

THE NATURALIST'S DILEMMA

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At every epoch there lies, beyond the domain of what man knows, the domain of the unknown, in which faith has its dwelling.—AMIEL.

SPACE is the most obvious component of the universe—unlimited, unfillable space. But what is space? Next comes matter, which in its totality occupies but an infinitesimal fraction of space—not so large a proportion, perhaps, as that of the fishes and other animals of the oceans to the whole body of water. But who can explain the essential nature of matter? Of spirit and intellect we have no certain, scientifically demonstrable knowledge except in ourselves; and yet, with how much dross and base metal do we find them alloyed in man.

We seek unendingly for that which, by virtue of its affinity to our inner selves, we can understand—for that which is spiritual. It has ever been so. Primitive man gropingly sought the spiritual element among the stars, in mountains, rivers, rocks, trees, and animals. He invented a whole army of deities, great and small, to dwell in the heavens, with tritons to people the seas, nymphs the rivers, dryads and fauns the woodlands, gnomes the rocks and recesses of the earth. His quest for spirituality was not unalloyed with grossness and bestiality, as was to be expected from his own nature.

Even today the finding of a new star, containing some thousands of trillions of tons of matter, would not excite so much popular attention as the announcement of proof of the existence of the smallest sentient being upon some other planet. In this the minds of the mass of men follow a true instinct, which doubtless they would not be able to account for. We value things in proportion to their rareness and the difficulty of acquiring them. As the discovery of gold excites greater attention than the finding of yet another deposit of iron, so must proof of the existence of other spiritual or intellectual beings command more interest than the demonstration of still more matter. Yet if we could see truly, perhaps we should find spirit

coextensive with space, and matter but one of its varied manifestations.

But of all the age-long quests of mankind none has been more baffling, none has yielded a richer harvest of heartbreak and disappointment, than the search for infallible proof of the spiritual element in the universe. Spirit and intellect are closely associated in ourselves: we feel and think, hope and plan, suffer and try to explain suffering, with the same organ. On the whole, intelligent men are more responsive than dullards to spiritual influences, such as beauty, nobility of character, loftiness of sentiment, and unselfish love. The relationship is not always simple and straightforward; in one man intellect seems dominant; in another, the spiritual qualities are the more obvious; yet the two somehow go hand in hand. Still—and this is the greatest and most exasperating of paradoxes—the intellect appears to be incapable of demonstrating to its own satisfaction the existence of spirit, or even of intelligence outside itself. We draw analogies and point probabilities and ask ourselves how otherwise can it be, but no man—begging Spinoza's pardon—has been able to demonstrate, by approved methods of logic or science or mathematics, the existence of a Supreme Spirit. In the ultimate analysis, we know or fail to know Him through the mysterious workings of the spiritual element in ourselves; and no crushing weight of arguments, pro or con, can make us effectively deny the verdict of our spirit. Thought and investigation have swept away many false and repulsive notions of the deity; but I doubt whether they have ever crushed, or ever implanted, the feeling of a supreme spiritual Being in any human breast.

The quest for the spiritual element reveals in the seeker the same limitations, the same insufficiency for the discovery of truth, the same ultimate doubts, whether he directs his attention to creation as a whole or to the smallest of created things. And is not this the outcome we might expect? For the spiri-

tual element in each of us, in every living creature, appears to be derived from the same great source of spirituality; and the demonstration of the smallest part of spirit is attended by the same difficulties as surround the proof of the existence of the Supreme Spirit from which it flows. And being subject to the same difficulties, it has the same importance; for the parts bear witness to the existence of the whole.

The inner, spiritual, or mental life—as we may choose to call it—of the living creatures which share the earth with us is one of the most fascinating, as it is one of the most important, objects of human curiosity. This bird that sings so sweetly in my shade tree, this dog that follows me so faithfully around, this horse so obedient to the touch of my rein, this squirrel chattering among the boughs, what does it think, what does it feel, what does it hope? Is its apparent affection anything deeper than eagerness for another meal, its love more than a brute appetite, its parental devotion more than the unconscious manifestation of a blind instinct? Does it in truth, as some have held, cry without pain, eat without pleasure, sing without joy?

These and a hundred similar questions constantly assail the thoughtful observer of animals. We need their answer with pressing urgency. We need it, first, because many of us must daily deal with animals in a practical way. How can we treat them with intelligence, justice, and humanity unless we understand what they really are? We call ourselves the lords of the earth; as such we wield power over all the rest of its inhabitants. But how can we be wise, moderate, and benign sovereigns, rather than arbitrary, merciless tyrants, unless we know the true and inward nature of our subjects? This, then, is the more immediate and practical importance of understanding the inner life of our fellow creatures on this globe. But the subject bears a still vaster significance by virtue of its connection with man's age-long, unending quest for the spiritual principle in the universe at large. The recognition of any smallest part of spirituality points toward the source whence it flows. Indeed, if we follow the inductive method of science, we shall strive to understand the parts before

we attempt to grasp the magnitude of the whole.

The naturalist who occupies himself with the habits of living creatures in their native haunts ought, if anyone, to be able to answer some of these urgent questions, to tell us something of the inner life of the four-footed or feathered beings he so patiently watches. No other outcome of his studies—no description of the appearance, or details of the food, or enemies, or mode of reproduction, or length of life of an animal—can be quite so important as this. If he can answer our questions, we ought to honor the naturalist along with the greatest of philosophers and venerate him as a prophet.

But alas! your naturalist is only an ordinary mortal, subject to all the humors, whims, moods, prejudices, and limitations of knowledge and of insight to which his species as a whole is liable. And his problem, as we have seen, is the same in kind as that which has baffled the philosophers and seers of all ages—is, in fact, one aspect of this great problem. Hence, a revealing analogy arises between the metaphysical philosopher and the student of animal psychology. It is a common observation that a man's philosophy is colored by his temperament, the state of his health, and all his spiritual yearnings. Or, to express the same thought in other language, the riddle of the universe has been inscribed in such characters that a man reveals his whole personality in his attempt to decipher it. And, by an exactly similar law, a naturalist's interpretation of the behavior of animals tells you what he hopes to find in Nature. If he expects to discover in living beings only more complex examples of the operation of the laws of physics and chemistry, he will be a mechanist. If he seeks only material with which to experiment in a psychological laboratory, without taking into consideration the possible agonies of his subjects, he will be a behaviorist. If he prefers to devote his attention to the mystic manifestations of incomprehensible forces, he must perforce become a vitalist.

We derive from our studies what we put into them. If love and sympathy enter into our efforts to understand Nature, we shall see love and kindness in her children. If we

start out obsessed with the notion that Nature is red in tooth and claw, we shall find no end of fangs and talons dripping gore. If we devote to our investigations cold intelligence alone, we shall discover nothing but cool facts, upon which we base certain more or less exact generalizations. Our philosophy, our views of Nature, are inevitably tinged by our personal penchants.

It is commonly held that animals—the term being used to include the whole animal kingdom except ourselves—are guided in what they do largely by "instinct." This is a most unfortunate generalization. We have hastily pasted a label over the entire class of phenomena we strive to understand, and then find that we cannot read the inscription on the label. For since none of the things we do ourselves are instinctive actions according to the general acceptance of this term, we are cut off from the simplest and readiest—perhaps the only—means of understanding what an instinct really is. We have our reflexes, as when we start at a sudden loud noise, or blink our eyes, or grasp whatever is within reach to save ourselves from falling. But all our more complex activities, involving a whole series of simple muscular actions, have been taught us, or we have learned by reason and experience how to go about them. We build a house or a chair as we have been taught to make them, or as we are guided by reason or experience to improve upon the current models. A bird, we say, fashions its nest by instinct. No pattern of comparable complexity is included in the baggage we bring into the world with us. If it were, human education would be immensely simplified. If we could instinctively write, read, cipher, give the important dates of history, and name the parts of a flower, we might start years earlier to explore the unknown.

A bird builds her nest! I have watched a hundred kinds of birds build more nests than I can recall; I have counted their comings and goings and identified the materials they use. But the construction of the nest is still a mystery to me. Does the young bird, beginning her first nest, start out with a mental picture of the completed structure? She

might, of course, have studied the nest in which she was hatched and fledged, made inward note of all its so various materials, and learned exactly how each was employed; but I think this would call for a degree of infantine observation far more astounding than any manifestation of "instinct." Moreover, the birds which construct the largest and most elaborate nests were raised in the dark interior of similar nests, where they could see but a small part of the whole edifice, and that but dimly in the poor illumination. I forget what naturalist it was who attempted to evade the difficulty of the first nest by supposing that a bird breeding for the first time always mates with an older partner who had previous experience in nest-building; but he must have known nothing of the habits of hummingbirds and many others, of which the female always builds without even the presence of a male.

If a young bird starts her first nest with a picture of the finished structure, I think it more probable that the picture is innate than that it is acquired in infancy. Does she know why she builds; does she foresee the eggs, the newly hatched nestlings, the fledglings in their first plumage? Or does all the marvelous process of rearing a family of young birds unfold before her stage by stage as, foreseeing nothing, she proceeds from step to step guided surely by "instinct," in much the same fashion as the plot of a new novel develops before us as we turn the pages of the book, or as our own life opens before us with the passage of the years? There are naturalists who claim that since the actions of the bird during the breeding cycle are "instinctive," it foresees nothing and so fashions its nest without foreknowledge of the purpose it will serve. These naturalists have treated us unkindly; they have withheld from us the sources of their information. Without access to their secret founts of knowledge, I am unable on my own account to answer the questions raised in this paragraph.

Instincts, as we commonly conceive them, savor strongly of the Innate Ideas of Plato. May it not be that a bird, before escaping from the shell, was equipped with an idea of a nest, and a migration route, and what

is and is not good to eat, and did not lose its knowledge upon hatching, as men forget when they are born? Had Plato been a bird-watcher, he would undoubtedly have found in the instincts of birds additional support for his theory of Innate Ideas.

But perhaps birds, like men, forget what they knew in an earlier existence, only not so completely. Birds may make blunders in building their nests, sometimes, for example, trying to place them in positions where they will never find adequate support, as in the angle between the tip of a leaf and the neighboring stem which it loosely touches. It is instructive to watch the building operations of colonial birds, such as the oropéndolas of tropical America, which may hang a hundred of their long, skillfully woven pouches from the terminal twigs of a single great tree standing in isolation from its neighbors. The wide-spreading crown offers an almost unlimited choice of twigs, suitable for the attachment of the nests; the slender vines, strips of palm and banana leaf, and other fibrous materials needed for their construction are equally accessible to all the birds. Yet, with equal facilities, some of the oropéndolas blunder along and take twice as long to complete their nests as their more adept sisters. Are these slow, blundering workers young birds building their first nests? Unfortunately, we have no means of distinguishing the old birds from the young. But these and many other observations for which we lack space lead me to suspect that instinct is not the infallible guide it is commonly held to be, that it must often be supplemented and perfected by experience, observation, and practice—in short, by learning.

No example is more commonly cited to prove the "blindness" of instinct than that of the pair of small birds who go on stuffing a young cuckoo with food, while their own proper nestlings, thrown out of the nest by the more powerful foster child, lie cold and starving on the ground in plain sight. It seems to me that the situation could as well be interpreted to illustrate the insufficiency of reason. Who knows but that the foster parents, like the Lacedaemonians of old, wish to raise only the most vigorous babies?

Or maybe they are only making the best of a bad bargain; for the great majority of birds are unable to lift their offspring, and an unfeathered birdling that has fallen from the nest is irretrievably doomed.

Still, the habitual, routine activities of animals are attributed to instinct, and since we are not in a position to know the degree of consciousness that attends instinctive actions, their study scarcely helps us to understand the inner life of these animals. But we may attempt to further our quest by considering those exceptional actions of animals which appear to be guided by intelligence, because we know from personal experience something of the state of mind in which intelligent or rational activities are carried on. We know, for example, that we do not create any object—except accidentally, by the rarest chance—without beginning with at least a vague mental picture of the thing we desire to make; while we are not sure whether the bird starts out with an image of the nest in whose construction she is guided by instinct. I would not have it inferred from this that I hold reason to be "superior" or "more marvelous" than instinct. Reason appears superior for certain purposes and inferior for others. Both are equally wonderful, and in the ultimate analysis equally difficult to explain. If instinct has its deficiencies and blind spots, one has only to cast his eyes about the world of today to be convinced that reason also is subject to exceedingly grave limitations and aberrations; so that as a guide to action it is very doubtful whether it is more to be trusted than instinct. For instinct is almost always clear and sound as to its purposes, although likely to become confused in applying unfamiliar means to its ends, or in following its ends amid strange circumstances. Reason's greatest danger lies in its propensity to become confused, morbid, or self-destructive in its purposes, for it is less intimately in touch with the full, strong currents of life. I suppose whether one would prefer to lead his life by instinct or by reason depends largely upon whether he is conservative or radical at heart. The single point that I wish to emphasize here is that, since so many of our own activities are

classed as rational, we are in a better position to understand such of the activities of animals as we can place in this category than we are those which we attribute to instinct. How little we understand instinct may be gathered from the fact that we apply the term indifferently to creatures so diverse as, let us say, birds and insects. If zoological affinity is a guide to the inner life, as it is to the structure, of animals, then—although both birds and insects are said to be led by instinct, and men by reason—in their psychic life birds must nevertheless resemble men far more closely than they resemble ants and bees.

So, unhappily, in our quest to discover something of the inner or mental life of animals, we must turn our backs upon all those actions classed as instinctive, which include by far the greater part of the things we see them do. The supposed nature of instinctive behavior is the chief support of those who would see in animals only machines made up of flesh and blood rather than metal and wood, mechanisms that sing without pleasure and emit a cry without pain.

Since our endeavor is to discover the whole inner life of animals, which includes feeling as well as thought, we are free to consider expressions of emotion as well as manifestations of intelligence. But here again we run into grave difficulties. Birds, in particular, we believe to be emotional creatures; in them, as Julian Huxley has pointed out, "emotion, untrammelled by much reason, has the upper hand." Their expressions of emotion are vivid and varied, calling into play voice, wings, and often the whole body. Thus, mated birds of the most diverse kinds, upon becoming united after a temporary period of separation, greet each other with voice and quivering of wings, at times with a brief musical phrase reserved for this purpose, and often in the nesting season with complex ceremonies involving the presentation of nest material, and antics which remind us strongly of a caper of joy and a loving embrace. It is difficult for one who witnesses these greetings to resist the impression that they are the spontaneous effusion of genuine affection. But as we continue to watch birds we learn that in each species the

ceremony of greeting follows a more or less fixed pattern. We may compare it with a salutation and a handshake or, if we will, an embrace and a kiss, which are conventional forms of greeting among men. But there are hand-grips in which we feel all the warmth of years of friendship; there are hands as responsive to our own as the handle of a broom; and again, there are hand-clasps in which we detect a deceitful substitute for the punch that time and place forbid. A third person might find it difficult to interpret the emotions of two strangers whom he watches as they shake hands. And even kisses bestowed upon relatives vary, as every child knows, from expressions of warm affection to feelingless compliance with parental dictates. If it is so difficult to interpret the emotional content of conventional acts of greeting among other creatures like ourselves, how can we hope to do so with any degree of confidence when the protagonists are birds so very different from ourselves?

Thus, emotional displays after a fixed pattern had best follow other instinctive forms of behavior, like nest-building and food-hunting, into the limbo of things which will not help us in our present quest. Since the conclusions we strive to reach will be of the utmost importance, we must be exceedingly cautious and discriminating in the selection and interpretation of our facts, even at the risk of inclining toward skepticism in our recoil from credulity. Already we have little left. Still, there remains a little. Birds are at times seen to do things in a way which does not appear to follow an instinctive pattern, but rather to be an individual, intelligent solution of a particular problem. Or they express emotion in a fashion which appears spontaneous and individual rather than conventional. Let us turn to these actions which, from being uncommon and rarely witnessed, seem to be the peculiar behavior of the individual rather than the instinctive behavior of the species. Let us see if they throw light upon the nature of a bird's mind.

SEVERAL species of yellow-breasted flycatchers, common and widespread in tropical America, build large nests with a domed roof that keeps the interior dry during heavy

rainfalls, and with a round doorway in the side facing out from the supporting tree. Usually the birds construct the commodious edifice entirely by their own efforts, beginning with the foundation of coarse, dry weed stems and ending with the soft lining upon which the eggs, and later the nestlings, will rest. But years ago I watched a chipsacheery flycatcher (*Myiozetetes similis*)—the most widely distributed of these yellow-breasted architects—that built her nest in a most individual fashion. Her site was a small lemon tree, where a pair of scarlet-rumped black tanagers (*Ramphocelus passerinii*) were feeding newly hatched nestlings, in an open, cup-shaped nest such as the great majority of tanagers build. Before the chipsacheery had proceeded far with her work, some mishap befell the tanager nestlings, leaving their nest vacant. Thereupon the flycatcher claimed the empty cup and began removing the straws and weed stems from her newly begun nest and placing them upon the tanager's nest. Soon she had converted the open, cuplike structure into the domed nest typical of her own kind. In this she laid three eggs and raised her brood, only to have them carried off by a hawk when nearly fledged. By suddenly changing her plans when her neighbors' nest was left vacant, and using it as a foundation for her own, she saved herself the labor of hunting and fetching as much material as the tanagers' nest contained.

"A bird who knows how to think and plan!" I exclaimed to myself at the time. The sudden shift in procedure, to take advantage of a newly found opportunity, seemed to indicate forethought. It seemed incredible that a bird could convert a nest of one type into another of distinct style, without a mental picture of the completed structure. "Blind" instinct seemed inadequate to achieve such results.

In subsequent years I have never again seen a chipsacheery flycatcher effect such a conversion. But twice I have known a closely related flycatcher, the graycap (*Myiozetetes granadensis*), to select an abandoned open nest as the foundation of its bulky roofed structure. The chipsacheery that took advantage of the tanagers' deserted nest was not quite so individual a genius as I at first

supposed, for other members of her genus are capable of remodeling nests in the same fashion. What am I to conclude from my fuller knowledge? That these yellow-breasted flycatchers are all intelligent birds, or at least produce a considerable number of intelligent individuals? Or that here is an instinct which manifests itself only when the bird finds an empty nest which fills certain requisites as to size and position, and at the period when it is beginning to build? The reader will be able to answer these questions as well as I. But this much at least we have learned: that an act which at first appears unique and individual may, upon longer acquaintance with a group of birds, prove to be more widespread than we at first suspected.

Let me cite one other example that warns us to exercise caution in concluding that behavior is individual, this time touching a display of emotion rather than of intelligence. A female blue cotinga (*Cotinga amabilis*), clad in a modest speckled dress of brown and buff instead of the intense blue and purple of the male, had built her slight nest among the topmost boughs of a great, spreading *yos* tree standing in a pasture at the edge of the forest, in the Costa Rican mountains. Late one afternoon the nest was discovered by a blue-throated toucanet (*Aulacorhynchus caeruleogularis*), a small green toucan with a great bill and an inordinate appetite for other birds' eggs and nestlings. My attention was drawn to the nest and its assailant by the loud, agonized shrieking of the mother cotinga. Peering up into the many-branched crown, I beheld the toucanet standing on one of the uppermost boughs in a defensive attitude, great bill raised in menace, while the cotinga darted angrily past its head, uttering cries of distress. Soon the toucanet flew off through the forest, and the cotinga vanished amid the cloud of verdure that was the crown of the *yos* tree. But a little later I saw her go to the fork of a thick, mossy branch at the very top of the tree, nearly a hundred feet above the ground. Here, standing upon a cushion of moss which enveloped the crotch, she picked up a billful of fine twiglets and let them fall to the ground, thereby revealing to me the position of her nest, which hitherto I had sought in vain. She repeated this act

so full of melancholy significance, lingered a few moments on the side of the nest in an attitude that suggested forlorn resignation, then turned about and darted away through the foliage. Later, both she and I found her well-feathered nestling which had been knocked or frightened from the nest and rested on the ground in the pasture below, and did our best to take care of it until it could fly. Mother-love brought this tree-top bird to the ground.

The lifting up and dropping of the materials of the despoiled nest was a heartbroken gesture which, it would seem, could be of no possible use in the struggle for existence, and hence could have no "survival value" which might cause it to become a general habit of the species. It appeared to be an individual expression of melancholy resignation. Nests of these tree-top birds are not found every day; and it is difficult to know whether the behavior I witnessed was peculiar to this particular cotinga or widespread in her species. So far as I am aware, the only other nesting cotinga of this genus ever watched by an ornithologist was a female of a closely related species (*C. nattereri*), which on two successive years attempted to raise a brood in a lofty tree on Barro Colorado Island, where she was watched by the sympathetic eyes of Dr. Frank M. Chapman. After the nestlings prematurely vanished, he saw the bereaved mother pull her nest to pieces, much as my blue cotinga had done. But because a mode of expressing emotion proves to be widespread, are we to conclude that less of feeling enters into it? Do not most of our own manifestations of emotion follow more or less definite patterns?

Last year, on the rocky shore of a wild, rushing mountain stream, I found my long-sought first nest of the black phoebe (*Sayornis nigricans*), a familiar figure along swift inland waterways of the milder parts of the American Continent, from Oregon to Bolivia. The thick-walled cup, composed of gray mud strengthened by bits of dead vegetable matter, was plastered to the nearly vertical side of a ridge projecting from the lower face of a huge, outjutting rock. Here, with a stony roof above and the rushing current below, it seemed inaccessible to all enemies

and in danger of destruction only by a sudden rise in the current. The female built with the encouragement but not the help of her mate. When she had lined the hollow of the nest with soft grass and a few feathers and had laid her two white eggs, I decided to watch her as she kept them warm. Ordinarily I should have concealed myself for such a study; but the rocky shore of the wide torrent offered no convenient screening bush or any spot for the erection of my little brown wigwam. So, perforce, I sat unconcealed upon a mossy rock hard by the dashing current, beneath the shade of a wide-spreading, orchid-laden *sotocaballo* tree, about twelve yards from the nest.

When the female phoebe flew down the river and saw me watching so near her nest, she was afraid to return to it—not so full of fear that she fled precipitately away, but with just that degree of uneasiness which left her uncertain whether it would be quite safe to sit on the eggs in my presence. In this undecided state of mind she stood on the low rocks projecting above the water below her nest, and after a while flew up as if to enter it, but when still a few inches away lost courage and dropped back to the low rocks. Several times she started for the nest but always changed her mind before reaching it. While she delayed in this vacillating state, her mate arrived and hovered in front of the nest, beneath the huge overhanging rock. His presence gave her confidence, and without further loss of time she darted up and settled on the nest in front of him. Then he dropped down to stand quietly for ten minutes on the rock below, while she sat steadily upon the eggs above him. After he had gone away she continued on the nest three minutes longer, then flew off to catch insects.

When she returned to the nest after a recess of six minutes she still lacked courage to settle down upon it in my presence, despite the fact that she had already sat for thirteen minutes while I watched her from exactly the same position. As last time, she flew up very close to it, only to drop back to the low rocks again. Again and again she repeated this move, sometimes actually touching the rim of the earthen cup, but always in the end re-

turned to the low rocks. She flew across the river, then in a few minutes came back and continued her false starts toward the nest. But she could not quite gather courage to rest upon it, and in the end flew upstream to seek her mate.

Soon she was back again with the male, who went direct to the nest and perched upon the rim, facing inward. Now at last the female phoebe went to the nest without hesitation and settled on the eggs in front of him. He lingered beside her a minute, then dropped down to rest on the rocks below a minute or two longer. Then he flew away.

Through the remainder of my five-hour watch, the female phoebe would never enter her nest unless her mate were close by. Sometimes he would accompany her as she returned from her recess, and then she would promptly settle down to warm her eggs. At other times she would come alone and, standing on the rocks below the nest, call *chip* until he arrived to see her safely on it. Once, while he perched on the rocks on the opposite side of the river, catching insects above the water, she waited ten whole minutes for his arrival, meanwhile catching insects herself by darting out from the low rocks beneath the nest. Or, becoming impatient, she would go off in search of her mate, and finally bring him back with her.

The male phoebe would sometimes stand on the nest's rim, and then the female would go promptly to sit in it. Again, he would flutter momentarily in front of the nest, and this had the same result. Yet again, he would not go to the nest, but merely stand on the rock below. Then his mate would usually make a few false starts before she actually settled down. The male would always linger a while on the rock below her, for less than a minute to as much as ten.

This interesting conduct, unique in all my experience with birds, raised an important question. Was I witnessing the normal, unconstrained behavior of this pair—the way they would have acted if they could not have seen me; or was it that the female phoebe would not enter her nest in the absence of her consort because she lacked confidence in my presence and needed him to bolster up her courage?

To gather evidence upon this point, I returned in the afternoon and sat upon a more distant rock, now about fifty feet from the nest, but still with no intervening vegetation to screen me. Soon the bird returned alone, and seeing me there, hesitated a while and then flew off upriver, doubtless to seek her mate. But as he was not inclined to come just then she was obliged to come back without him; and again she stood on the rock beneath the nest, starting toward it as if to enter but lacking courage to do so. Another journey upstream, and a third solitary return to the nest; and now, since she could not prevail upon her usually so attentive mate to escort her, she had no recourse but to settle down on her neglected eggs in his absence.

During four hours of the following morning I watched the nest from the more distant rock. Now the female phoebe, becoming reconciled to my presence at the greater distance, settled upon her nest alone, with little or no hesitation. Of twelve returns to the nest after as many recesses, on nine she came unaccompanied; only three times, or at one-quarter of her returns, was her mate present. This may be taken as about the normal rate of occurrence of his pretty custom of seeing her on the nest—a custom practiced, with many variations, by a considerable number of monogamous birds of which the male does not incubate. He was present at every single return on the previous morning only because in his absence his consort would not settle upon her eggs. But later, when she had grown quite accustomed to my presence, she would enter the nest alone even while I sat only seven feet away. She gradually lost her distrust of me.

The behavior of this phoebe, which in the presence of a potential enemy would not go to her eggs unless her mate were close at hand, opens fascinating glimpses into the psyche of a bird—glimpses which, unfortunately, suggest more than they prove. It is for this reason that I have dwelt upon her conduct in such detail. I doubt whether her refusal to enter her nest, when afraid, unless her mate were close at hand, was instinctive in the sense that it followed a hereditary pattern. Only the study of several nests,

under similar circumstances, could settle this point. But certainly the conduct of this pair was not purposive in the strictly utilitarian sense; it had no "survival value." When an enemy too big or powerful to be driven away approaches the nest, birds do well to slink away in silence, on the chance that it will escape detection, not call their mates, for the presence of two attracts more notice than one alone would. But certainly the actions of this female phoebe were very humanlike. As all of us, she found courage, in the presence of one she loved and trusted, to do what she feared to do alone. And even, it seemed to me, toward the end she was taking advantage of the situation to win additional attention from her mate, coquettishly feigning a distrust she no longer felt, until at last she learned it would avail her no longer.

One aspect of the phoebe's behavior, her many starts toward the nest when her mate was not at hand, each falling short of it and ending in a retreat, is very widespread among birds under similar circumstances. Their attachment to the nest draws them onward, and their fear of a man or a strange object in its vicinity urges them in the opposite direction, and so they oscillate forward and away, until at length either parental devotion or prudence gains the upper hand, and they settle in the nest or leave it to its fate. How different is this vacillating conduct from the direct, straightforward action of the insect, which appears to be influenced by but a single motive at a time. This conflict of impulses in the avian mind closely resembles our own attacks of indecision. As everyone has experienced in himself, our consciousness is heightened by such stress of opposing emotions. The things we do and say in such circumstances are graven deeply upon the memory, while habitual actions frequently make so little impression that we cannot say an hour later whether we have done them. Who has not amused or vexed himself by continuing to search through his room for an object that he has mechanically slipped into his pocket? It is from this consideration that I believe we must look to the uncommon rather than the customary activities of animals, and to their conduct while

beset by conflicting emotions, to throw light upon the dark and difficult subject of their psychic life.

A little, brownish, bare-cheeked Costa Rican Tityra (*Tityra semifasciata*)—a widespread member of the cotinga family—had built her nest in an abandoned woodpecker hole near the top of a tall dead trunk standing in a clearing in the forest. For her, nest-making was a simple process, consisting merely in the accumulation of a loose litter of small bits of dead leaf and dry twigs in the bottom of the hole. A larger woodpecker's hole, only a few feet below that chosen by the Tityra, was the dormitory of four Frantzius's araçarís (*Pteroglossus frantzii*), a species of toucan much bigger than she, with huge red bills half as long as her whole body. The Tityra strongly disapproved of the presence of these inconvenient neighbors, which were probably not above making a meal of her eggs or nestlings; and each evening she, and sometimes also her mate, would pursue and dart at them as they flew to their high bedroom. But the great-billed birds took slight notice of the anger of creatures so mild-tempered as the Tityras. Finally, night closing down, the white male Tityra would fly off to sleep in the forest, leaving his mate alone in the clearing.

Left to herself, the female Tityra would rest upon the lofty top of the trunk that contained her nest and the araçarís' dormitory, or upon some neighboring eminence. Then, after a while, she would fly toward her doorway, but as she came close to it—and to the doorway of the araçarís whom she feared—she would lose courage and return to her high perch. Here she remained motionless, a very solitary and diminutive figure silhouetted darkly against the fading light above the western ridge, while all the bird world sank into hushed repose. What a struggle must have been taking place in her small breast as she rested, outwardly so quiescent, against the great, open, cloud-veiled sky! On the one hand, duty called her to pass the night in the nest, which had been completed and perhaps already contained the two mottled gray eggs. But just below it slept larger and more powerful birds that she feared, and she scarcely dared to slumber

so close to them—even if several feet of wood did separate the two cavities. Her thoughts must have turned with longing toward the sheltering tree where she was in the habit of roosting with her mate, in the forest far from these red-billed monsters.

At length, when even the late-retiring motmots and woodhewers had sought their sleeping places, and the bats had begun to flit through the dusk, the lonesome little bird made another move toward the round entrance of the hole, now scarcely visible in the darkening trunk. But in front of it her courage failed, she hovered on fluttering wings, then rose to rest once again atop the trunk. Five or six times more she started for her nest with the same negative result. At last, she winged off toward the forest to the south, whither she and her mate had gone together on previous evenings, and vanished amid the dusky foliage. She had not been brave enough to pass the night in her nest so close to the aragaris. But a few evenings later, with growing parental devotion, she found courage to enter the nest and sleep upon her eggs so near the dreaded toucans.

I believe it was Herbert Spencer who suggested that consciousness was kindled by the friction of conflicting impulses within creatures motivated by instincts. As she perched motionless against the darkening sky, the Tityra was without any doubt torn between opposing impulses. As I watched her from the pathway at the edge of the forest, sympathizing with her agitated state of mind, I found it hard to believe that she was not acutely conscious of her situation.

I MIGHT go on indefinitely to cite observations, made by others or myself, which seem to throw light upon the inner life of birds, to prove that they possess at least a modicum of reason, a high degree of memory, a dash of foresight, and such spiritual qualities as affection for their mates and young, devotion, courage, a feeling for beauty, a sense of play, anger, rage, and other attributes. But these examples will serve our purpose, since we are not here attempting to make an exhaustive exploration of a bird's mind but rather to understand the conditions under which such exploration is possible. I am well aware

that clever students of animal behavior have devised experiments which make birds appear exceedingly foolish, their mental processes singularly blind. Yet even the older, less scientific literature is full of instances of the insufficiency of a bird's intelligence to meet all the contingencies of its life. But what of it? The books which deal with ourselves, our history and biography and fiction, contain far more numerous and far more ludicrous instances of the insufficiency of the human intellect.

Perhaps others who have watched intimately the lives of wild creatures have discovered, like myself, that every episode somewhat out of the ordinary which we are privileged to witness produces by turns two contrasting states of mind. There is the moment of sympathetic insight, when we enter—or fancy that we enter—into the feelings of the creature that we watch, and hardly entertain a doubt as to the motives which drive it to act, the emotions it experiences. Such intimate communion with the spirit of a creature so different from ourselves produces a warm glow that endures for a longer or briefer spell but sooner or later must cool, leaving only a memory. This state of exalted feeling is followed by what we may call the intellectual reaction, when reason sets to work, with all its upsetting questions and cautious doubts, to pluck apart and demolish the beautiful image which sympathy so readily created. Can we really know anything of the inner life of creatures so different from ourselves? Can we not explain all that we have seen on the basis of instincts, tropisms, behavioristic patterns, without calling consciousness into the account? Are birds, or other animals, actually capable of thinking, of loving dispassionately, of responding to beauty? These and a hundred more disturbing queries rise into our minds.

Hence comes the naturalist's great dilemma. But it is not a dilemma confined to naturalists alone. Every man not all spirit or all intellect—and doubtless there are few such—must experience it if he tries to pierce through the opaque mask of matter and reach the things that lie behind and beyond. The more nearly what we may distinguish briefly as the intellectual and the spiritual qualities

are balanced in him, the more bothersome this dilemma will be; if either of these qualities, spirit or intellect, has definitely the ascendancy, it will trouble him the less in proportion to the degree of dominance of either. That man is indeed to be pitied who has not at least once or twice in a lifetime known moments of insight when great cosmic spiritual truths stood sharply and clearly before him; he is more than ordinarily fortunate if he has not at a later date focused the cold light of reason upon his revelation and come to doubt its validity. Such, on a smaller scale, is the common experience of the naturalist who would enter into the inner life of the creatures he studies, not merely record external details of behavior. We said at the outset that the quest for spirit was attended by the same difficulties, whether it be sought in the universe as a whole or in some humble creature of our fields or woodland. And, being subject to the same difficulties, it has the same importance, for the parts give evidence of the whole.

How, then, can we escape from between the horns of our dilemma? We might adopt an attitude of skepticism—which would do very well if we never faced the necessity for action. Aside from this negative middle course, whichever way we incline has its dangers. If we yield to our glimpses of sympathetic insight and give credence to them, we risk falling into scientific error. If we refuse to believe what cannot be demonstrated in a laboratory, we risk closing our eyes and ears to a whole section of reality, which, if recognized, would give depth and breadth of meaning, not only to our contacts with this or that living creature, but to life as a whole. If we elect this second course, we indeed cut ourselves off from the possibility of understand-

ing aught of the psychic life of other creatures. Huxley long ago pointed out that the strict methods of science are inadequate to demonstrate the conscious processes of any human being except our individual selves. How, then, can we hope that they will reveal the inner life of members of other species?

So it narrows down to a question of whether we shall have faith in our flashes of insight or, denying them, cut ourselves completely off from all possibility of recognizing the spiritual element in the lives of other beings. For although spirit and thought appear to have their seat in the same organ, yet, strangely enough, only spirit can bear witness to spirit, and thought alone to thought. We may understand the inner life of another being only insofar as it bears affinity to our own inner life; only through sympathy can we enter into it. The naturalist, as we have seen, must inevitably be influenced by his own temperament and his own aspirations in the interpretation of the inner life of the creatures he studies, just as the philosopher is swayed by his own personality in erecting his system of the cosmos. For myself, each year I incline more strongly to put confidence in those rare flashes of sympathetic understanding that seem to penetrate the outer husk of a bird and reveal the life within; I believe that they are more likely to disclose the truth than those laborious analyses of behavior by which we attempt to discredit them. If I must incur the risk of error, I prefer to incur it with the gateways to the spirit open rather than shut. As in all questions transcending practical demonstration, each of us must make his own choice at his own peril. And every choice, if it avoids the hideous form of dogma, is entitled to respectful consideration.