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JEAN-HENRI FABRE

THE LIFE
OF THE GRASSHOPPER

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The Life of the Grasshopper

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CHAPTER I

THE FABLE OF THE CICADA AND THE ANT

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Fame is built up mainly of legend; in the animal world, as in the world of men, the story takes precedence of history. Insects in particular, whether they attract our attention in this way or in that, have their fair share in a folk-lore which pays but little regard to truth.

For instance, who does not know the Cicada, at least by name? Where, in the entomological world, can we find a renown that equals hers? Her reputation as an inveterate singer, who takes no thought for the future, has formed a subject for our earliest exercises in repetition. In verses that are very easily learnt, she is shown to us, when the bitter winds begin to blow, quite destitute and hurrying to her neighbour, the Ant, to announce her hunger. The would-be borrower meets with a poor [2]welcome and with a reply which has remained proverbial and is the chief cause of the little creature's fame. Those two short lines,

Vous chantiez! J'en suis bien en aise.
Eh bien, dansez maintenant,[1]

with their petty malice, have done more for the Cicada's celebrity than all her talent as a musician. They enter the child's mind like a wedge and never leave it.

To most of us, the Cicada's song is unknown, for she dwells in the land of the olive-trees; but we all, big and little, have heard of the snub which she received from the Ant. See how reputations are made! A story of very doubtful value, offending as much against morality as against natural history; a nursery-tale whose only merit lies in its brevity: there we have the origin of a renown which will tower over the ruins of the centuries like Hop-o'-my-Thumb's boots and Little Red-Riding-Hood's basket. [3]

The child is essentially conservative. Custom and traditions become indestructible once they are confided to the archives of his memory. We owe to him the celebrity of the Cicada, whose woes he stammered in his first attempts at recitation. He preserves for us the glaring absurdities that are part and parcel of the fable: the Cicada will always be hungry when the cold comes, though there are no Cicadæ left in the winter; she will always beg for the alms of a few grains of wheat, a food quite out of keeping with her delicate sucker; the supplicant is supposed to hunt for Flies and grubs, she who never eats!

Whom are we to hold responsible for these curious blunders? La Fontaine,[2] who charms us in most of his fables with his exquisite delicacy of observation, is very ill-inspired in this case. He knows thoroughly his common subjects, the Fox, the Wolf, the Cat, the Goat, the Crow, the Rat, the Weasel and many others, whose sayings and doings he describes to us with delightful precision of detail. They are local characters, neighbours, housemates of his. Their [4]public and private life is spent under his eyes; but, where Jack Rabbit gambols, the Cicada is an entire stranger: La Fontaine never heard of her, never saw her. To him the famous singer is undoubtedly a Grasshopper.

Grandville,[3] whose drawings have the same delicious spice of malice as the text itself, falls into the same error. In his illustration, we see the Ant arrayed like an industrious housewife. Standing on her threshold, beside great sacks of wheat, she turns a contemptuous back on the borrower, who is holding out her foot, I beg pardon, her hand. The second figure wears a great cartwheel hat, with a guitar under her arm and her skirt plastered to her legs by the wind, and is the perfect picture of a Grasshopper. Grandville no more than La Fontaine suspected the real appearance of the Cicada; he reproduced magnificently the general mistake.

For the rest, La Fontaine, in his poor [5]little story, only echoes another fabulist. The legend of the Cicada's sorry welcome by the Ant is as old as selfishness, that is to say, as old as the world. The children of Athens, going to school with their esparto-grass baskets crammed with figs and olives, were already mumbling it as a piece for recitation:

"In winter," said they, "the Ants dry their wet provisions in the sun. Up comes a hungry Cicada begging. She asks for a few grains. The greedy hoarders reply, 'You used to sing in summer; now dance in winter.'"[4]

This, although a little more baldly put, is precisely La Fontaine's theme and is contrary to all sound knowledge. [6]

Nevertheless the fable comes to us from Greece, which is preeminently the land of olive-trees and Cicadæ. Was Æsop really the author, as tradition pretends? It is doubtful. Nor does it matter, after all: the narrator is a Greek and a fellow-countryman of the Cicada, whom he must know well enough. My village does not contain a peasant so ignorant as to be unaware of the absolute lack of Cicadæ in winter; every tiller of the soil is familiar with the insect's primary state, the larva, which he turns over with his spade as often as he has occasion to bank up the olive-trees at the approach of the cold weather; he knows, from seeing it a thousand times along the paths, how this grub leaves the ground through a round pit of its own making, how it fastens on to some twig, splits its back, divests itself of its skin, now drier than shrivelled parchment, and turns into the Cicada, pale grass-green at first, soon to be succeeded by brown.

The Attic peasant was no fool either: he had remarked that which cannot escape the least observant eye; he also knew what my rustic neighbours know so well. The poet, whoever he may have been, who invented the fable was writing under the best conditions [7]for knowing all about these things. Then whence did the blunders in his story arise?

The Greek fabulist had less excuse than La Fontaine for portraying the Cicada of the books instead of going to the actual Cicada, whose cymbals were echoing at his side; heedless of the real, he followed tradition. He himself was but echoing a more ancient scribe; he was repeating some legend handed down from India, the venerable mother of civilizations. Without knowing exactly the story which the Hindu's reed had put in writing to show the danger of a life led without foresight, we are entitled to believe that the little dialogue set down was nearer to the truth than the conversation between the Cicada and the Ant. India, the great lover of animals, was incapable of committing such a mistake. Everything seems to tell us that the leading figure in the original fable was not our Cicada but rather some other creature, an insect if you will, whose habits corresponded fittingly with the text adopted.

Imported into Greece, after serving for centuries to make the wise reflect and to amuse the children on the banks of the [8]Indus, the ancient story, perhaps as old as the first piece of economical advice vouchsafed by Paterfamilias and handed down more or less faithfully from memory to memory, must have undergone an alteration in its details, as do all legends which the course of the ages adapts to circumstances of time and place.

The Greek, not possessing in his fields the insect of which the Hindu spoke, dragged in, as the nearest thing to it, the Cicada, even as in Paris, the modern Athens, the Cicada is replaced by the Grasshopper. The mischief was done. Henceforth ineradicable, since it has been confided to the memory of childhood, the mistake will prevail against an obvious truth.

Let us try to rehabilitate the singer slandered by the fable. He is, I hasten to admit, an importunate neighbour. Every summer he comes and settles in his hundreds outside my door, attracted by the greenery of two tall plane-trees; and here, from sunrise to sunset, the rasping of his harsh symphony goes through my head. Amid this deafening concert, thought is impossible; one's ideas reel and whirl, are incapable of concentrating. When I have not profited by [9]the early hours of the morning, my day is lost.

Oh, little demon, plague of my dwelling which I should like to have so peaceful, they say that the Athenians used to rear you in a cage to enjoy your singing at their ease! One we could do with, perhaps, during the drowsy hour of digestion; but hundreds at a time, all rattling and drumming in our ears when we are trying to collect our thoughts, that is sheer torture! You say that you were here first, do you? Before I came, you were in undisputed possession of the two plane-trees; and it is I who am the intruder there. I agree. Nevertheless, muffle your drums, moderate your arpeggios, for the sake of your biographer!

Truth will have none of the absurd rigmarole which we find in the fable. That there are sometimes relations between the Cicada and the Ant is most certain; only, these relations are the converse of what we are told. They are not made on the initiative of the Cicada, who is never dependent on the aid of others for his living; they come from the Ant, a greedy spoiler, who monopolizes every edible thing for her granaries. At no time does the Cicada go [10]crying famine at the doors of the Ant-hills, promising honestly to repay principal and interest; on the contrary, it is the Ant who, driven by hunger, begs and entreats the singer. Entreats, do I say? Borrowing and repaying form no part of the pillager’s habits. She despoils the Cicada, brazenly robs him of his possessions. Let us describe this theft, a curious point in natural history and, as yet, unknown.

In July, during the stifling heat of the afternoon, when the insect populace, parched with thirst, vainly wanders around the limp and withered flowers in search of refreshment, the Cicada laughs at the general need. With that delicate gimlet, his rostrum, he broaches a cask in his inexhaustible cellar. Sitting, always singing, on the branch of a shrub, he bores through the firm, smooth bark swollen with sap ripened by the sun. Driving his sucker through the bung-hole, he drinks luxuriously, motionless and rapt in contemplation, absorbed in the charms of syrup and song.

Watch him for a little while. We shall perhaps witness unexpected tribulation. There are many thirsty ones prowling around, in fact; they discover the well betrayed [11]by the sap that oozes from the margin. They hasten up, at first with some discretion, confining themselves to licking the fluid as it exudes. I see gathering around the mellifluous puncture Wasps, Flies, Earwigs, Sphex-wasps,[5] Pompili,[6] Rose-chafers[7] and, above all, Ants.

The smallest, in order to reach the well, slip under the abdomen of the Cicada, who good-naturedly raises himself on his legs and leaves a free passage for the intruders; the larger ones, unable to stand still for impatience, quickly snatch a sip, retreat, take a walk on the neighbouring branches and then return and show greater enterprise. The coveting becomes more eager; the discreet ones of a moment ago develop into turbulent aggressors, ready to chase away from the spring the well-sinker who caused it to gush forth.

In this brigandage, the worst offenders [12]are the Ants. I have seen them nibbling at the ends of the Cicada’s legs; I have caught them tugging at the tips of his wings, climbing on his back, tickling his antennæ. One, greatly daring, went to the length, before my eyes, of catching hold of his sucker and trying to pull it out.

Thus worried by these pigmies and losing all patience, the giant ends by abandoning the well. He flees, spraying the robbers with his urine as he goes. What cares the Ant for this expression of supreme contempt! Her object is attained. She is now the mistress of the spring, which dries up only too soon when the pump that made it flow ceases to work. There is little of it, but that little is exquisite. It is so much to the good, enabling her to wait for another draught, acquired in the same fashion, as soon as the occasion presents itself.

You see, the actual facts entirely reverse the parts assigned in the fable. The hardened beggar, who does not shrink from theft, is the Ant; the industrious artisan, gladly sharing his possessions with the sufferer, is the Cicada. I will mention one more detail; and the reversal of characters will stand out even more clearly. After five [13]or six weeks of wassail, which is a long space of time, the singer, exhausted by the strain of life, drops from the tree. The sun dries up the body; the feet of the passers-by crush it. The Ant, always a highway-robber in search of spoil, comes upon it. She cuts up the rich dish, dissects it, carves it and reduces it to morsels which go to swell her hoard of provisions. It is not unusual to see a dying Cicada, with his wing still quivering in the dust, drawn and quartered by a gang of knackers. He is quite black with them. After this cannibalistic proceeding, there is no question as to the true relations between the two insects.

The ancients held the Cicada in high favour. Anacreon, the Greek Béranger,[8] devoted an ode to singing his praises in curiously exaggerated language:

“Thou art almost like unto the gods,” says he.

The reasons which he gives for this apotheosis are none of the best. They consist of these three privileges: γηγενής, απαθής, ὰναιμόσαρκε; earthborn, insensible to pain, bloodless. Let us not start reproaching [14]the poet for these blunders, which were generally believed at the time and perpetuated for very long after, until the observer’s searching eyes were opened. Besides, it does not do to look so closely at verses whose chief merit lies in harmony and rhythm.

Even in our own days, the Provençal poets, who are at least as familiar with the Cicada as Anacreon was, are not so very careful of the truth in celebrating the insect which they take as an emblem. One of my friends, a fervent observer and a scrupulous realist, escapes this reproach. He has authorized me to take from his unpublished verse the following Provençal ballad, which depicts the relations between the Cicada and the Ant with strictly scientific accuracy. I leave to him the responsibility for his poetic images and his moral views, delicate flowers outside my province as a naturalist; but I can vouch for the truth of his story, which tallies with what I see every summer on the lilac-trees in my garden. [15]

La Cigalo e la Fournigo

I

Jour de Dièu, queto caud! Bèu tèms pèr la cigalo

Que, trefoulido, se regalo
D’uno raisso de fiò; bèu tèms pèr la meissoun.
Dins lis erso d’or, lou segaire,
Ren plega, pitre au vent, rustico e canto gaire:
Dins soun gousiè, la set estranglo la cansoun.
Tèms benesi pèr tu. Dounc, ardit! cigaleto,
Fai-lei brusi, ti chimbaleto,
E brandusso lou ventre à creba ti mirau.
L’Ome enterin mando la daio,
Que vai balin-balan de longo e que dardaio
L’uiau de soun acié sus li rous espigau.
Plèn d’aigo pèr la péiro e tampouna d’erbiho
Lou coufié sus l’anco pendiho.
Se la péiro es au frès dins soun estui de bos
E se de longo es abèurado,
L’Ome barbelo au fiò d’aqueli souleiado
Que fan bouli de fes la mesoulo dis os.
[16]
Tu, Cigalo, as un biais pèr la set: dins la rusco
Tendro e jutouso d’uno busco,
L’aguio de toun bè cabusso e cavo un pous.
Lou sirò monto pèr la draio.
T’amourres à la fon melicouso que raio,
E dòu sourgènt sucra bèves lou teta-dous.
Mai pas toujour en pas, oh! que nàni: de laire,
Vesin, vesino o barrulaire,
T’an vist cava lou pous. An set; vènon, doulènt,
Te prène un degout pèr si tasso.
Mesfiso-te, ma bello: aqueli curo-biasso,
Umble d’abord, soun lèu de gusas insoulènt.
Quiston un chicouloun de rèn; pièi de ti resto
Soun plus countènt, ausson la testo
E volon tout. L’auran. Sis arpioun en rastèu
Te gatihoun lou bout de l’alo.
Sus ta larjo esquinasso es un mounto-davalo;
T’aganton pèr lou bè, li bano, lis artèu;
Tiron d’eici, d’eilà. L’impaciènci te gagno.
Pst! pst! d’un giscle de pissagno
Aspèrges l’assemblado e quites lou ramèu.
T’en vas bèn liuen de la racaio, [17]
Que t’a rauba lou pous, e ris, e se gougaio,

E se lipo li brego enviscado de mèu.
Or d’aqueli boumian abèura sens fatigo,
Lou mai tihous es la fournigo.
Mousco, cabrian, guespo e tavan embana,
Espeloufi de touto meno,
Costo-en-long qu’à toun pous lou souleias ameno,
N’an pas soun testardige à te faire enana.
Pèr t’esquicha l’artèu, te coutiga lou mourre,
Te pessuga lou nas, pèr courre
A l’oumbro de toun ventre, osco! degun la vau.
Lou marrit-péu prend pèr escalo
Uno patto e te monto, ardido, sus lis alo,
E s’espasso, insoulènto, e vai d’amont, d’avau.

II

Aro veici qu’es pas de crèire.
Ancian tèms, nous dison li rèire,
Un jour d’ivèr, la fam te prenguè. Lou front bas
E d’escoundoun anères vèire,
Dins si grand magasin, la fournigo, eilàbas.
[18]
L’endrudido au soulèu secavo,
Avans de lis escoundre en cavo,
Si blad qu’aviè mousi l’eigagno de la niue.
Quand èron lest lis ensacavo.
Tu survènes alor, emè de plour is iue.
Ié disés: “Fai bèn fre; l’aurasso
D’un caire à l’autre me tirasso
Avanido de fam. A toun riche mouloun
Leisso-me prène pèr ma biasso.
Te lou rendrai segur au bèu tèms di meloun.
“Presto-me un pau de gran.” Mai, bouto,
Se cresès que l’autro, t’escouto,
T’enganes. Di gros sa, rèn de rèn sara tièu.
“Vai-t’en plus liuen rascia de bouto;
Crebo de fam l’iver, tu que cantes l’estièu”
Ansin charro la fablo antico
Pèr nous counséia la pratico
Di sarro-piastro, urous de nousa li courdoun
De si bourso.—Que la coulico

Rousiguè la tripaio en aqueli coudoun!
Me fai susa, lou fabulisto,
Quand dis que l'ivèr vas en quisto [19]
De mousco, verme, gran, tu que manges jamai.
De blad! Que n'en fariès, ma fisto!
As ta fon melicouso e demandes rèn mai.
Que t'enchau l'ivèr! Ta famiho
A la sousto en terro soumiho,
E tu dormes la som que n'a ges de revèi;
Toun cadabre toumbo en douliho.
Un jour, en tafurant, la fournigo lou vèi.
De ta magro péu dessecado
La marriasso fai becado;
Te curo lou perus, te chapouto à moucèu,
T'encafourno pèr car-salado,
Requisto prouvisioun, l'ivèr, en tèms de nèu.

III

Vaqui l'istori veritablo
Bèn liuen dòu conte de la fablo.
Que n'en pensas, canèu de sort!
—O ramaissaire de dardeno,
Det croucu, boumbudo bedeno
Que gouvernas lou mounde emé lou coffre-fort,
Fasès courre lou bru, canaio
Que l'artisto jamai travaio [20]
E dèu pati, lou bedigas.
Teisas-vous dounc: quand di lambrusco
La Cigalo a cava la rusco,
Raubas soun bèure, e pièi, morto, la rousigas.

Thus speaks my friend, in his expressive Provençal tongue, rehabilitating the Cicada, who has been so grossly libelled by the fabulist.

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TRANSLATOR'S NOTE

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I am indebted for the following translation to the felicitous pen of my friend Mr. Osman Edwards:

THE CICADA AND THE ANT

I

Ye gods, what heat! Cicada thrills
With mad delight when fairy rills
Submerge the corn in waves of gold,
When, with bowed back and toil untold,
His blade the songless reaper plies,
For in dry throats song gasps and dies.
This hour is thine: then, loud and clear,
Thy cymbals clash, Cicada dear, [21]
Let mirrors crack, let belly writhe!
Behold! The man yet darts his scythe,
Whose glitter lifts and drops again
A lightning-flash on ruddy grain.
With grass and water well supplied,
His whetstone dangles at his side;
The whetstone in its case of wood
Has moisture for each thirsty mood;
But he, poor fellow, pants and moans,
The marrow boiling in his bones.
Dost thirst, Cicada? Never mind!
Deep in a young bough’s tender rind

Thy sharp proboscis bores a well,
Whence, narrowly, sweet juices swell.
Ah, soon what honied joys are thine
To quaff a vintage so divine!
In peace? Not always.… There’s a band
Of roving thieves (or close at hand)
Who watched thee draw the nectar up
And beg one drop with doleful cup.
Beware, my love! They humbly crave;
Soon each will prove a saucy knave.
The merest sip?—’Tis set aside.
What’s left?—They are not satisfied.
All must be theirs, who rudely fling
A rakish claw athwart thy wing;
Next on thy back swarm up and down,
From tip to toe, from tail to crown.

On every side they fuss and fret,
Provoking an impatient jet;
Thou leavest soon the sprinkled rind,
Its robber-rascals, far behind;
Thy well purloined, each grins and skips
And licks the honey from her lips.
No tireless, quenchless mendicant
Is so persistent as the Ant;
Wasps, Beetles, Hornets, Drones and Flies,
Sharpers of every sort and size,

Loafers, intent on ousting thee,
All are less obstinate than she.
To pinch thy toe, thy nose to tweak,
To tickle face and loins, to sneak
Beneath thy belly, who so bold?
Give her the tiniest foothold,
The slut will march from side to side
Across thy wings in shameless pride.

II

Now here’s a story that is told,
Incredible, by men of old:
Once starving on a winter’s day
By secret, miserable way
Thou soughtest out the Ant and found
Her spacious warehouse underground.
That rich possessor in the sun
Was busy drying, one by one,
Her treasures, moist with the night’s dew,
Before she buried them from view [23]
In corn-sacks of sufficient size;
Then didst thou sue with tearful eyes,
Saying, “Alas! This deadly breeze
Pursues me everywhere; I freeze
With hunger; let me fill (no more!)
My wallet from that copious store;
Next year, when melons are full-blown,

Be sure I shall repay the loan!
“Lend me a little corn!”—Absurd!
Of course she will not hear a word;
Thou wilt not win, for all thy pain,
From bulging sacks a single grain.
“Be off and scrape the binns!” she cries:
“Who sang in June, in winter dies.”
Thus doth the ancient tail impart
Fit moral for a miser’s heart;
Bids him all charity forget
And draw his purse-strings tighter yet.
May colic chase such scurvy knaves
With pangs internal to their graves!
A sorry fabulist, indeed,
Who fancied that the winter’s need
Would drive thee to subsist, forlorn,
On Flies, on grubs, on grains of corn;
No need was ever thine of those,
For whom the honied fountain flows.
What matters winter? All thy kin
Beneath the earth are gathered in; [24]
Thou sleepest with unwaking heart,
While the frail body falls apart
In rags that unregarded lie,
Save by the Ant’s rapacious eye.
She, groping greedily, one day
Makes of thy shrivelled corpse her prey;

Dissects the trunk, gnaws limb from limb,
Concocts, according to her whim,
A salad such grim housewives know,
A tit-bit saved for hours of snow.

III

That, gentlemen, is truly told,
Unlike the fairy-tale of old;
But finds it favour in his sight,
Who grabs at farthings, day and night?
Pot-bellied, crooked-fingered, he
Would rule the world with L.S.D.
Such riff-raff spread the vulgar view
That “artists are a lazy crew,”
That “fools must suffer.” Silent be!
When the Cicada taps the tree,
You steal his drink; when life has fled,
You basely batten on the dead.
[25]

1

> You used to sing! I’m glad to know it.
> Well, try dancing for a change!

2 Jean de La Fontaine (1621–1695), the author of the world-famous *Fables*.—*Translator’s Note.*↑

3 Jean Ignace Isidore Gérard (1803–1847), better known by his pseudonym of Grandville, a famous French caricaturist and illustrator of La Fontaine’s *Fables*, Béranger’s *Chansons* and the standard French editions of *Robinson Crusoe* and *Gulliver’s Travels*.—*Translator’s Note.*↑

[4] Sir Roger L'Estrange attributes the fable to Anianus and, as is usual in the English version, substitutes the Grasshopper for the Cicada. It may be interesting to quote his translation:

"As the Ants were airing their provisions one winter, up comes a hungry Grasshopper to 'em and begs a charity. They told him that he should have wrought in summer, if he would not have wanted in winter. 'Well,' says the Grasshopper, 'but I was not idle neither; for I sung out the whole season.' 'Nay then,' said they, 'you shall e'en do well to make a merry year on't and dance in winter to the tune that you sung in summer.'"—*Translator's Note.*↑

[5] Cf. *The Hunting Wasps*, by J. Henri Fabre, translated by Alexander Teixeira de Mattos: chaps. iv. to x.—*Translator's Note.*↑

[6] For the Pompilus-wasp, or Ringed Calicurgus, cf. *The Life and Love of the Insect*, by J. Henri Fabre, translated by Alexander Teixeira de Mattos: chap. xii.—*Translator's Note.*↑

[7] For the grub of the Rose-chafer, or Cetonia, cf. *The Life and Love of the Insect*: chap. xi.—*Translator's Note.*↑

[8] Pierre Jean de Béranger (1780–1857), the popular French lyric poet.—*Translator's Note.*↑

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CHAPTER II

THE CICADA: LEAVING THE BURROW

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To come back to the Cicada after Réaumur[1] has told the insect's story would be waste of time, save that the disciple enjoys an advantage unknown to the master. The great naturalist received the materials for his work from my part of the world; his subjects came by barge after being carefully preserved in spirits. I, on the other hand, live in the Cicada's company. When July comes, he takes possession of the enclosure right up to the threshold of the house. The hermitage is our joint property. I remain master indoors; but out of doors he is the sovereign lord and an extremely noisy and abusive one. Our near neighbourhood and constant association [26]have enabled me to enter into certain details of which Réaumur could not dream.

The first Cicadæ appear at the time of the summer solstice. Along the much-trodden paths baked by the sun and hardened by the frequent passage of feet there open, level with the ground, round orifices about the size of a man's thumb. These are the exit-holes of the Cicada-larvæ, who come up from the depths to undergo their transformation on the surface. They are more or less everywhere, except in soil turned over by the plough. Their usual position is in the driest spots, those most exposed to the sun, especially by the side of the roads. Equipped with powerful tools to pass, if necessary, through sandstone and dried clay, the larva, on leaving the earth, has a fancy for the hardest places.

One of the garden-paths, converted into a little inferno by the glare from a wall facing south, abounds in such exit-holes. I proceed, in the last days of June, to examine these recently abandoned pits. The soil is so hard that I have to take my pickaxe to tackle it.

The orifices are round and nearly an inch in diameter. There is absolutely no rubbish around them, no mound of earth thrown up [27]outside. This is invariably the case: the Cicada’s hole is never surmounted with a mole-hill, as are the burrows of the Geotrupes,[2] or Dorbeetles, those other sturdy excavators. The manner of working accounts for this difference. The Dung-beetle progresses from the outside inwards; he commences his digging at the mouth of the well, which allows him to ascend and heap up on the surface the material which he has extracted. The larva of the Cicada, on the other hand, goes from the inside outwards; the last thing that it does is to open the exit-door, which, remaining closed until the very end of the work, cannot be used for getting rid of the rubbish. The former goes in and makes a mound on the threshold of the home; the latter comes out and cannot heap up anything on a threshold that does not yet exist.

The Cicada’s tunnel runs to a depth of between fifteen and sixteen inches. It is cylindrical, winds slightly, according to the exigencies of the soil, and is always nearly perpendicular, for it is shorter to go that way. The passage is quite open throughout [28]its length. It is useless to search for the rubbish which this excavation ought, one would think, to produce; we see none anywhere. The tunnel ends in a blind alley, in a rather wider chamber, with level walls and not the least vestige of communication with any gallery prolonging the well.

Reckoned by its length and its diameter, the excavation represents a volume of about twelve cubic inches. What has become of the earth removed? Sunk in very dry and very loose soil, the well and the chamber at the bottom ought to have crumbly walls, which would easily fall in, if nothing else had taken place but the work of boring. My surprise was great to find, on the contrary, coated surfaces, washed with a paste of clayey earth. They are not by a long way what one could call smooth, but at any rate their irregularities are covered with a layer of plaster; and their slippery materials, soaked with some agglutinant, are kept in position.

The larva can move about and climb nearly up to the surface and down again to its refuge at the bottom without producing, with its clawed legs, landslips which would block the tube, making ascent difficult and [29]retreat impossible. The miner shores up his galleries with pit-props and cross-beams; the builder of underground railways strengthens his tunnels with a casing of brickwork; the Cicada’s larva, which is quite as clever an engineer, cements its shaft so as to keep it open however long it may have to serve.

If I surprise the creature at the moment when it emerges from the soil to make for a neighbouring branch and there undergo its transformation, I see it at once beat a prudent retreat and, without the slightest difficulty, run down again to the bottom of its gallery, proving that, even when the dwelling is on the point of being abandoned for good, it does not become blocked with earth.

The ascending-shaft is not a piece of work improvised in a hurry, in the insect’s impatience to reach the sunlight; it is a regular manor-house, an abode in which the grub is meant to make a long stay. So the plastered walls tell us. Any such precaution would be superfluous in the case of a mere exit abandoned as soon as bored. There is not a doubt but that we have here a sort of meteorological station in which observations are taken of the weather outside. Underground, fifteen inches down, or more, the [30]larva ripe for its emergence is hardly able to judge whether the climatic conditions be favourable. Its subterranean weather is too gradual in its changes to be able to supply it with the precise indications necessary for the most important action of its life, its escape into the sunlight for the metamorphosis.

Patiently, for weeks, perhaps for months, it digs, clears and strengthens a perpendicular chimney, leaving at the surface, to keep it sequestered from the world without, a layer as thick as one’s finger. At the bottom it makes itself a recess more carefully built than the remainder. This is its refuge, its waiting-room, where it rests if its reconnoitring lead it to defer its emigration. At the least suspicion of fine weather, it scrambles up, tests the exterior through the thin layer of earth forming a lid and enquires into the temperature and the degree of humidity of the air.

If things do not bode well, if a heavy shower threaten or a blustering storm—events of supreme importance when the delicate Cicada throws off her skin—the prudent insect slips back to the bottom of the tube and goes on waiting. If, on the other hand, the atmospheric conditions be favourable, [31]then the ceiling is smashed with a few strokes of the claws and the larva emerges from the well.

Everything seems to confirm that the Cicada’s gallery is a waiting-room, a meteorological station where the larva stays for a long time, now hoisting itself near the surface to discover the state of the weather, now retreating to the depths for better shelter. This explains the convenience of a resting-place at the base and the need for a strong cement on walls which, without it, would certainly give way under continual comings and goings.

What is not so easily explained is the complete disappearance of the rubbish corresponding with the space excavated. What has become of the twelve cubic inches of earth yielded by an average well? There is nothing outside to represent them, nor anything inside either. And then how, in a soil dry as cinders, is the plaster obtained with which the walls are glazed?

Larvæ that gnaw into wood, such as those of the Capricorn and the Buprestes,[3] [32]for instance, ought to be able to answer the first question. They make their way inside a tree-trunk, boring galleries by eating the materials of the road which they open. Detached in tiny fragments by the mandibles, these materials are digested. They pass through the pioneer’s body from end to end, yielding up their meagre nutritive elements on the way, and accumulate behind, completely blocking the road which the grub will never take again. The work of excessive division and subdivision, done either by the mandibles or the stomach, causes the digested materials to take up less room than the untouched wood; and the result is a space in front of the gallery, a chamber in which the grub works, a chamber which is greatly restricted in length, giving the prisoner just enough room to move about.

Can it not be in a similar fashion that the Cicada-grub bores its tunnel? Certainly the waste material flung up as it digs its way does not pass through its body; even if the soil were of the softest and most yielding character, earth plays no part whatever in the larva’s food. But, after all, cannot the materials removed be simply shot back as the work proceeds? The Cicada remains [33]four years in the ground. This long life is not, of course, spent at the bottom of the well which we have described: this is just a place where the larva prepares for its emergence. It comes from elsewhere, doubtless from some distance. It is a vagabond, going from one root to another and driving its sucker into each. When it moves, either to escape from the upper layers, which are too cold in winter, or to settle down at a better drinking-bar, it clears a road by flinging behind it the materials broken up by its pickaxes. This is undoubtedly the method.

As with the larvæ of the Capricorn and the Buprestes, the traveller needs around him only the small amount of free room which his movements require. Damp, soft, easily compressed earth is to this larva what the digested pap is to the others. Such earth is heaped up without difficulty; it condenses and leaves a vacant space.

The difficulty is one of a different kind with the exit-well bored in a very dry soil, which offers a marked resistance to compression so long as it retains its aridity. That the larva, when beginning to dig its passage, flung back part of the excavated materials into an earlier gallery which has now disappeared [34]is fairly probable, though there is nothing in the condition of things to tell us so; but, if we consider the capacity of the well and the extreme difficulty of finding room for so great a volume of rubbish, our doubts return and we say to ourselves:

“This rubbish demanded a large empty space, which itself was obtained by shifting other refuse no less difficult to house. The room required presupposes the existence of another space into which the earth extracted was shot.”

And so we find ourselves in a vicious circle, for the mere subsidence of materials flung behind would not be enough to explain so great a void. The Cicada must have a special method of disposing of the superfluous earth. Let us try and surprise his secret.

Examine a larva at the moment when it emerges from the ground. It is nearly always more or less soiled with mud, sometimes wet, sometimes dry. The digging-implements, the fore-feet, have the points of their pickaxes stuck in a globule of slime; its other legs are cased in mud; its back is spotted with clay. We are reminded of a scavenger who has been stirring up sewage. [35]These stains are the more striking inasmuch as the creature comes out of exceedingly dry ground. We expected to see it covered with dust and we find it covered with mud.

One more step in this direction and the problem of the well is solved. I exhume a larva which happens to be working at its exit-gallery. Very occasionally, I get a piece of luck like this, in the course of my digging; it would be useless for me to try for it, as there is nothing outside to guide my search. My welcome prize is just beginning its excavations. An inch of tunnel, free from any rubbish, and the waiting-room at the bottom represent all the work for the moment. In what condition is the worker? We shall see.

The grub is much paler in colour than those which I catch as they emerge. Its big eyes in particular are whitish, cloudy, squinting and apparently of little use for seeing. What good is sight underground? The eyes of the larvæ issuing from the earth are, on the contrary, black and shining and indicate ability to see. When it makes its appearance in the sunshine, the future Cicada has to seek, occasionally at some distance from the exit-hole, the hanging [36]branch on which the metamorphosis will be performed; and here sight will manifestly be useful. This maturity of vision attained during the preparation for the release is enough to show us that the larva, far from hastily improvising its ascending-shaft, works at it for a long time.

Moreover, the pale and blind larva is bulkier than it is in the state of maturity. It is swollen with liquid and looks dropsical. If you take it in your fingers, a limpid humour oozes from the hinder part and moistens the whole body. Is this fluid, expelled from the intestines, a urinary product? Is it just the residue of a stomach fed solely on sap? I will not decide the question and will content myself with calling it urine, merely for convenience.

Well, this fountain of urine is the key to the mystery. The larva, as it goes on and digs, sprinkles the dusty materials and makes them into paste, which is forthwith applied to the walls by abdominal pressure. The original dryness is succeeded by plasticity. The mud obtained penetrates the interstices of a rough soil; the more liquid part of it trickles in front; the remainder is compressed and packed and occupies the empty [37]spaces in between. Thus is an unblocked tunnel obtained, without any refuse, because the dust and rubbish are used on the spot in the form of a mortar which is more compact and more homogeneous than the soil traversed.

The larva therefore works in the midst of clayey mire; and this is the cause of the stains that astonish us so much when we see it issuing from excessively dry soil. The perfect insect, though relieved henceforth from all mining labour, does not utterly abandon the use of its bladder; a few drains of urine are preserved as a weapon of defence. When too closely observed, it discharges a spray at the intruder and quickly flies away. In either form, the Cicada, his dry constitution notwithstanding, proves himself a skilled irrigator.

Dropsical though it be, the larva cannot carry sufficient liquid to moisten and turn into compressible mud the long column of earth which has to be tunnelled. The reservoir becomes exhausted and the supply has to be renewed. How is this done and when? I think I see.