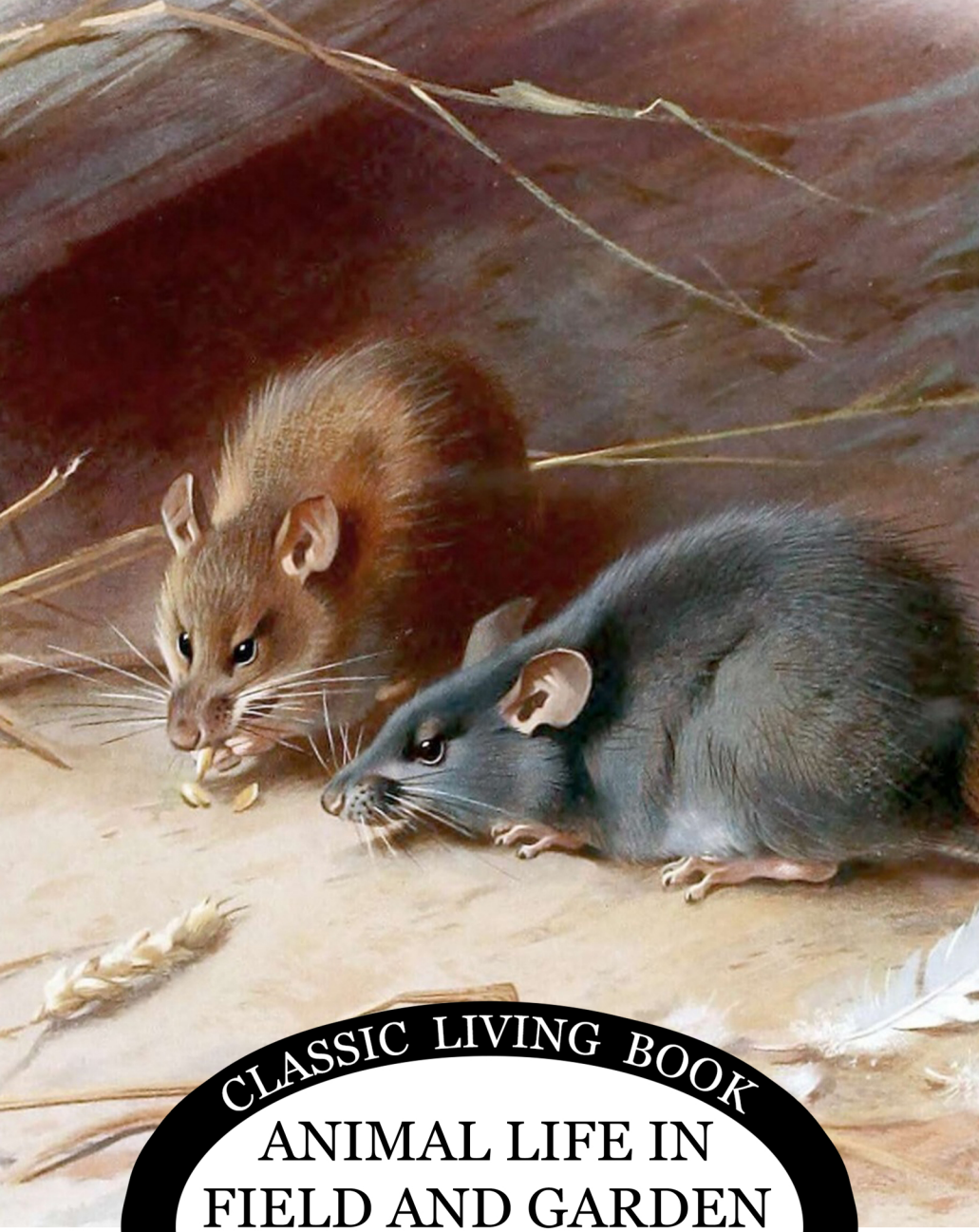

CLASSIC LIVING BOOK

ANIMAL LIFE IN FIELD AND GARDEN

Jean-Henri Fabre

COMPLETE AND UNABRIDGED

This edition published 2025
by Living Book Press

ISBN: 978-1-76153-391-4 (hardcover)
978-1-76153-392-1 (softcover)

First published in 1921.

This edition is based on the 1921 printing by The Century Co.

A catalogue record for this
book is available from the
National Library of Australia

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by

Jean-Henri Fabre

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CHAPTER I

WHAT UNCLE PAUL PROPOSES TO TALK ABOUT

"IN THESE talks that we shall have together," said Uncle Paul, as he sat with his nephews one evening in May under the big elder tree in the garden, "I propose to designate as 'friends' those forms of animal life that, though not domesticated or cared for by us, nevertheless come to our aid by waging war on insects and various other devouring creatures which would in the end, unless their excessive multiplication were kept in restraint by others besides ourselves, eat up all our crops and lay waste our fields; and it is these ravagers of the farmer's carefully tilled acres that I shall speak of as 'foes.'

"What can man's efforts avail against those voracious hordes, multiplying as they do every year to an extent beyond calculation? Will he have the patience, the skill, the keenness of vision necessary for waging successful warfare on the tiniest species, often the most formidable, when the June-bug, despite its far greater size, baffles all his endeavors? Will he undertake to examine his fields and inspect every lump of soil, every spear of wheat, every separate leaf on his fruit trees? For so prodigious a task the whole human race would be inadequate, even if it united all its efforts to this one end. The devouring hordes would reduce us to starvation, my children, had we not able helpers to work for us, helpers endowed with a patience that nothing can tire, a skill that foils all ruses, a vigilance that nothing escapes. To lie in ambush for the enemy, to track it to its remotest retreats, to hunt it unceasingly, and finally to exterminate it—that is their sole care, their never-ending occupation. Urged on by the pangs

of hunger, they are relentless in their pursuit, both for their own sake and on behalf of their progeny. They live on those that live on us; they are the enemies of our enemies.

"Engaged in this work are the martins that just at present are circling over our heads, the bats that fly around our house, the owls that call to one another from the hollow willow trunks in the meadow, the warblers that sing in the grove, the frogs that croak in the ditches, and many more besides, including the toad, which is an object of loathing to most people. Thanks be to God who has given us, to serve as guardians of our daily bread, the owl and the toad, the bat and the viper, the frog and the lizard! All these creatures, wrongfully cursed and shamefully abused by us, and foolishly looked upon with repugnance and hatred, in reality lend us valiant assistance and should take a high place in our esteem. To repair the injustice they have suffered shall be my first duty as we come to each of them in turn. Thanks be to God who, to protect us from that great eater the insect, has given us the swallow and the warbler, the robin redbreast and the nightingale! These, the delight of our eye and ear, creatures of infinite grace—must I again raise my voice in their defense? Alas, yes, for their homes are ravaged by the barbarous nest-hunter.

"It is my purpose now to acquaint you, my children, with these various helpers of man in his labors as tiller of the soil. I will tell you about their ways of living, their habits and their aptitudes, and the services they render us. My object will be attained if I succeed in imparting to you a little of the interest they deserve. I will begin with those that have teeth. But first let us take a glance at the shape and structure of teeth in general; for it is this that determines the kind of food required by the animal."

CHAPTER II

TEETH

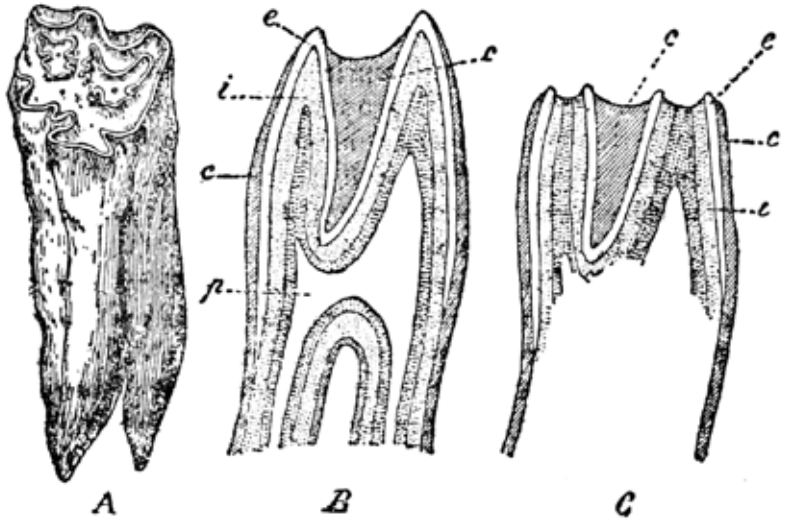
"Is it not true," resumed Uncle Paul, "that each kind of work demands its own special tool? The plowman must have the plow, the blacksmith the anvil, the mason the trowel, the weaver the shuttle, the carpenter the plane; and these different tools, all excellent for the work to which they are applied, would be of no use in any other. Could the mason rough-cast his wall with a shuttle? Could the weaver weave his cloth with a trowel? Evidently not. Is it not true, then, that from the tool one may easily guess the kind of work it does?"

"Nothing could be easier, it seems to me," replied Jules. "If I see planes and saws hanging on the wall, I know that I am in a carpenter's shop."

"And I should know," said Emile, "from seeing an anvil, a hammer, and a pair of tongs, that I was in a blacksmith's shop. But if I saw a mortar-board and a trowel, I should look around for the mason."

"Well," Uncle Paul went on, "every creature has its special task in creation's great workshop, where all take part, all work, according to the design of Divine Wisdom. Each species has its mission—I might say its trade to follow—a trade that requires special tools just as does any work done by man. Now, among the innumerable trades of animals there is one that is common to all without exception, the most important trade of all, as without it life itself would be impossible: it is the business of eating.

"But all animals do not take the same kind of food. Some need prey, raw flesh, others fodder; some eat roots, others seeds and fruit. In every instance teeth are the tools used in



TOOTH OF A HORSE
A, the tooth entire; *B*, cross-section of an unworn tooth; *C*, cross-section of a worn tooth; *e*, enamel; *c*, cement; *i*, ivory; *p*, dental pulp.

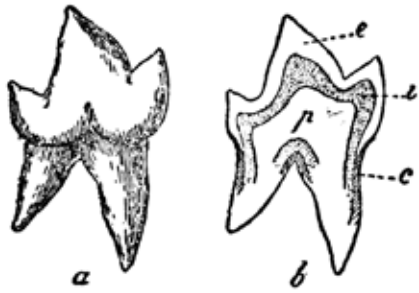
the work of eating; so they must have the shape appropriate to the kind of food eaten, whether that be tough or tender, hard or easy to chew. Therefore, just as from his tool the artisan's work may be inferred, so from the shape of its teeth one can usually tell the kind of food eaten by any animal.

"Herbivorous animals are those that live on grass, fodder, hay; and carnivorous animals are those that eat flesh. The horse, the donkey, the ox, and the sheep are herbivorous; the dog, the cat, and the wolf, carnivorous. The food of the herbivorous animal is tough, hard, fibrous, and must be ground for a long time by the teeth in order to be reduced to a paste-like mass suitable for swallowing and, after that, for easy digestion. In this case the teeth in both upper and lower jaw must have broad and almost flat surfaces that will come together and grind the food as millstones grind grain. On the other hand, the flesh eaten by the carnivorous animal is soft, easy to swallow, and easy to digest. All that the animal has to do is to tear it apart and cut it into shreds. So the teeth here must have sharp

edges that come together and operate like the blades of a pair of scissors.

"I think I have said enough on that subject. Now, which of you will tell me what kind of food goes with each of the teeth I show you here?"

And Uncle Paul laid before his hearers the two teeth pictured on these pages, with others to follow.



TOOTH OF A WOLF
a, the tooth entire; *b*, cross-section; *e*, enamel; *c*, cement; *i*, ivory; *p*, dental pulp.

"The first tooth," said Emile, "is flattened and very wide at the top; it must crush and grind by rubbing against a tooth of the same kind in the opposite jaw. So it is the tooth of an animal that eats fodder."

"It is indeed," Uncle Paul replied, "the tooth of an herbivorous animal, a horse."

"The second," continued Emile, "is composed of several broad points with edges almost as sharp as knife blades. It must be meant for cutting flesh."

"Those winding folds that you see in the horse's tooth—what are they for?" asked Jules. "There is nothing like them in the wolf's tooth."

"I was going to tell you about them," his uncle replied. "If the horse's teeth had perfectly smooth surfaces, without any roughness to act as a grater, is it not true that in pressing and rubbing, each against the opposite tooth, they would simply crush the fodder or hay as you would crush it between two smooth stones without changing it into fine powder? Millstones, if they were polished like marble tables, would flatten the grain without making flour of it; they must be rough on the surface in order to seize the wheat during the grinding of the upper stone on the stationary lower one and to make it into powder.

When by long use the surface is worn smooth, the stones are of no service until they are dented again with the hammer. Well, the folds of a horse's teeth may be likened to the roughness of a millstone: they project a little above the general surface of the tooth, making a sort of coarse file that tears to pieces blades of grass or hay when rubbed by the opposite tooth."

"I think I see a danger threatening the herbivorous animal," put in Jules at this point. "Those projecting folds must soon be worn down by rubbing against one another, just the same as the roughness on the millstone. If smooth millstones can't make flour without being roughened again, no more can the herbivorous animal's worn teeth go on grinding."

"That is provided for, admirably provided for, my boy. Everything in the world is arranged so that it can do its work: a wisdom that nothing escapes watches over the smallest details; everything, even to a donkey's jaw, shows this to be so. Listen, and judge for yourselves.

"There are two different substances in a tooth: one very hard, a little like glass and called enamel; the other quicker to wear out, but very difficult to break, and known as ivory. These two substances are combined in different ways, according to the animal's diet. In the horse, the sheep, the ox, the donkey, and many other herbivorous animals the ivory makes up the main part of the tooth, while the harder substance, the enamel, extends in winding sheets throughout the former, projecting a little above its surface in a fold which varies in form in the different kinds of animals. So, then, it is the enamel, a substance as hard as a pebble, that composes the folds in the herbivorous animal's teeth. From the rubbing of the lower teeth against the upper the ivory wears away faster than the enamel, so that the folds of the latter embedded in the mass of the tooth have their cutting edges brought above the general level as fast as required, and thus the grinding surfaces are kept in constant repair. You see how it is: in the donkey's food-mill, for instance, the millstones re-roughen themselves as fast as necessary for

the chewing of a thistle; the machinery is self-repairing even while at work."

"What you tell us, Uncle, is wonderful," commented Jules. "I never should have guessed that such an arrangement was necessary for chewing a thistle."

"And only the other day," put in Louis, "I kicked out of my way a jaw-bone that was lying in the road. How gladly should I have looked at it closely if I had known all these things!"

"Ignorance always kicks things aside like that, my boy, but science is interested in everything, knowing that it can always learn something. But let us return to the teeth of the carnivorous animals and examine those of the wolf.

"Here the irregularities of the nutmeg-grater, the parallel ridges of the file, and the roughness of the millstone would be of no use, since the animal's food is to be torn into shreds and not chewed into paste. For the wolf's food cutting blades are needed—sharp scissors which are hard enough not to become blunt. Hence the working edges of the wolf's teeth are not flat like millstones, but shaped rather like pointed chisels. The ivory forms the central body of the tooth, making it tough and strong, while the enamel, harder but more brittle, is spread as a continuous layer over the tooth and furnishes the requisite cutting edges. In like manner a skilful cutler, when he wishes to make an edged tool that will cut well and at the same time withstand violent blows, makes its central mass of iron, a tough material that bears considerable violence without injury, but is not hard enough to furnish a keen cutting edge. He then overlays it, to obtain such an edge, with fine steel, which combines excessive hardness with the fragility of glass. The best that man can contrive in the making of edged tools is met with in perfection in the teeth of carnivorous animals."

"If I understand you, then," said Jules, "ivory, which is not so hard as enamel, but less brittle, forms the interior of the teeth of carnivorous animals, and enamel, which is harder and more brittle, forms the outside layer. Ivory makes the teeth strong; enamel makes them cut."

"Yes, that is it."

"Now, I don't know which is the more wonderful, the donkey's or the wolf's set of teeth."

"Both are wonderful, as both are admirably adapted to the kind of work they have to do."

"What surprises me most," Emile interposed, "is that a lot of things we should never pay any attention to turn out to be very interesting when Uncle Paul explains them to us. I never should have thought that the time would come when I should listen with pleasure to the history of a tooth."

"Since that interests you," said Uncle Paul, "I will continue the subject a little further and will tell you about human teeth, about yours, my boy, so white and so well arranged, and so admirably adapted for biting a slice of bread and butter."

CHAPTER III

THE DIFFERENT SHAPES OF TEETH

"MAN HAS thirty-two teeth, sixteen to each jaw," Uncle Paul continued.

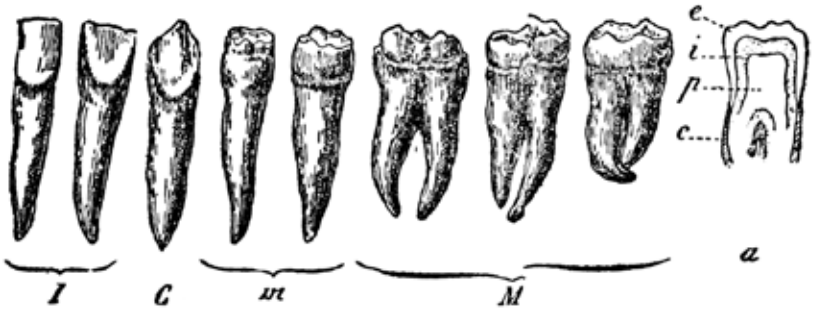
Emile already had his finger in his mouth, passing it from one tooth to another, to count them. His uncle paused until he had finished the count.

"But I have only twenty, all told," declared the boy; "twenty, and not thirty-two."

"The other twelve will come some day, my boy; at present you have the right number of teeth for a child of your age. They do not all come at one time, but one after another. We begin with twenty, and no more. They are called milk teeth, or first teeth. When we are about seven years old they begin to fall out and are replaced by others stronger and set in more firmly. In addition to this second score of teeth there appear later twelve others, bringing the total number up to thirty-two. Those farthest back, in the inmost cavity of the mouth, come late, when we are eighteen or twenty years old, or even older, for which reason they are called wisdom teeth to signify that they appear at an age when the reason is well developed. These thirty-two last teeth constitute the second cutting. I call them last because they are never replaced by any others; if we lose them, that is the end of our teeth; no more will come."

"I have two now that are loose," said Emile.

"They must come out soon to leave room for the new teeth that are to take their place. The others will get loose, too, and the twenty that you have now will be succeeded by twenty others, to which, sooner or later, will be added twelve more which



HUMAN TEETH
I, incisors; *C*, canine tooth; *m*, small molars; *M*, large molars;
a, cross-section showing, *e*, enamel; *c*, cement; *i*, ivory; *p*, dental pulp.

come only once. These last occupy the back part of the jaws, three on each side, top and bottom. Thus the final number will be thirty-two.

"These thirty-two teeth are divided into three classes according to their shape and the work they must do. The same names being repeated top and bottom and right and left, I show you merely the eight teeth of half a jaw. In every tooth there are two parts to be distinguished, the crown and the root. The root is the part that is embedded in the jaw-bone like a nail hammered into wood; the crown is the part that comes into view, and it may be likened to the head of a nail. The root holds the tooth in place, fixes it firmly; the crown cuts, tears, and grinds the food.

"In the two front teeth in each half-jaw the crown grows thinner toward the top. The edge is straight and sharp, fitted for cutting food, dividing it into small mouthfuls. Therefore these teeth are called incisors, from the Latin *incidere*, meaning to cut. Their root is a simple pivot. The next tooth is called canine. Its root is a little longer than those of the preceding teeth, and its crown is slightly pointed. The dog, the cat, the wolf, and carnivorous animals in general have this tooth shaped like a powerful fang, which serves to catch and hold prey, but above all acts as a weapon in attack and defense. It is the canine teeth that you see crossing one another, long and pointed, two on each side, when you raise the upper lip of a cat or a dog. Because of these

remarkable fangs of carnivorous animals, especially the dog, which in Latin is *canis*, the name canine has been given to the teeth that in man are like them, if not in form and use, at least in the position they occupy.

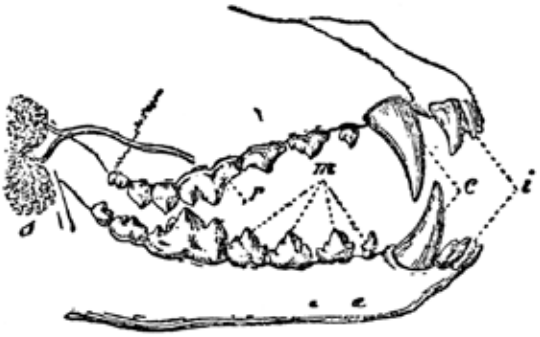
"The next five teeth are the most useful of all. They are called molars, from the Latin *mola*, a millstone, because they play the part of millstones in grinding the food. For this purpose their crowns are blunt and broad and slightly irregular, not flat like the horse's molars or with sharp cutting edges like the wolf's, because man's food is not composed exclusively of either vegetables or flesh, but of both at the same time. For food as varied as man's, there is need of molars fit for all sorts of service: they must grind like those of the herbivorous animals and cut like those of the carnivorous; in short, they must be like those of both. And, indeed, their wide crowns are suited to vegetable food, and their rather sharp irregularities are adapted to animal food.

"The first two are called little molars or, in more learned language, bicuspids, because they have each two cusps or points. They are the least strong of the five and have only one root each. The two little molars, the canine tooth, and the two incisors (of each half-jaw) are the only teeth that are renewed. Multiply them by four and you will have the twenty teeth of the first cutting, teeth that begin to fall out toward the age of seven and are gradually replaced by others. That is the state of Emile's teeth at present, there being but twenty of them.

"The other three teeth, in each half-jaw, come only once. They are the large molars, of which the very end one is also called the wisdom tooth. As in the act of mastication the large molars have to bear strong pressure, the root is composed of several pivots or prongs reaching down each into a special cavity or socket. This makes them strong and firm, so that they can stand pressure both downward and sideways.

"To sum up, the grown man has thirty-two teeth in all, sixteen to each jaw; namely, four incisors, two canines, and ten

molars. These last are divided into four bicuspids or little molars and six large molars; the milk teeth do not include these last six."



Jaws and Teeth of a Wolf
i, incisors; *c*, canine teeth; *m*, small molars; *r*, large molars; *s*, salivary glands.

Here Jules had a question to ask. "Ivory and enamel," said he, "those two substances of different degrees of hardness that you told us were arranged in such a wonderful way in horses' and wolves' teeth—are they in our teeth, too?"

"Yes, they are there. Ivory forms the entire root, which must serve as a firm support, and it also fills the crown, while enamel merely covers the outside as a hard protecting layer."

"I am going to get the cat and look at her teeth," said Emile. "Has she twenty, like me, or has she thirty-two?"

"Neither twenty nor thirty-two, but thirty when full-grown. Dogs and wolves have forty-two; horses and donkeys forty-four. In fact, the number varies with different animals as much as the shape. Perhaps a few words on this subject will not be out of place.

"First, here is the picture of a wolf's mouth. If one did not already know, one could easily guess the animal's diet by merely looking at its teeth. Those deeply indented molars, those strong, curved canines—surely they call for wild prey and show great strength. The whole set indicates clearly enough a carnivorous appetite. At *i* are the incisors, six in number. They are small and of slight use, for the animal does not cut its prey into little mouthfuls, but swallows it gluttonously in great strips. At *c* are the canines, veritable daggers which the bandit plunges into the sheep's neck. The little molars are at *m*. The large molars

Jaws and Teeth of a Cat

come next. The first, marked *r*, is the strongest, and it is with this that the wolf and the dog crack the hardest bones. Finally, the picture shows the salivary glands; that is, the organs that prepare the saliva and let it ooze into the mouth through the canal *s* as the animal eats. Without dwelling on this point, which would take me too far from my subject, I will merely say that saliva serves to soak the food and make a soft mouthful that can be easily swallowed, and it also plays an important part in the stomach in reducing to a fluid pap the food taken in; that is to say, it helps to digest the food.

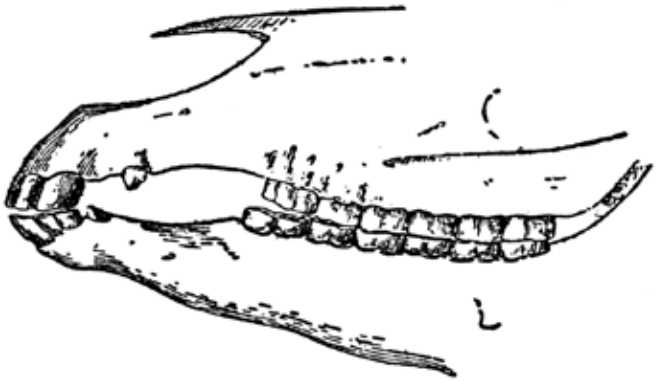
"Let us pass on to the cat, another typical flesh-eater. Six small incisors are ranged in the front of the jaw like a row of elegant but useless pearls. They are ornamental rather than useful to the animal. A mouse-hunter needs very long and pointed canines for piercing the prey seized by the claws. In this respect the cat is armed in a very formidable manner. What do you think of it, Louis?"

"I think," he replied, "a rat must be very uncomfortable between those curved canines the picture shows us."

"One day," said Emile, "when I was pulling the cat's mustache, she gave me a bite that felt like the sharp prick of a needle. It was done so quickly I had no time to draw my hand back."

"The cat brought her canines into play and wounded you with one of them as quickly as a steel point could have done.

"Now look at the molars. There are four above, the last one very small, and three below. Their cusps or points are still sharper than the wolf's; so, too, the cat's appetite—like that of its kindred, the tiger, the panther, the jaguar, and others—demands more flesh than that of the wolf and animals like it, such as the fox, the jackal, and especially the dog. Have you ever noticed how disdainful the cat is when you throw her only a piece of



Jaws and Teeth of a Horse

bread? Scarcely has she smelt it when she makes a movement of superb scorn, tail in the air, back raised, and looks at you as if to say: 'Are you making fun of me? I want something else.' Or, if very hungry, she reluctantly bites the bread, chews it awkwardly, and swallows it with distaste. The dog, on the contrary, our good Azor for example, catches the bread joyfully in his mouth without letting it touch the ground, and if he finds any fault with the piece it is for being too small. You call the cat a glutton. I take her part and maintain that it is not the vice of gluttony she shows, but that her teeth must have meat. What could you expect her pointed canines and keen-edged molars to do with a crust of bread? They demand, above all, a prey that bleeds, a quivering bit of flesh.

"What a difference between the teeth of the hunter and those of the peaceful chewer of grass! Let us examine this picture of a horse's head. Here the incisors, six in number, are powerful; they seize the forage and cut it, a mouthful at a time. The canines, of no use here, show only as little knobs on the jaw-bone. Next beyond comes a long vacant space called the bar; that is where the bit is held in the horse's mouth. Back of the bar you see the real grinding mechanism, composed of twelve pairs of strong molars with square, flat crowns furnished with slightly projecting folds whose use-

JAWS AND TEETH OF A RODENT
a, hamster's jaws and teeth; *b*, upper incisor of a rabbit.

fulness I have already pointed out to you. If I am not much mistaken, here we have a mill capable of grinding tough straw and fibrous hay.

"Finally, here is a rabbit's head. Each jaw is furnished with two enormous incisors set deep into the bone, bent backward above, and ending each in a sharp-edged crown. What are such incisors as those made for?"

"I know," Jules quickly replied. "The rabbit is always nibbling. For want of better food it will gnaw the bark of a tree and even the wood. It uses its incisors to cut its food very fine, to gnaw it."

"To gnaw it—that is the right word; hence we give the name of rodents or gnawers to the various animals having incisors of that kind. Such are the squirrel, the hare, the rabbit, the rat, and the mouse, those poor creatures which must gnaw the toughest vegetable substances and fill their bellies with wood, paper, rags even, when there is nothing better for supplying the mill that is kept always going. But it is not merely to satisfy their hunger that these animals are almost incessantly gnawing; there is another reason for their doing it. Their incisors grow all their lives and tend to lengthen indefinitely; consequently, the animal must wear them away by continual friction, as otherwise their crowns would at last so far overlap that they could not be made to meet. Then the poor beast would be unable to seize its food and would perish. In order to be able to eat when hungry, the

rat and the rabbit must eat when not hungry, so as to sharpen their incisors and keep them the right length. It is true that they often turn their attention to very poor fodder. A splinter of wood, a straw, a mere nothing suffices to maintain the play of their indefatigable incisors. Remember, children, the expressive term *rodents* (which means *gnawers*), applied to a whole class of animals akin to the rabbit and the rat; remember their curious incisors, for we shall have occasion to speak of them again hereafter. For the present let us finish our examination of the rabbit's teeth.

"The canines are lacking; in their place the jaw shows a bar or, in other words, a large open space. At the extreme back of the mouth are the molars, few in number but strong, with flat crowns and several folds of enamel. In fact, they make an excellent grinding machine.

"In giving you these details concerning the different shapes of teeth in different species of animals, I wished particularly to point out the following truth: Each species eats a particular kind of food for which the teeth are especially formed, so that one might say of any animal, 'Show me its teeth and I will tell you what it eats.' In many instances where we cannot examine the teeth we do not know what such and such a creature feeds on, and in our hasty judgment we mistake a friend for an enemy, a helper for a destroyer. If the animal is ugly we condemn it on the spot and hate it, accusing it of any number of misdeeds. We declare war against it, and never suspect, in our foolishness, that it is a war at our own expense. But there is a very simple precaution by which we can avoid these regrettable mistakes: let us yield to no prejudice, however wide-spread, and before condemning an animal as harmful let us find out what sort of teeth it has. They will tell us the animal's way of living, as you shall soon see for yourselves."

CHAPTER IV

BATS

"WHICH OF you three can tell me what bats feed upon?" asked Uncle Paul the next day.

At this question Emile put on his thinking-cap, closing his eyes and rubbing his forehead; but no ideas came. Nor were Jules and Louis any prompter with an answer.

"Nobody knows? Well, then, so much the better, for you will have the satisfaction of finding it out for yourselves, from the shape of the teeth. The incisors, small and weak, which you see on an enlarged scale in this picture of a bat's set of teeth—do they look as if they were made for gnawing vegetable substances, after the manner of rats and rabbits? Could they cut any such tough fodder?"

"Certainly not," replied Jules; "they are too weak to be of much use. And then it seems to me those two sharp, curved fangs must belong to a flesh-eating animal."

"The long, pointed canines do indicate as much, but the molars show it perhaps still more plainly. With their strong and sharp indented crowns fitting so well into the sharp-edged depressions of the opposite jaw—are those molars designed to crush grain, to grind, slowly and patiently, fibrous substances?"

"No," said Jules; "they are the teeth of a flesh-eater, not the grist-mill of an herbivorous animal."

"I am sure now," affirmed Louis, "that the bat lives on prey."

"It is a greedy hunter of flesh and blood," Emile declared. "The cat's teeth are not more savage-looking."

"All that is quite correct," said Uncle Paul. "The teeth have taught you the chief thing about the animal's habits. Yes, the

Jaws and Teeth of a Bat

bat is a hunter, an eater of live prey, a little ogre always demanding fresh meat. It only remains to find out the kind of game it likes. Evidently the size of the prey must suit the size of the hunter. A bat's head is no bigger than a large hazelnut. It is true the mouth is split from ear to ear and can, when wide open, swallow mouthfuls larger than the smallness of the animal would lead one to suppose. Nevertheless the bat can attack only small creatures. What can it be that it goes chasing through the air when, after sunset, it flies hither and thither unceasingly?"

"Gnats, perhaps, and night-moths," Jules suggested.

"Exactly. Those are its prey. The bat lives on insects exclusively. All are food for its maw: hard-winged beetles, slender mosquitoes, plump moths, flying insects of all sorts; in fact, all the little winged foes of our cereals, vines, fruit trees, woolen stuffs—all those creatures of the air that come in the evening, attracted by our lighted rooms, and singe their wings in the flames of our lamps. Who would undertake to say how many insects bats destroy when they fly around a house? The game is so small, and the hunter is so hungry.

"Notice what happens on a calm summer evening. Lured abroad by the balmy atmosphere of the twilight hours, a host of insects leave their lurking-places and come forth, guests at life's garden party, to sport together in the air, hunt for food, and mate with one another. It is the hour when the sphinx-moths fly abruptly from flower to flower and thrust their long probosces into the depths of the corollas, where honey is stored; the hour when the mosquito, thirsting for human blood, sounds its war-cry in our ears and selects our tenderest spot to stab with its poisoned lancet; the hour when the June-bug leaves the shelter of the leaf, spreads its buzzing wings, and goes humming through the air in quest of its fellows. The gnats dance in

A Bat in Flight

joyous swarms which the slightest breath of wind disperses like a column of smoke; butterflies and moths, in wedding-garments, their wings powdered with silvery dust and their antennæ spread out like plumes, join in the frolic or seek places in which to deposit their eggs; the wood-borer comes forth from its hidden retreat under the bark of the elm; the weevil breaks its cell hollowed out in a grain of wheat; the plume-moths rise in clouds from the granaries and fly toward the fields of ripe cereals; other moths explore here the grape-vines, there the pear trees, apple trees, cherry trees, busily seeking food and shelter for their evil progeny.

"But in the midst of these festive assemblies suddenly there comes a killjoy. It is the bat, which flies hither and thither, up and down, appearing and disappearing, darting its head out this side and that, and each time snapping up an insect on the wing, crushing and swallowing it immediately. The hunting is good; gnats, beetles, and moths abound; and every now and then a little cry of joy announces the capture of a plump June-bug. As long as the fading twilight permits, the eager hunter thus pursues its work of extermination. Satisfied at last, the bat flies back to its somber and quiet retreat. The next evening and all through the summer the hunt is resumed, always with the same ardor, always at the expense of insects only.

"To give you an idea of the multitude of harmful insects, especially of moths, from which the bat delivers us, I will quote a passage from the celebrated French naturalist Buffon, the most graphic historian of the animal kingdom. But first I must tell you that bats are in the habit of making their homes in old towers, grottoes, and abandoned quarries. There, in great numbers, they