then you will never hear it," said the bird-lover; never hear it with that inward ear that gives beauty and meaning to the note. He could probably have taken her in a few minutes where she could have heard the call or warble of the bluebird; but it would have fallen upon unresponsive ears – upon ears that were not sensitized by love for the birds or associations with them. Bird-songs are not music, properly speaking, but only suggestions of music. A great many people whose attention would be quickly arrested by the same volume of sound made by a musical instrument or by artificial means never hear them at all. The sound of a boy's penny whistle there in the grove or the meadow would separate itself more from the background of nature, and be a greater challenge to the ear, than is the strain of the thrush or the song of the sparrow. There is something elusive, indefinite, neutral, about bird-songs that makes them strike obliquely, as it were, upon the ear; and we are very apt to miss them. They are a part of nature, the Nature that lies about us, entirely occupied with her own affairs, and quite regardless of our presence. Hence it is with bird-songs as it is with so many other things in nature – they are what we make them; the ear that hears them must be half creative. I am always disturbed when persons not especially observant of birds ask me to take them where they can hear a particular bird, in whose song they have become interested through a description in some book. As I listen with them, I feel like apologizing for the bird: it has a bad cold, or has just heard some depressing news; it will not let itself out. The song seems so casual and minor when you make a dead set at it. I have taken persons to hear the hermit thrush, and I have fancied that they were all the time saying to themselves, "Is that all?" But should one hear the bird in his walk, when the mind is attuned to simple things and is open and receptive, when expectation is not aroused and the song comes as a surprise out of the dusky silence of the woods, then one feels that it merits all the fine things that can be said of it.

One of our popular writers and lecturers upon birds told me this incident: He had engaged to take two city girls out for a walk in the country, to teach them the names of the birds they might see and hear. Before they started, he read to them Henry van Dyke's poem on the song sparrow, – one of our best bird-poems, – telling them that the song sparrow was one of the first birds they were likely to hear. As they proceeded with their walk, sure enough, there by the roadside was a sparrow in song. The bird man called the attention of his companions to it. It was some time before the unpracticed ears of the girls could make it out; then one of them said (the poem she had just heard, I suppose, still ringing in her ears), "What! that little squeaky thing?" The sparrow's song meant nothing to her at all, and how could she share the enthusiasm of the poet? Probably the warble of the robin, or the call of the meadowlark or of the highhole, if they chanced to hear them, meant no more to these girls. If we have no associations with these sounds, they will mean very little to us. Their merit as musical performances is very slight. It is as signs of joy and love in nature, as heralds of spring, and as the spirit of the woods and fields made audible, that they appeal to us. The drumming of the woodpeckers and of the ruffed grouse give great pleasure to a countryman, though these sounds have not the quality of real music. It is the same with the call of the migrating geese or the voice of any wild thing: our pleasure in them is entirely apart from any considerations of music. Why does the wild flower, as we chance upon it in the woods or bogs, give us more pleasure than the more elaborate flower of the

garden or lawn? Because it comes as a surprise, offers a greater contrast with its surroundings, and suggests a spirit in wild nature that seems to take thought of itself and to aspire to beautiful forms.

The songs of caged birds are always disappointing, because such birds have nothing but their musical qualities to recommend them to us. We have separated them from that which gives quality and, meaning to their songs. One recalls Emerson's lines: —

"I thought the sparrow's note from heaven,
Singing at dawn on the alder bough;
I brought him home, in his nest, at even;
He sings the song, but it cheers not now,
For I did not bring home the river and sky; —
He sang to my ear, – they sang to my eye."

I have never yet seen a caged bird that I wanted, – at least, not on account of its song, – nor a wild flower that I wished to transfer to my garden. A caged skylark will sing its song sitting on a bit of turf in the bottom of the cage; but you want to stop your ears, it is so harsh and sibilant and penetrating. But up there against the morning sky, and above the wide expanse of fields, what delight we have in it! It is not the concord of sweet sounds: it is the soaring spirit of gladness and ecstasy raining down upon us from "heaven's gate."

Then, if to the time and the place one could only add the association, or hear the bird through the vista of the years, the song touched with the magic of youthful memories! One season a friend in England sent me a score of skylarks in a cage. I gave them their liberty in a field near my place. They drifted away, and I never heard them or saw them again. But one Sunday a Scotchman from a neighboring city called upon me, and declared with visible excitement that on his way along the road he had heard a skylark. He was not dreaming; he knew it was a skylark, though he had not heard one since he had left the banks of the Doon, a quarter of a century or more before. What pleasure it gave him! How much more the song meant to him than it would have meant to me! For the moment he was on his native heath again. Then I told him about the larks I had liberated, and he seemed to enjoy it all over again with renewed appreciation.

Many years ago some skylarks were liberated on Long Island, and they became established there, and may now occasionally be heard in certain localities. One summer day a friend of mine was out there observing them; a lark was soaring and singing in the sky above him. An old Irishman came along, and suddenly stopped as if transfixed to the spot; a look of mingled delight and incredulity came into his face. Was he indeed hearing the bird of his youth? He took off his hat, turned his face skyward, and with moving lips and streaming eyes stood a long time regarding the bird. "Ah," my friend thought, "if I could only hear that song with his ears!" How it brought back his youth and all those long-gone days on his native hills!

The power of bird-songs over us is so much a matter of association that every traveler to other countries finds the feathered songsters of less merit than those he left behind. The stranger does not hear the birds in the same receptive, uncritical frame of mind as does the native; they are not in the same way the voices of the place and the season. What music can there be in that long, piercing, far-heard note of the first meadowlark in spring to any but a native, or in the "o-ka-lee" of the red-shouldered starling as he rests upon the willows in March? A stranger would probably recognize melody and a wild woody quality in the flutings of the veery thrush; but how much more they would mean to him after he had spent many successive Junes threading our northern trout-streams and encamping on their banks! The veery will come early in the morning, and again at sundown, and perch above your tent, and blow his soft, reverberant note for many minutes at a time. The strain repeats the echoes of the limpid stream in the halls and corridors of the leafy woods.

While in England in 1882, I rushed about two or three counties in late June and early July, bent on hearing the song of the nightingale, but missed it by a few days, and in some cases, as it seemed, only by a few hours. The nightingale seems to be wound up to go only so long, or till about the middle of June, and it is only by a rare chance that you hear one after that date. Then I came home to hear a nightingale in song one winter morning in a friend's house in the city. It was a curious let-down to my enthusiasm. A caged song in a city chamber in broad daylight, in lieu of the wild, free song in the gloaming of an English landscape! I closed my eyes, abstracted myself from my surroundings, and tried my best to fancy myself listening to the strain back there amid the scenes I had haunted about Haslemere and Godalming, but with poor success, I suspect. The nightingale's song, like the lark's, needs vista, needs all the accessories of time and place. The song is not all in the singing, any more than the wit is all in the saying. It is in the occasion, the surroundings, the spirit of which it is the expression. My friend said that the bird did not fully let itself out. Its song was a brilliant medley of notes, – no theme that I could detect, – like the lark's song in this respect; all the notes of the field and forest appeared to be the gift of this bird, but what tone! what accent! like that of a great poet!

Nearly every May I am seized with an impulse to go back to the scenes of my youth, and hear the bobolinks in the home meadows once more. I am sure they sing there better than anywhere else. They probably drink nothing but dew, and the dew distilled in those high pastoral regions has surprising virtues. It gives a clear, full, vibrant quality to the birds' voices that I have never heard elsewhere. The night of my arrival, I leave my southern window open, so that the meadow chorus may come pouring in before I am up in the morning. How it does transport me athwart the years, and make me a boy again, sheltered by the paternal wing! On one occasion, the third morning after my arrival, a bobolink appeared with a new note in his song. The note sounded like the word "baby" uttered with a peculiar, tender resonance: but it was clearly an interpolation; it did not belong there; it had no relation to the rest of the song. Yet the bird never failed to utter it with the same joy and confidence as the rest of his song. Maybe it was the beginning of a variation that will in time result in an entirely new bobolink song.

On my last spring visit to my native hills, my attention was attracted to another songster not seen or heard there in my youth, namely, the prairie horned lark. Flocks of these birds used to be seen in some of the Northern States in the late fall during their southern migrations; but within the last twenty years they have become regular summer residents in the hilly parts of many sections of New York and New England. They are genuine skylarks, and lack only the powers of song to make them as attractive as their famous cousins of Europe.

The larks are ground-birds when they perch, and sky-birds when they sing; from the turf to the clouds – nothing between. Our horned lark mounts upward on quivering wing in the true lark fashion, and, spread out against the sky at an altitude of two or three hundred feet, hovers and sings. The watcher and listener below holds him in his eye, but the ear catches only a faint, broken, half-inarticulate note now and then – mere splinters, as it were, of the song of the skylark. The song of the latter is continuous, and is loud and humming; it is a fountain of jubilant song up there in the sky: but our lark sings in snatches; at each repetition of its notes it dips forward and downward a few feet, and then rises again. One day I kept my eye upon one until it had repeated its song one hundred and three times; then it closed its wings, and dropped toward the earth like a plummet, as does its European congener. While I was watching the bird, a bobolink flew over my head, between me and the lark, and poured out his voluble and copious strain. "What a contrast," I thought, "between the voice of the spluttering, tongue-tied lark, and the free, liquid, and varied song of the bobolink!"

I have heard of a curious fact in the life-histories of these larks in the West. A Michigan woman once wrote me that her brother, who was an engineer on an express train that made daily trips between two Western cities, reported that many birds were struck by the engine every day, and killed – often as many as thirty on a trip of sixty miles. Birds of many kinds were killed, but the most common was a bird that went in flocks, the description of which answered to the horned lark. Since then I

have read in a Minnesota newspaper that many horned larks are killed by railroad locomotives in that State. It was thought that the birds sat behind the rails to get out of the wind, and on starting up in front of the advancing train, were struck down by the engine. The Michigan engineer referred to thought that the birds gathered upon the track to earth their wings, or else to pick up the grain that leaks out of the wheat-trains, and sows the track from Dakota to the seaboard. Probably the wind which they might have to face in getting up was the prime cause of their being struck. One does not think of the locomotive as a bird-destroyer, though it is well known that many of the smaller mammals often fall beneath it.

A very interesting feature of our bird-songs is the wing-song, or song of ecstasy. It is not the gift of many of our birds. Indeed, less than a dozen species are known to me as ever singing on the wing. It seems to spring from more intense excitement and self-abandonment than the ordinary song delivered from the perch. When its joy reaches the point of rapture, the bird is literally carried off its feet, and up it goes into the air, pouring out its song as a rocket pours out its sparks. The skylark and the bobolink habitually do this, while a few others of our birds do it only on occasions. One summer, up in the Catskills, I added another name to my list of ecstatic singers – that of the vesper sparrow. Several times I heard a new song in the air, and caught a glimpse of the bird as it dropped back to the earth. My attention would be attracted by a succession of hurried, chirping notes, followed by a brief burst of song, then by the vanishing form of the bird. One day I was lucky enough to see the bird as it was rising to its climax in the air, and to identify it as the vesper sparrow. The burst of song that crowned the upward flight of seventy-five or one hundred feet was brief; but it was brilliant and striking, and entirely unlike the leisurely chant of the bird while upon the ground. It suggested a lark, but was less buzzing or humming. The preliminary chirping notes, uttered faster and faster as the bird mounted in the air, were like the trail of sparks which a rocket emits before its grand burst of color at the top of its flight.

It is interesting to note that this bird is quite lark-like in its color and markings, having the two lateral white quills in the tail, and it has the habit of elevating the feathers on the top of the head so as to suggest a crest. The solitary skylark that I discovered several years ago in a field near me was seen on several occasions paying his addresses to one of these birds, but the vesper-bird was shy, and eluded all his advances.

Probably the perch-songster among our ordinary birds that is most regularly seized with the fit of ecstasy that results in this lyric burst in the air, as I described in my first book, "Wake Robin," over thirty years ago, is the oven-bird, or wood-accentor – the golden-crowned thrush of the old ornithologists. Every loiterer about the woods knows this pretty, speckled-breasted, olive-backed little bird, which walks along over the dry leaves a few yards from him, moving its head as it walks, like a miniature domestic fowl. Most birds are very stiff-necked, like the robin, and as they run or hop upon the ground, carry the head as if it were riveted to the body. Not so the oven-bird, or the other birds that walk, as the cow-bunting, or the quail, or the crow. They move the head forward with the movement of the feet. The sharp, reiterated, almost screeching song of the oven-bird, as it perches on a limb a few feet from the ground, like the words, "preacher, preacher, preacher," or "teacher, teacher, teacher," uttered louder and louder, and repeated six or seven times, is also familiar to most ears; but its wild, ringing, rapturous burst of song in the air high above the tree-tops is not so well known. From a very prosy, tiresome, unmelodious singer, it is suddenly transformed for a brief moment into a lyric poet of great power. It is a great surprise. The bird undergoes a complete transformation. Ordinarily it is a very quiet, demure sort of bird. It walks about over the leaves, moving its head like a little hen; then perches on a limb a few feet from the ground and sends forth its shrill, rather prosy, unmusical chant. Surely it is an ordinary, common-place bird. But wait till the inspiration of its flight-song is upon it. What a change! Up it goes through the branches of the trees, leaping from limb to limb, faster and faster, till it shoots from the tree-tops fifty or more feet into the air above them, and bursts into an ecstasy of song, rapid, ringing, lyrical; no more like its habitual performance than a match

is like a rocket; brief but thrilling; emphatic but musical. Having reached its climax of flight and song, the bird closes its wings and drops nearly perpendicularly downward like the skylark. If its song were more prolonged, it would rival the song of that famous bird. The bird does this many times a day during early June, but oftenest at twilight. The song in quality and general cast is like that of its congener, the water-accentor, which, however, I believe is never delivered on the wing. From its habit of singing at twilight, and from the swift, darting motions of the bird, I am inclined to think that in it we have solved the mystery of Thoreau's "night-warbler," that puzzled and eluded him for years. Emerson told him he must beware of finding and booking it, lest life should have nothing more to show him. The older ornithologists must have heard this song many times, but they never seem to have suspected the identity of the singer.

Other birds that sing on the wing are the meadowlark, goldfinch, purple finch, indigo-bird, Maryland yellow-throat, and woodcock. The flight-song of the woodcock I have heard but twice in my life. The first time was in the evening twilight about the middle of April. The bird was calling in the dusk "yeap, yeap," or "seap, seap," from the ground, – a peculiar reedy call. Then, by and by, it started upward on an easy slant, that peculiar whistling of its wings alone heard; then, at an altitude of one hundred feet or more, it began to float about in wide circles and broke out in an ecstatic chipper, almost a warble at times, with a peculiar smacking musical quality; then, in a minute or so, it dropped back to the ground again, not straight down like the lark, but more spirally, and continued its call as before. In less than five minutes it was up again. The next time, a few years later, I heard the song in company with a friend, Dr. Clara Barrus. Let me give the woman's impression of the song as she afterward wrote it up for a popular journal.

"The sunset light was flooding all this May loveliness of field and farm and distant wood; song sparrows were blithely pouring out happiness by the throatful; peepers were piping and toads trilling, and we thought it no hardship to wait in such a place till the dusk should gather, and the wary woodcock announce his presence. But hark! while yet 'tis light, only a few rods distant, I hear that welcome 'seap ... seap,' and lo! a chipper and a chirr, and past us he flies, – a direct, slanting upward flight, somewhat labored, – his bill showing long against the reddened sky. 'He has something in his mouth,' I start to say, when I bethink me what a long bill he has. Around, above us he flies in wide, ambitious circles, the while we are enveloped, as it were, in that hurried chipping sound – fine, elusive, now near, now distant. How rapid is the flight! Now it sounds faster and faster, 'like a whiplash flashed through the air,' said my friend; up, up he soars, till he becomes lost to sight at the instant that his song ends in that last mad ecstasy that just precedes his alighting."

The meadowlark sings in a level flight, half hovering in the air, giving voice to a rapid medley of lark-like notes. The goldfinch also sings in a level flight, beating the air slowly with its wings broadly open, and pouring out its jubilant, ecstatic strain I think it indulges in this wing-song only in the early season. After the mother bird has begun sitting, the male circles about within earshot of her, in that curious undulating flight, uttering his "per-chic-o-pee, per-chic-o-pee," while the female calls back to him in the tenderest tones, "Yes, lovie; I hear you." The indigo-bird and the purple finch, when their happiness becomes too full and buoyant for them longer to control it, launch into the air, and sing briefly, ecstatically, in a tremulous, hovering flight. The air-song of these birds does not differ essentially from the song delivered from the perch, except that it betrays more excitement, and hence is a more complete lyrical rapture.

The purple finch is our finest songster among the finches. Its strain is so soft and melodious, and touched with such a childlike gayety and plaintiveness, that I think it might sound well even in a cage inside a room, if the bird would only sing with the same joyous abandonment, which, of course, it would not do.

It is not generally known that individual birds of the same species show different degrees of musical ability. This is often noticed in caged birds, among which the principle of variation seems more active; but an attentive observer notes the same fact in wild birds. Occasionally he hears one

that in powers of song surpasses all its fellows. I have heard a sparrow, an oriole, and a wood thrush, each of which had a song of its own that far exceeded any other. I stood one day by a trout-stream, and suspended my fishing for several minutes to watch a song sparrow that was singing on a dry limb before me. He had five distinct songs, each as markedly different from the others as any human songs, which he repeated one after the other. He may have had a sixth or a seventh, but he bethought himself of some business in the next field, and flew away before he had exhausted his repertory. I once had a letter from Robert Louis Stevenson, who said he had read an account I had written of the song of the English blackbird. He said I might as well talk of the song of man; that every blackbird had its own song; and then he told me of a remarkable singer he used to hear somewhere amid the Scottish hills. But his singer was, of course, an exception; twenty-four blackbirds out of every twenty-five probably sing the same song, with no appreciable variations: but the twenty-fifth may show extraordinary powers. I told Stevenson that his famous singer had probably been to school to some nightingale on the Continent or in southern England. I might have told him of the robin I once heard here that sang with great spirit and accuracy the song of the brown thrasher, or of another that had the note of the whip-poor-will interpolated in the regular robin song, or of still another that had the call of the quail. In each case the bird had probably heard the song and learned it while very young. In the Trossachs, in Scotland, I followed a song thrush about for a long time, attracted by its peculiar song. It repeated over and over again three or four notes of a well-known air, which it might have caught from some shepherd boy whistling to his flock or to his cow.

The songless birds – why has Nature denied them this gift? But they nearly all have some musical call or impulse that serves them very well. The quail has his whistle, the woodpecker his drum, the pewee his plaintive cry, the chickadee his exquisitely sweet call, the highhole his long, repeated "wick, wick, wick," one of the most welcome sounds of spring, the jay his musical gurgle, the hawk his scream, the crow his sturdy caw. Only one of our pretty birds of the orchard is reduced to an all but inaudible note, and that is the cedar-bird.

III

NATURE WITH CLOSED DOORS

December in our climate is the month when Nature finally shuts up house and turns the key. She has been slowly packing up and putting away her things and closing a door and a window here and there all the fall. Now she completes the work and puts up the last bar. She is ready for winter. The leaves are all off the trees, except that here and there a beech or an oak or a hickory still clings to a remnant of its withered foliage. Her streams are full, her new growths of wood are ripened, her saps and juices are quiescent. The muskrat has completed his house in the shallow pond or stream, the beaver in the northern woods has completed his. The wild mice and the chipmunk have laid up their winter stores of nuts and grains in their dens in the ground and in the cavities of trees. The woodchuck is rolled up in his burrow in the hillside, sleeping his long winter sleep. The coon has deserted his chamber in the old tree and gone into winter quarters in his den in the rocks. The winter birds have taken on a good coat of fat against the coming cold and a possible scarcity of food. The frogs and toads are all in their hibernaculums in the ground.

I saw it stated the other day, in a paper read before some scientific body, that the wood frogs retreat two feet into the ground beyond the reach of frost. In two instances I have found the wood frog in December with a covering of less than two inches of leaves and moss. It had buried itself in the soil and leaf mould only to the depth of the thickness of its own body, and for covering had only the ordinary coat of dry leaves and pine needles to be found in the wood. It was evidently counting upon the snow for its main protection. In one case I marked the spot, and returned there in early spring to see how the frog had wintered. I found it all right. Evidently it had some charm against the cold, for while the earth around and beneath it was yet frozen solid, there was no frost in the frog. It was not a brisk frog, but it was well, and when I came again on a warm day a week later, it had come forth from its retreat and was headed for the near-by marsh, where in April, with its kith and kin, it helped make the air vocal with its love-calls. A friend of mine, one mild day late in December, found a wood frog sitting upon the snow in the woods. She took it home and put it to bed in the soil of one of her flower-pots in the cellar. In the spring she found it in good condition, and in April carried it back to the woods. The hyla, or little piping frog, passes the winter in the ground like the wood frog. I have seen the toad go into the ground in the late fall. It is an interesting proceeding. It literally elbows its way into the soil. It sits on end, and works and presses with the sharp joints of its folded legs until it has sunk itself at a sufficient depth, which is only a few inches beneath the surface. The water frogs appear to pass the winter in the mud at the bottom of ponds and marshes. The queen bumblebee and the queen hornet, I think, seek out their winter quarters in holes in the ground in September, while the drones and the workers perish. The honey-bees do not hibernate: they must have food all winter; but our native wild bees are dormant during the cold months, and survive the winter only in the person of the queen mother. In the spring these queens set up housekeeping alone, and found new families.

Insects in all stages of their growth are creatures of the warmth; the heat is the motive power that makes them go; when this fails, they are still. The katydids rasp away in the fall as long as there is warmth enough to keep them going; as the heat fails, they fail, till from the emphatic "Katy did it" of August they dwindle to a hoarse, dying, "Kate, Kate," in October. Think of the stillness that falls upon the myriad wood-borers in the dry trees and stumps in the forest as the chill of autumn comes on. All summer have they worked incessantly in oak and hickory and birch and chestnut and spruce, some of them making a sound exactly like that of the old-fashioned hand augur, others a fine, snapping, and splintering sound; but as the cold comes on, they go slower and slower, till they finally cease to move. A warm day starts them again, slowly or briskly according to the degree of heat, but in December they are finally stilled for the season. These creatures, like the big fat grubs of the June

beetles which one sometimes finds in the ground or in decayed wood, are full of frost in winter; cut one of the big grubs in two, and it looks like a lump of ice cream.

Some time in October the crows begin to collect together in large flocks and establish their winter quarters. They choose some secluded wood for a roosting-place, and thither all the crows for many square miles of country betake themselves at night, and thence they disperse in all directions again in the early morning. The crow is a social bird, a true American; no hermit or recluse is he. The winter probably brings them together in these large colonies for purposes of sociability and for greater warmth. By roosting close together and quite filling a tree-top, there must result some economy of heat.

I have seen it stated in a rhetorical flight of some writer that the new buds crowd the old leaves off. But this is not true as a rule. The new bud is formed in the axil of the old leaf long before the leaves are ready to fall. With only two species of our trees known to me might the swelling bud push off the old leaf. In the sumach and button-ball or plane-tree the new bud is formed immediately under the base of the old leaf-stalk, by which it is covered like a cap. Examine the fallen leaves of these trees, and you will see the cavity in the base of each where the new bud was cradled. Why the beech, the oak, and the hickory cling to their old leaves is not clear. It may be simply a slovenly trait – inability to finish and have done with a thing – a fault of so many people. Some oaks and beeches appear to lack decision of character. It requires strength and vitality, it seems, simply to let go. Kill a tree suddenly, and the leaves wither upon the branches. How neatly and thoroughly the maples, the ashes, the birches, the elm clean up. They are tidy, energetic trees, and can turn over a new leaf without hesitation.

A correspondent, writing to me from one of the colleges, suggests that our spring really begins in December, because the "annual cycle of vegetable life" seems to start then. At this time he finds that many of our wild flowers – the bloodroot, hepatica, columbine, shinleaf, maidenhair fern, etc. – have all made quite a start toward the next season's growth, in some cases the new shoot being an inch high. But the real start of the next season's vegetable life in this sense is long before December. It is in late summer, when the new buds are formed on the trees. Nature looks ahead, and makes ready for the new season in the midst of the old. Cut open the terminal hickory buds in the late fall and you will find the new growth of the coming season all snugly packed away there, many times folded up and wrapped about by protecting scales. The catkins of the birches, alders, and hazel are fully formed, and as in the case of the buds, are like eggs to be hatched by the warmth of spring. The present season is always the mother of the next, and the inception takes place long before the sun loses his power. The eggs that hold the coming crop of insect life are mostly laid in the late summer or early fall, and an analogous start is made in the vegetable world. The egg, the seed, the bud, are all alike in many ways, and look to the future. Our earliest spring flower, the skunk-cabbage, may be found with its round green spear-point an inch or two above the mould in December. It is ready to welcome and make the most of the first fitful March warmth. Look at the elms, too, and see how they swarm with buds. In early April they suggest a swarm of bees.

In all cases, before Nature closes her house in the fall, she makes ready for its spring opening.

IV THE WIT OF A DUCK

The homing instinct in birds and animals is one of their most remarkable traits: their strong local attachments and their skill in finding their way back when removed to a distance. It seems at times as if they possessed some extra sense – the home sense – which operates unerringly. I saw this illustrated one spring in the case of a mallard drake.

My son had two ducks, and to mate with them he procured a drake of a neighbor who lived two miles south of us. He brought the drake home in a bag. The bird had no opportunity to see the road along which it was carried, or to get the general direction, except at the time of starting, when the boy carried him a few rods openly.

He was placed with the ducks in a spring run, under a tree in a secluded place on the river slope, about a hundred yards from the highway. The two ducks treated him very contemptuously. It was easy to see that the drake was homesick from the first hour, and he soon left the presence of the scornful ducks.

Then we shut the three in the barn together, and kept them there a day and a night. Still the friendship did not ripen; the ducks and the drake separated the moment we let them out. Left to himself, the drake at once turned his head homeward, and started up the hill for the highway.

Then we shut the trio up together again for a couple of days, but with the same results as before. There seemed to be but one thought in the mind of the drake, and that was home.

Several times we headed him off and brought him back, till finally on the third or fourth day I said to my son, "If that drake is really bound to go home, he shall have an opportunity to make the trial, and I will go with him to see that he has fair play." We withdrew, and the homesick mallard started up through the currant patch, then through the vineyard toward the highway which he had never seen.

When he reached the fence, he followed it south till he came to the open gate, where he took to the road as confidently as if he knew for a certainty that it would lead him straight to his mate. How eagerly he paddled along, glancing right and left, and increasing his speed at every step! I kept about fifty yards behind him. Presently he met a dog; he paused and eyed the animal for a moment, and then turned to the right along a road which diverged just at that point, and which led to the railroad station. I followed, thinking the drake would soon lose his bearings, and get hopelessly confused in the tangle of roads that converged at the station.

But he seemed to have an exact map of the country in his mind; he soon left the station road, went around a house, through a vineyard, till he struck a stone fence that crossed his course at right angles; this he followed eastward till it was joined by a barbed wire fence, under which he passed and again entered the highway he had first taken. Then down the road he paddled with renewed confidence: under the trees, down a hill, through a grove, over a bridge, up the hill again toward home.

Presently he found his clue cut in two by the railroad track; this was something he had never before seen; he paused, glanced up it, then down it, then at the highway across it, and quickly concluded this last was his course. On he went again, faster and faster.

He had now gone half the distance, and was getting tired. A little pool of water by the roadside caught his eye. Into it he plunged, bathed, drank, preened his plumage for a few moments, and then started homeward again. He knew his home was on the upper side of the road, for he kept his eye bent in that direction, scanning the fields. Twice he stopped, stretched himself up, and scanned the landscape intently; then on again. It seemed as if an invisible cord was attached to him, and he was being pulled down the road.

Just opposite a farm lane which led up to a group of farm buildings, and which did indeed look like his home lane, he paused and seemed to be debating with himself. Two women just then came

along; they lifted and flirted their skirts, for it was raining, and this disturbed him again and decided him to take to the farm lane. Up the lane he went, rather doubtfully, I thought.

In a few moments it brought him into a barn-yard, where a group of hens caught his eye. Evidently he was on good terms with hens at home, for he made up to these eagerly as if to tell them his troubles; but the hens knew not ducks; they withdrew suspiciously, then assumed a threatening attitude, till one old "dominic" put up her feathers and charged upon him viciously.

Again he tried to make up to them, quacking softly, and again he was repulsed. Then the cattle in the yard spied this strange creature and came sniffing toward it, full of curiosity.

The drake quickly concluded he had got into the wrong place, and turned his face southward again. Through the fence he went into a plowed field. Presently another stone fence crossed his path; along this he again turned toward the highway. In a few minutes he found himself in a corner formed by the meeting of two stone fences. Then he turned appealingly to me, uttering the soft note of the mallard. To use his wings never seemed to cross his mind.

Well, I am bound to confess that I helped the drake over the wall, but I sat him down in the road as impartially as I could. How well his pink feet knew the course! How they flew up the road! His green head and white throat fairly twinkled under the long avenue of oaks and chestnuts.

At last we came in sight of the home lane, which led up to the farmhouse one hundred or more yards from the road. I was curious to see if he would recognize the place. At the gate leading into the lane he paused. He had just gone up a lane that looked like that and had been disappointed. What should he do now? Truth compels me to say that he overshot the mark: he kept on hesitatingly along the highway.

It was now nearly night. I felt sure the duck would soon discover his mistake, but I had not time to watch the experiment further. I went around the drake and turned him back. As he neared the lane this time he seemed suddenly to see some familiar landmark, and he rushed up it at the top of his speed. His joy and eagerness were almost pathetic.

I followed close. Into the house yard he rushed with uplifted wings, and fell down almost exhausted by the side of his mate. A half hour later the two were nipping the grass together in the pasture, and he, I have no doubt, was eagerly telling her the story of his adventures.

V

FACTORS IN ANIMAL LIFE

The question that the Californian schoolchildren put to me, "Have the birds got sense?" still "sticks in my crop."

Such extraordinary sense has been attributed to most of the wild creatures by several of our latter day nature-writers, that I have been moved to examine the whole question more thoroughly than ever before, and to find out, as far as I can, just how much and what kind of sense the birds and four-footed beasts have.

In this and in some following chapters I shall make an effort to use my own sense to the best advantage in probing that of the animals, which has, as I think, been so vastly overrated.

When sentiment gets overripe, it becomes sentimentalism. The sentiment for nature which has been so assiduously cultivated in our times is fast undergoing this change, and is softening into sentimentalism toward the lower animals. Many a wholesome feeling can be pushed so far that it becomes a weakness and a sign of disease. Pity for the sufferings of our brute neighbors may be a manly feeling; and then again it may be so fostered and cosseted that it becomes maudlin and unworthy. When hospitals are founded for sick or homeless cats and dogs, when all forms of vivisection are cried down, when the animals are humanized and books are written to show that the wild creatures have schools and kindergartens, and that their young are instructed and disciplined in quite the human way by their fond parents; when we want to believe that reason and not instinct guides them, that they are quite up in some of the simpler arts of surgery, mending or amputating their own broken limbs and salving their wounds, – when, I say, our attitude toward the natural life about us and our feeling for it have reached the stage implied by these things, then has sentiment degenerated into sentimentalism, and our appreciation of nature lost its firm edge.

No doubt there is a considerable number of people in any community that are greatly taken with this improved anthropomorphic view of wild nature now current among us. Such a view tickles the fancy and touches the emotions. It makes the wild creatures so much more interesting. Shall we deny anything to a bird or beast that makes it more interesting, and more worthy of our study and admiration?

This sentimental view of animal life has its good side and its bad side. Its good side is its result in making us more considerate and merciful toward our brute neighbors; its bad side is seen in the degree to which it leads to a false interpretation of their lives. The tendency to which I refer is no doubt partly the result of our growing humanitarianism and feeling of kinship with all the lower orders of creation, and partly due to the fact that we live in a time of impromptu nature study, when birds and plants and trees are fast becoming a fad with half the population, and when the "yellow" reporter is abroad in the fields and woods. Never before in my time have so many exaggerations and misconceptions of the wild life about us been current in the popular mind. It is becoming the fashion to ascribe to the lower animals nearly all our human motives and attributes, and often to credit them with plans and devices that imply reason and a fair amount of mechanical knowledge. An illustration of this is the account of the nest of a pair of orioles, as described in the "North American Review" for May, 1903, by a writer of popular nature books. These orioles built a nest so extraordinary that it can be accounted for only on the theory that there *is* a school of the woods, and that these two birds had been pupils there and had taken an advanced course in Strings. Among other things impossible for birds to do, these orioles tied a knot in the end of a string to prevent its fraying in the wind! If the whole idea were not too preposterous for even a half-witted child to believe, one might ask, What in the name of anything and everything but the "Modern School of Nature Study" do orioles know about strings fraying in the wind and the use of knots to prevent it? They have never had occasion to

know; they have had no experience with strings that hang loose and unravel in the wind. They often use strings, to be sure, in building their nests, but they use them in a sort of haphazard way, weaving them awkwardly into the structure, and leaving no loose ends that would suffer by fraying in the wind. Sometimes they use strings in attaching the nest to the limb, but they never knot or tie them; they simply wind them round and round as a child might. It is possible that a bird might be taught to tie a knot with its foot and beak, though I should have to see it done to be convinced. But the orioles in question not only tied knots; they tied them with a "reversed double hitch, the kind that a man uses in cinching his saddle"! More wonderful still, not finding in a New England elm-embowered town a suitable branch from which to suspend their nest, the birds went down upon the ground and tied three twigs together in the form of "a perfectly measured triangle" (no doubt working from a plan drawn to a scale). They attached to the three sides of this framework four strings of equal length (eight or ten inches), all carefully doubled, tied them to a heavier string, carried the whole ingenious contrivance to a tree, and tied it fast to a limb in precisely the way you or I would have done it! From this framework they suspended their nest, the whole structure being about two feet long, and having the effect of a small hanging basket. Still more astonishing, when the genuineness of the nest is questioned, a man is found who makes affidavit that he saw the orioles build it! After such a proceeding, how long will it be before the water-birds are building little rush cradles for their young, or rush boats to be driven about the ponds and lakes by means of leaf sails, or before Jenny Wren will be living in a log cabin of her own construction? How long will it be before some one makes affidavit that the sparrow with his bow and arrow has actually been seen to kill Cock Robin, and the beetle with his thread and needle engaged in making the shroud? Birds show the taste and skill of their kind in building their nests, but rarely any individual ingenuity and inventiveness. The nest referred to is on a plane entirely outside of Nature and her processes. It belongs to a different order of things, the order of mechanical contrivances, and was of course "made up," probably from a real oriole's nest, and the writer who vouches for its genuineness has been the victim of a clever practical joke – a willing victim, no doubt, since he is looking in Nature for just this kind of thing, and since he believes there is "absolutely no limit to the variety and adaptiveness of Nature even in a single species." If there is no such limit, then I suppose we need not be surprised to meet a winged horse, or a centaur, or a mermaid at any time.

It is as plain as anything can be that the animals share our emotional nature in vastly greater measure than they do our intellectual or our moral nature; and because they do this, because they show fear, love, joy, anger, sympathy, jealousy, because they suffer and are glad, because they form friendships and local attachments and have the home and paternal instincts, in short, because their lives run parallel to our own in so many particulars, we come, if we are not careful, to ascribe to them the whole human psychology. But it is equally plain that of what we mean by mind, intellect, they show only a trace now and then. They do not accumulate a store of knowledge any more than they do a store of riches. A store of knowledge is impossible without language. Man began to emerge from the lower orders when he invented a language of some sort. As the language of animals is little more than various cries expressive of pleasure or pain, or fear or suspicion, they do not think in any proper sense, because they have no terms in which to think – no language. I shall have more to say upon this point in another chapter. One trait they do show which is the first step toward knowledge – curiosity. Nearly all the animals show at times varying degrees of curiosity, but here again an instinctive feeling of possible danger probably lies back of it. They even seem to show at times a kind of altruistic feeling. A correspondent writes me that she possessed a canary which lived to so great an age that it finally became so feeble it could not crack the seeds she gave it, when the other birds, its own progeny, it is true, fed it; and Darwin cites cases of blind birds, in a state of nature, being fed by their fellows. Probably it would be hasty to conclude that such acts show anything more than instinct. I should be slow to ascribe to the animals any notion of the uses of punishment as we practice it, though the cat will box her kittens when they play too long with her tail, and the mother hen will separate her chickens when they get into a fight, and sometimes peck one or both of them on the

head, as much as to say, "There, don't you do that again." The rooster will in the same way separate two hens when they are fighting. On the surface this seems like a very human act, but can we say that it is punishment or discipline in the human sense, as having for its aim a betterment of the manners of the kittens or of the chickens? The cat aims to get rid of an annoyance, and the rooster and the mother hen interfere to prevent an injury to members of their family; they exhibit the paternal and maternal instinct of protection. More than that would imply ethical considerations, of which the lower animals are not capable. The act of the baboon, mentioned by Darwin, I believe, that examined the paws of the cat that had scratched it, and then deliberately bit off the nails, belongs to a different and to a higher order of conduct.

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