

ANIMAL BEHAVIOR AND THE NEW PSYCHOLOGY

BY

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ILLUSTRATIONS BY CHARLES LIVINGSTON BULL

IF I were to give a detailed account of the tide of wild life that ebbs and flows, winter and summer, about my cabin door, of the shrike I saw a few days ago hunting a little brown creeper about the trunk of the maple tree in front of my window, and especially of the downy woodpecker that has been excavating a chamber for his winter quarters in the top of a chestnut post in the vineyard near my study, hammering away at it day after day like a carpenter building a house, and returning there at night after his day's work and his foraging for supper are over — if I were to give a detailed account of these things and others, many of the incidents would show so much of what we call in ourselves rational intelligence that we should be tempted to ascribe the same powers or faculties to these wild neighbors of mine. Intelligence we may call it without falling into any very serious anthropomorphism — the kind of intelligence that pervades all nature, and which is seen in the vegetable as well as in the animal world, but which differs radically, in its mode of working, from rational human intelligence.

A more specific name for it, and a better one, I think, and for all similar behavior on the part of bird and beast, is the ancient and honorable term "instinct" — a term that the "new psychology" is beginning to shy at or openly to repudiate, but which I do not see how we can get along without.

Take the case of the woodpecker and his retreat. It may be the first cavity of the kind the bird has ever made or occupied, but its forebears have made and used such cavities for untold generations, and Downy unconsciously remembers it all. The whole proceeding is very human, very like what a person might do under certain circumstances — build a hut at

the approach of winter, or take possession of one already built, enlarging and changing it to suit his notions, be on the alert for his enemies while thus engaged, etc. Yet we do not, because of this, ascribe reason to the woodpecker, or conscious forethought; we call it instinct, inherited memory. In a man these and similar acts are attended with more or less reflection and conscious exercise of will, with, no doubt, much instinctive or inherited impulse.

Now the new laboratory psychology comes along and says that the key to animal behavior is neither reason nor instinct, but habit or experience. I have in mind especially Professor E. T. Brewster's two papers in *McCLURE'S MAGAZINE* for June and August, 1909, in which he urges that the lower animals not only do not reason, — which is just what I have been preaching myself, in season and out of season, for some years past, — but that, with adult animals of the more intelligent species, pure instinct, so far from being a controlling factor in the creature's life, hardly has to be reckoned with at all — which is just the opposite of what I have been preaching. The animal, Professor Brewster urges, "forms habits precisely as we do, and, precisely like ourselves, stores up, as habits, many common experiences of life." My own contention is that the wild animals act mainly from inherited habits or instinct, and that their acquired habits, "so far from being a controlling factor in the creature's life, hardly have to be reckoned with at all."

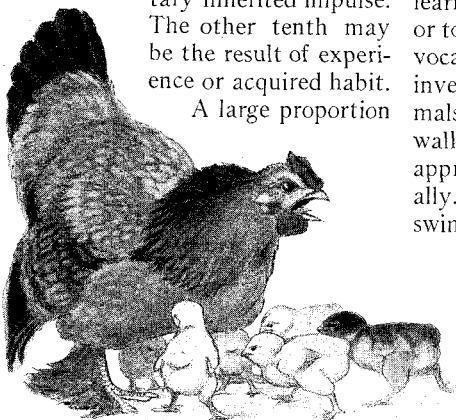
How the writer explains the conduct of animals that have had no chance to store up experiences and form habits — the bird building its first nest, the hen with her first brood of chickens speaking a language she never before spoke and her young understanding a language they never before heard, the heifer hiding her

first calf in the bush, the ground-bird decoying you away from her first nest by fluttering over the ground as if half disabled, the puppy burying its first bone, perhaps on the carpet or the kitchen floor, the chipmunk or the wood-mouse laying up its forest store of nuts, and a score of other primary acts of the animals, which they never could have learned as we learn, and which they do offhand the first time the occasion arises—how the writer explains all these things, I say, I am at a loss to know.

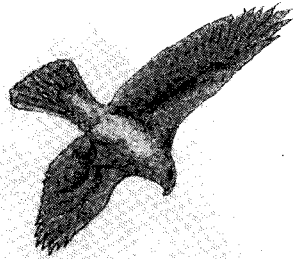
These instincts or native impulses, as they are passed along down the line of animal descent, are slightly modified now and then, but remain practically the same from generation to generation. The cliff-swallows have built their nests of mud—how long? The chimney-swifts have built theirs of twigs—how long? The brooding grouse, when started from her nest, has feigned lameness and paralysis—how long? The beaver has been building its dam of sticks and mud—how long?

The word “instinct” is of metaphysical rather than of scientific origin, but it means so much more than reaction or tropism that we cannot dispense with it. It marks off the animal world from the human almost as distinctly as the animal is marked off from the vegetable. It covers all the animal behavior that is independent of experience, and that an animal does perfectly on the first occasion. In the orders immediately below man nine tenths of the actions of the animals are the result of involuntary inherited impulse. The other tenth may be the result of experience or acquired habit.

A large proportion



CHARLES WINTER 1911



of our actions is also the result of inborn inherited impulses or tendencies, but these are constantly checked and controlled by reason and experience. An animal never checks its natural impulse unless we train it to do so or drill it into new habits. A man has an impulse to steal or to murder, to overeat or to run away from danger; but he checks the impulse, because he is a man and not a mere brute.

Each animal species inherits an organization

that determines the kind of life it shall live, how it shall meet its enemies, how get its food and what that food shall be, its habitat, and the like, and it inherits the instincts that go with the organization. The porcupine knows how to use its quills, the skunk its essence, the hawk its talons, the cuttlefish its ink, without previous experience or instruction—that is, instinctively. The mole takes to the ground and is lost on the surface. His organization makes him a prisoner of the soil. Call his behavior instinctive or a tropism or what you will, it is innate, and is not a habit acquired by the individual mole, but by the race of moles.

Man's organization is not specialized in anything like the same degree as that of his animal kin. He inherits no weapons, either of offense or defense; he is confined to no habitat or clime; he is restricted to no special food. He is a tool-maker and inventor, and arms and equips himself with a thousand external things and forces. He is a learner—an acquirer of knowledge. He has legs with which to walk, but he has to learn to walk as much as he has to learn to skate or to swim or to ride a bicycle. He is born with vocal cords and organs of speech, but he has to invent his own language and music. The animals, on the other hand, do not have to learn to walk or swim or fly or speak. If these acts are appropriate to their kind, they do them naturally. The lamb and the calf walk, the duck swims, the snake strikes, the hour they are born.



Man is a generalized type, except as regards his brain power. He is not by his anatomy a climber, or a swimmer, or a wader, or a flyer; he has neither fangs, tusks, talons, horns, spurs, nor claws. And yet, by virtue of his gift of reason, he does all of these things — provides himself with tools that serve all these purposes and many more. It is his reason, and not his instinct, that places him so far above all other animals. A man with skates on his feet is like one of the lower animals in this respect: he is specialized, his range is limited. If he were born with such a device on his feet, he would have an instinct for skating; or if he had a nose like a pig, he would have an instinct for rooting; if he had feet like a goose he would have an instinct for swimming. Man's organization and brain



power are such that pure instinct plays a far smaller part in his life than it does in the lives of the animals below him. He has general instincts, while they have special instincts; he checks and controls or suppresses his instincts by his reason, a thing that the animals never do. A man may have more instincts than his dog or his horse or his ox, but how wide of the mark it would be to say that he is under the dominion of his instincts as these animals are under the dominion of theirs.

We are all more or less the creatures of habit, but of acquired habits rather than inherited habits. Man has filled the world with his acquisitions, and changed the face of continents with the tools he has invented. He performs

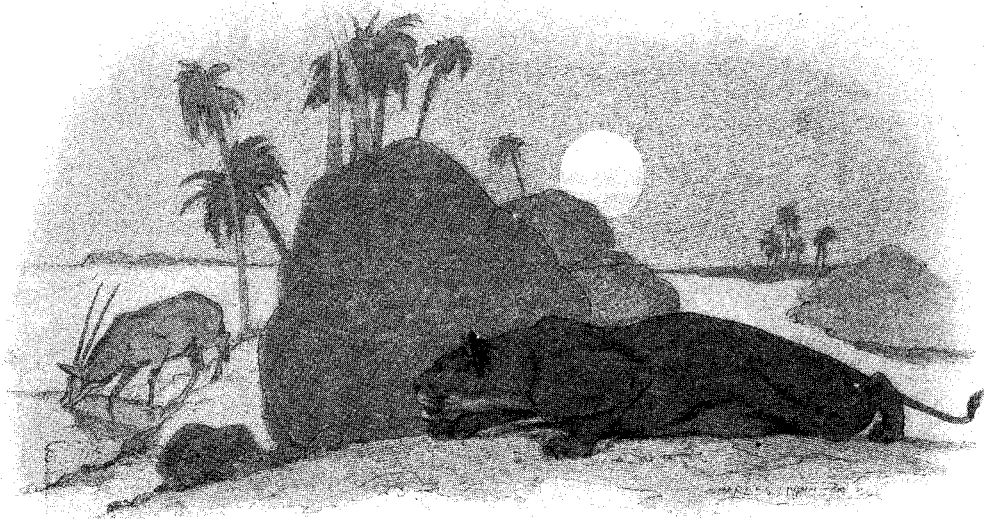
hardly an action that is not the result of some acquired habit or for which he does not draw upon some acquired or stored-up power. Nature gave him the power to make sounds, but his language, his music, he has invented; she gave him the power to walk, but his power to sail, to fly, to cross continents faster than the fleetest horse, he has given himself; she gave him the power to hurl a stone or a spear or a club, but the power to hurl tons of metal miles upon miles, he has given himself.

What the wild creatures shall do, where they shall live, what they shall eat, is determined, I repeat, by their organization. Acquired habit or experience modifies the natural course of their lives very little. The scarcity of their staple food may drive them to an unaccustomed diet, as when the crossbills from the North fell upon a peach orchard in my neighborhood one May and cut out the germ of the peach blossoms. Hunger will drive a fox to eat corn which he cannot digest, and fear of the mongoose will drive rats to nest in trees.

With our domestic animals the case is different; they are useful to us mainly on account of their acquired habits. We have trained them to do our bidding. The horse in the harness or under the saddle, the ox in the yoke or hitched to the plow or the cart, the dog trained to point, to retrieve, to trail, the performing animals in the circus or in the menagerie, all act from acquired habits. Their natural instincts have been eradicated or greatly modified. We have trained them to our own wills, as we train a tree to some arbitrary pattern. If let alone a few years, the clipped tree will go back to its natural form; the domestic animal, if given a chance, quickly reverts to the state of its wild brothers. Man himself, in war, in camps in the woods, or among the mines, tends to revert to a state of barbarism.

In calling instinct inherited habit we do not, of course, clear up the mystery. Perhaps we only substitute one mystery for another. There remains the mystery of inheritance, which we think we can track to certain parts of the nucleus of the germ cell, and there our analysis stops.

The new psychology is confusing when it says, through Professor Brewster, that, strictly speaking, there is no such thing as instinct, but "instincts there are by the score." Are we, then, forbidden to generalize or to make abstract statements about concrete facts? Are we forbidden to say, for instance, that there is no such thing as religion, though there be any number of religions? no such thing as character among men, though there may be any number of characteristics?



True, there is no such thing as instinct in the abstract, but there exists in our minds an idea of instinct that is a generalized form of the concrete examples we have seen. There is no such thing as maternal instinct, Professor Brewster says, but only "impulses that have to do with young, which females possess and males lack"; no such thing as a homing instinct, but only an attachment for some particular place to which the animal has learned the way. In short, "instinct is not a faculty but a reflex."

What men possess and share with the lower orders are impulses — involuntary, spontaneous impulses to do certain specific things; and this is what we mean by instinct. The "impulses that have to do with young, which females possess and males lack" — what is that but the maternal instinct? It is not acquired, it is latent in the female, and is developed when her young are born. In the insect world it is active before the young are born, and leads to solicitude about the young that the mother is never to see. There is the nesting instinct in birds, which is stronger in the female than in the male; the stalking instinct in the cat is stronger than it is in the dog. We form an idea of these various unconscious responses or reactions to external conditions, and we call it instinct.

Can we argue that there is no such thing as the mating instinct among animals, from the fact that it works differently in different species? There may not be such a thing as the "homing instinct," in the sense in which we used to believe there was in pre-evolutionary days — a

blind impulse that carries an animal back home unerringly, and that acts independently of sight or sense. Although this is still a mooted point, I do not believe that a wild animal ever gets lost, though we know domestic ones do. The domestic animal's instincts are by no means as sure in their action as are those of their wild brothers. But I do not believe that a wild animal finds its way home in the same way that a man does — by a process of calculation and judgment, and memory of familiar points. I have seen the muirs in Bering Sea fly for many miles straight home to their rookies through a dense fog; and the fur-seals in the vast pathless wilderness of the Pacific find their way back each spring to their breeding-rocks in Bering Sea. I cannot see how their sense of sight or smell could aid them in such cases. President Roosevelt told me of a horse he had in his ranch days that returned to its old home, seventy miles away, by taking a direct line across the prairie, swimming rivers in its course. How did the horse know the way? Wild animals probably have a sense of direction that is enfeebled or lost in domestic animals — a sense that civilized man has lost also, but that is keen in barbarians.

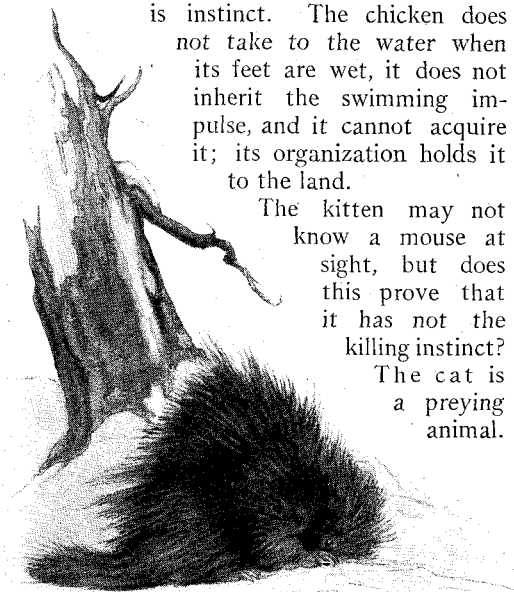
Is not Professor Brewster confusing, too, when he refuses to consider instinct as inherited habit, and then proceeds to relate the case of a white rat that in its wanderings in the laboratory came upon three chickens many times larger than itself, and "slew them most skilfully, each with a single bite through the neck,"

although the rat had never before seen a chicken, nor had its parents or grandparents? Yet the fowl-killing habit had survived in the rat.

Professor Brewster's statement that young ducks have no instinctive impulse to enter the water is misleading. Why, then, do they enter it voluntarily? Young ducks have no instinctive recognition of water through the eye, but they have through the feet; the moment they feel the water with their feet, the impulse to enter it is awakened, and away they go. Is this true of chickens? Neither ducks nor chickens know water through the sense of sight, but by the sense of touch. Their drinking and swimming habits are simply reactions. The power must be directly applied to set the machinery going. This inherent tendency on the part

of the duck to take to the water is instinct. The chicken does not take to the water when its feet are wet, it does not inherit the swimming impulse, and it cannot acquire it; its organization holds it to the land.

The kitten may not know a mouse at sight, but does this prove that it has not the killing instinct? The cat is a preying animal.



It preys upon the smaller animals and birds and insects; and this is not a habit, but an instinct which you cannot eradicate. It is quite possible that a laboratory kitten would not kill a mouse offhand, but can any one doubt that the young of a wildcat would kill a mouse at sight?

Animals gain very little knowledge through the eye (often the dog does not know his own master by sight). The sense of smell is their guide; that alone is convincing to them; hence the keenness of this sense in most wild creatures.

Our professor says that, "so far as the study of animal behavior is concerned, the days of the mere observer are past." He has lost his job. The "new psychology" captures the animal,

imprisons it in a cage like a culprit, and then begins its detective work. Certain things may, no doubt, be learned about animal mentality by this course; but I am very skeptical about the amount of light that can be thrown upon the springs of animal life, at least upon the life of the higher vertebrates, by this inquisitorial proceeding. In the laboratory, or in any sort of confinement, the animal is placed in unnatural conditions, and the problems that confront it in captivity do not arise in the natural course of its life. Their instincts are demoralized because their bodies are restrained. Man is a disturbing influence. Animals under his care even change their colors. In laboratories their native wit is usually at a low ebb, and they do not know what they do know. Their instincts are balked because of the strangeness of the environment. They are not themselves, and do not and cannot act out their true natures. What, for instance, could your new psychologist learn of the real life and character of my downy woodpecker by his laboratory experiments? Could he persuade him to excavate his winter lodge? Could he induce him to select a drum from a lot of dry limbs put in his cage, and, when the spring days come, begin his resonant hammering to attract a mate? Can the real instincts and the varied natural accomplishments of any of the wild creatures be brought out by this jailing process? I doubt it. Some of us men would cut a pretty poor figure under such a test.

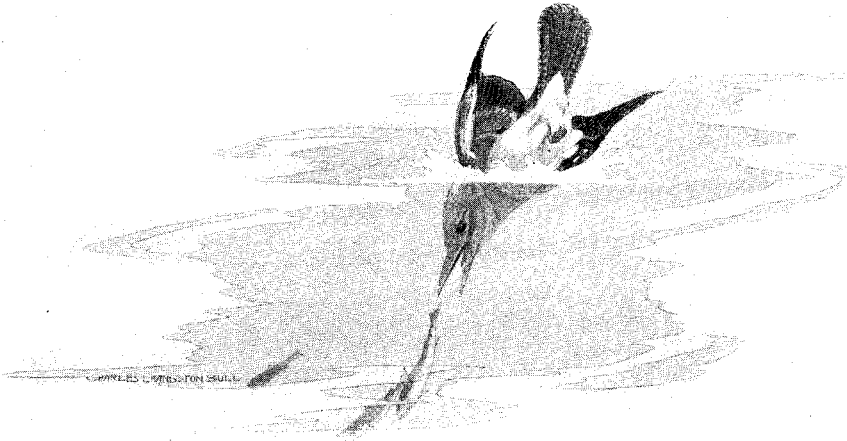
What sort of a figure does your mountaineer cut in town? Take John Muir, for instance. Now, John Muir is one of the most expert woodsmen and mountain-climbers we have ever had.

He will find his way about and over the Sierra Mountains, even at night. But put him down in a city and he will be lost at once unless you keep hold of his coat-tails. No other man has so keen a scent for glaciers and sequoias; but in the streets of

a strange city he could not find his way to a glacier or a Douglas spruce, if it was only two squares away. Unnatural conditions make both man and beast unnatural.

I confess that this short cut to animal psychology through the laboratory interests me very little. Laboratory experiments can lead to little more than negative results. They prove what the animal does not know and cannot do under artificial conditions, but do they show what it does know and can do under natural conditions?

I grant that you can prove in your laboratories that animals do not reason — that they have nothing like our mental processes. But the observer in the field and woods, if he exer-

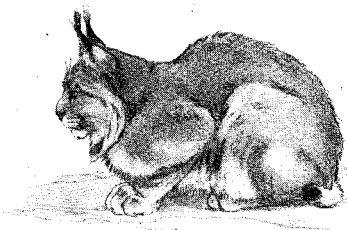


cise any reason of his own, knows this. We see that the caged bird or the caged beast does not reason, because no strength of bar or wall can convince it that it cannot escape. It cannot be convinced, because it has no faculties that are influenced by evidence. It continues to struggle and to dash itself against the bars, not until it is convinced, but until it is exhausted. Then, slowly, a new habit is formed — the cage habit, the habit of submission to bars or tethers. Its inherited habits give place to acquired habits. When we train an animal to do certain “stunts,” we do not teach it or enlighten it, in any proper sense, but we compel it to form new habits. We work with the animal until it goes through its little trick in the same automatic manner in which its natural instincts were wont to work.

I do not care to know how a laboratory coon gets his food out of a box that is locked; but I should like to know why he always goes through the motion of washing his food before eating it, rubbing it in the sand or sawdust or straw of his cage, if no water is handy. I should like to know why he is fond of shellfish, and how he secures them, since he is in no sense an aquatic animal. In the laboratory you may easily learn how a mink or a weasel kills a chicken or a rat; but how does it capture a rabbit by fair running in the woods or fields, since the rabbit is so much more fleet of foot? In the laboratory

you might see a black-snake capture a frog or a mouse; but how does it capture the wild bird or the red squirrel in the woods? It is this interplay of wild life, the relations of one animal with another, and how each species meets and solves its own life problems, that interests us, and can afford us the real key to animal behavior. What can the keeper of the Zoo really learn about his animals that is valuable and interesting? Or what does the public get out of its Sunday or holiday visits to a zoölogical park besides a little idle amusement? The beasts there are all prisoners; and they are more dejected and abnormal than human prisoners would be under like conditions, because they are more completely cut off from their natural surroundings.

With very low forms of animal life the case is different. They are affected very little, if at all, by the presence of man and by artificial conditions. Professor Loeb's experiments with the medusae, ascidians, worms, and mollusks established many things about these low forms well worth knowing, and that could have been learned in no other way — his demonstration, for instance, that a certain phase of tropism, response to external stimuli, is the same in both animals and plants. His discovery that life can go on without the nervous system, that irritability and conductivity are qualities of protoplasm, and that nature invented and improved the nervous system to secure quicker and better communication between the parts of an organism; the discovery that only “certain species of animals possess associative memory, and have consciousness, and that it appears in them only after they have reached a certain stage in their ontogenetic development” — that any animal that can be trained, that can learn, possesses this memory: all these things, and many others that Loeb has found out by his



laboratory experiments, throw much light on the springs of animal life. It is not an instinct that drives the moth into the flame; it is a tropism — heliotropism. It is not an instinct that makes a bedbug take refuge in a crack; it is another tropism — stereotropism, the necessity of bringing the body on every side in contact with solid bodies.

Professor Loeb has shown that neither experience nor volition play any part in the behavior of bugs and worms; they are machines set going by outward conditions. The warmth of the spring brings about chemical changes in the bodies of caterpillars that set them moving about. Wingless plant-lice, he says, can at any time be made to grow wings by simply lowering the temperature, or by letting the plant upon which they are feeding dry out. The egg-laying mechanism of the blow-fly is set going by certain volatile substances contained in its meat, and this he calls chemotropism.

Still, one would like to know how this particular kind of machinery came to be developed in the blow-fly. The terms "reflexes" and "tropisms" do not give a plummet-line long enough to sound all the depths of animal behavior. With them one may measure very

well the conduct of the lower organisms, such as radiates, articulates, mollusks. The lives of these creatures are mainly a series of reflexes or tropisms. We could not correctly speak of the psychology of a clam, an oyster, or a worm, because they have no psychic life; but their tropisms or automatic responses to stimuli are interesting to study. These lower forms have no instincts, properly so called. Not until we get higher in the scale of life, and reach animals that have associative memory, do we reach the region of psychics, and find that complex behavior which we designate as instinctive, and which results as much from inborn impulses as from outward stimulation.

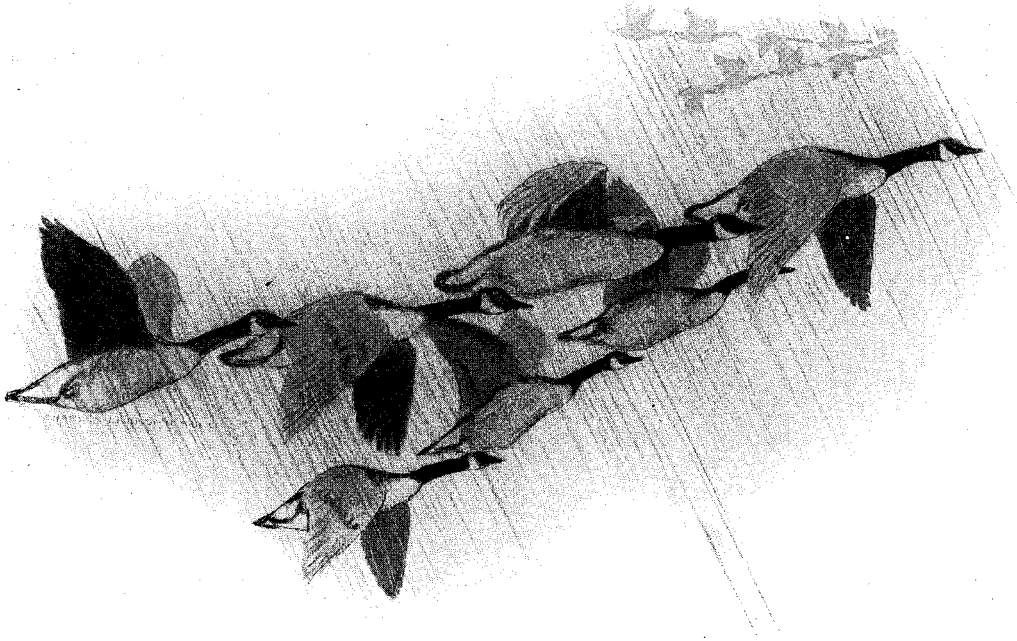
Loeb is of the opinion that all so-called instincts will ultimately be explained on purely physiological principles, that is, the physical and chemical qualities of protoplasm. When this is done the difference between reflex and instinctive actions will disappear. The actions of both men and beasts will turn out to be reactions to external stimuli. Probably everything in this world has its physics, has its genesis and explanation somehow in matter, from chemical affinity to human passion, from animal instincts to the poetic frenzy. That marvelous invention, the phonograph, has its physics as surely as the steam-engine has.

But how inadequate the mechanical explanation of it seems. How incredible it seems that the tone of a bell, the peal of a bugle, the wail of a violin, the ring of an anvil, and, above all, the soul of the singer as revealed in the human voice, can all be evoked from these fine, wavy lines on the disk.

The soul of man certainly has its physics; our thoughts, our emotions, all have their physical basis in protoplasm. I do not think that the brain secretes thought as the liver secretes bile, but I do believe our thoughts are as much the result of physiological conditions as bile is. An analysis of the brain and an account of all its chemical elements and properties would fail to reveal to us the secret of its thoughts, or why one brain has thoughts of one kind and another of another kind; yet, no doubt the cause is there, the actual, material, physiological cause, if our analysis were keen enough to find it. Our search would be as futile as our search for the complex music that slumbers in the records of the phonograph.

As a scientist, one cannot admit anything mystical or transcendental in nature; while, on the other hand, the final explanation of the least fact is beyond us. We know certain things about chemical affinity, for instance; but what makes chemical affinity? Why are certain sub-





stances so crazy to be locked in each other's embrace? Why, that is chemical affinity. But what is chemical affinity? The instinct of migration in birds doubtless has a physiological basis; but whence this basis? How did it come about? The instinct of the male for the female doubtless has a physiological basis, but whence the basis? All instincts have their physics, but are they on that account less instinctive? After we have explained them, are they any the less untaught, any the less independent of experience? Some kind of chemical and physiological stimuli make the heart beat, but does that clear up the mystery? Why is this muscle and no other so susceptible to these stimuli? Why is the heart the heart?

It takes time to develop and establish the instincts of the lower orders, as it takes time to develop the reason in man. Not until its organization approaches maturity does its system of reflexes act promptly and surely. It is not a question of experience or of acquired habits, but of physiological development. It takes nine days for the kitten's eyes to open, and it takes longer than that for the preying instincts to develop. The baby does not wink, when you threaten its eyes with your hand, until it is two months old, but its sucking instinct seems to be developed when it comes into the world. Its instinct of fear comes much later, and the little girl's doll-baby instinct, if such it be, comes later still.

Just at this point I am reminded of a curious

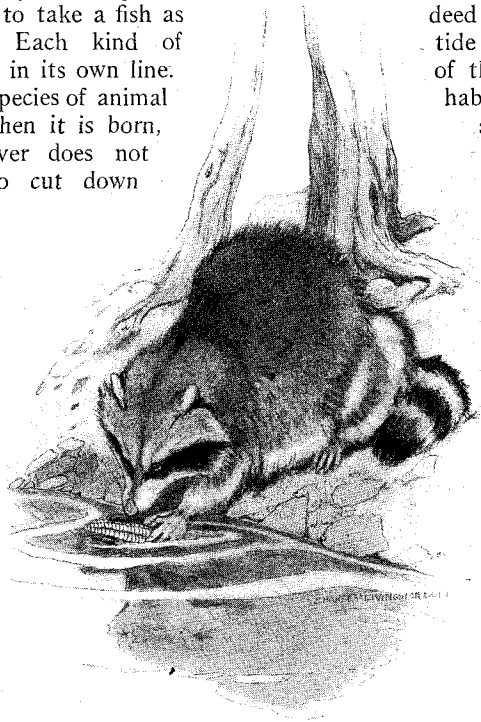
error that John Fiske fell into in his otherwise admirable paper on the helplessness of the human young as a factor in human evolution: "The bird known as the flycatcher no sooner breaks the egg than it will snap at and catch a fly." Of course, this is absurd. When the young flycatcher first comes out of the shell it can neither see nor lift its head. Its fly-catching does not begin until long after it is out of the nest and fully fledged, and then it begins instinctively; it is prompted to this by its organization and its inherited habits. So with the other forms of animal life. The young bird has wings, therefore it does not have to be taught to fly; the woodpeckers have bills made for drilling, therefore the drilling does not depend upon experience; the woodcock has a beak for probing mud and an inborn appetite for soft worms, therefore it instinctively probes mud. Does the young skunk have to be taught how to defend itself, or the young porcupine, or the young rattler, or the wasp, or the honey-bee on its first flight?

Squirrels are nut-eaters, therefore they know nuts the moment they see or smell them. Some species of monkeys are egg-suckers. A monkey of one of these species knows how to deal with the first egg it comes across; a monkey not of such a species makes a mess of the first egg. These are examples of instinct, automatic reactions, inherited habits. Birds not of the fly-catching species will sometimes pursue and try

to capture a small moth or other insect; but how awkward and futile their efforts when compared with the quick, sure swoop and snap of the born flycatcher. A sparrow never could learn to take a fly as the phoebe does, or a woodpecker to take a fish as the kingfisher does. Each kind of bird is a born specialist in its own line.

The career of every species of animal is determined for it when it is born, or before. The beaver does not have to be taught to cut down

trees and to build a dam, nor the muskrat to build its house, nor the woodchuck to dig its hole. They come into the world with the tools and the impulses to do these several things. "Habit," indeed! So is the ebb and flow of tide a habit; so is the singing of the wind in the treetops a habit; so is sunrise and sunset a habit. But the habit is as old as time and as new as the day.



VISIONING HOURS

BY

ARTHUR L. PHELPS

A SILVER mist o'er the city,
That lowers young day to adorn;
A hush, and a silvery city
In the first hour of the morn.

And eyes grown tired in the city,
Looking away and away,
See meadowlands out of the city,
Clean, in the dawn of the day. . . .

Men toil for pay in the city;
But grant them visioning hours
When they pause and dream in the city
Of wide, sweet meadows and flowers.