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MORE HUNTING WASPS

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Table of Contents

CHAPTER 1. THE POMPILI.

Table of Contents

(This essay should be read in conjunction with that on the Black-bellied Tarantula. Cf. "The Life of the Spider," by J. Henri Fabre, translated by Alexander Teixeira de Mattos: chapter 1.—Translator's Note.)

The Ammophila's caterpillar (Cf. "The Hunting Wasps," by J. Henri Fabre, translated by Alexander Teixeira de Mattos: chapters 13 and 18 to 20; and Chapter 11 of the present volume.—Translator's Note.), the Bembex (Cf. idem: chapter 14.—Translator's Note.), Gad-fly, the Cerceris (Cf. idem: chapters 1 to 3.—Translator's Note.), Buprestis (A Beetle usually remarkable for her brilliant colouring. Cf. idem: chapter 1.—Translator's Note.) and Weevil, the Sphex (Cf. idem: chapter 4 to 10.—Translator's Note.), Locust, Cricket and Ephippiger (Cf. "The Life of the Grasshopper," by J. Henri Fabre, translated by Alexander Teixeira de Mattos: chapters 13 and 14.—Translator's Note.): all these inoffensive peaceable victims are like the silly Sheep of our slaughter-houses; they allow themselves to be operated upon by the paralyser, submitting stupidly, without offering much resistance. The mandibles gape, the legs kick and protest, the body wriggles and twists; and that is all. They have no weapons capable of contending with the assassin's dagger. I should like to see the huntress grappling with an imposing adversary, one as crafty as herself, an expert layer of ambushes and, like her, bearing a poisoned dirk. I should like to see the bandit armed with her stiletto confronted by another bandit equally familiar with the use of that weapon.

Is such a duel possible? Yes, it is quite possible and even quite common. On the one hand we have the Pompili, the protagonists who are always victorious; on the other hand we have the Spiders, the protagonists who are always overthrown.

Who that has diverted himself, however little, with the study of insects does not know the Pompili? Against old walls, at the foot of the banks beside unfrequented footpaths, in the stubble after the harvest, in the tangles of dry grass, wherever the Spider spreads her nets, who has not seen them busily at work, now running hither and thither, at random, their wings raised and quivering above their backs, now moving from place to place in flights long or short? They are hunting for a quarry which might easily turn the tables and itself prey upon the trapper lying in wait for it.

The Pompili feed their larvae solely on Spiders; and the Spiders feed on any insect, commensurate with their size, that is caught in their nets. While the first possess a sting, the second have two poisoned fangs. Often their strength is equally matched; indeed the advantage is not seldom on the Spider's side. The Wasp has her ruses of war, her cunningly premeditated strokes: the Spider has her wiles and her set traps; the first has the advantage of great rapidity of movement, while the second is able to rely upon her perfidious web; the one has a sting which contrives to penetrate the exact point to cause paralysis, the other has fangs which bite the back of the neck and deal sudden death. We find the paralyser on the one hand and the

slaughterer on the other. Which of the two will become the other's prey?

If we consider only the relative strength of the adversaries, the power of their weapons, the virulence of their poisons and their different modes of action, the scale would very often be weighted in favour of the Spider. Since the Pompilus always emerges victorious from this contest, which appears to be full of peril for her, she must have a special method, of which I would fain learn the secret.

In our part of the country, the most powerful and courageous Spider-huntress is the Ringed Pompilus (Calicurgus annulatus, FAB.), clad in black and yellow. She stands high on her legs; and her wings have black tips, the rest being yellow, as though exposed to smoke, like a bloater. Her size is about that of the Hornet (Vespa crabro). She is rare. I see three or four of her in the course of the year; and I never fail to halt in the presence of the proud insect, rapidly striding through the dust of the fields when the dog-days arrive. Its audacious air, its uncouth gait, its war-like bearing long made me suspect that to obtain its prey it had to make some impossible, terrible, unspeakable capture. And my guess was correct. By dint of waiting and watching I beheld that victim; I saw it in the huntress' mandibles. It is the Black-bellied Tarantula, the terrible Spider who slays a Carpenter-bee or a Bumble-bee outright with one stroke of her weapon; the Spider who kills a Sparrow or a Mole; the formidable creature whose bite would perhaps not be without danger to ourselves. Yes, this is the bill of fare which the proud Pompilus provides for her larva.

This spectacle, one of the most striking with which the Hunting Wasps have ever provided me, has as yet been offered to my eyes but once; and that was close beside my rural home, in the famous laboratory of the harmas. (The enclosed piece of waste land on which the author studied his insects in their native state. Cf. "The Life of the Fly," by J. Henri Fabre, translated by Alexander Teixeira de Mattos: chapter 1.—Translator's Note.) I can still see the intrepid poacher dragging by the leg, at the foot of a wall, the monstrous prize which she had just secured, doubtless at no great distance. At the base of the wall was a hole, an accidental chink between some of the stones. The Wasp inspected the cavern, not for the first time: she had already reconnoitred it and the premises had satisfied her. The prey, deprived of the power of movement, was waiting somewhere, I know not where; and the huntress had gone back to fetch it and store it away. It was at this moment that I met her. The Pompilus gave a last glance at the cave, removed a few small fragments of loose mortar; and with that her preparations were completed. The Lycosa (The Spider in question is known indifferently as the Black-bellied Tarantula and the Narbonne Lycosa.—Translator's Note.) was introduced, dragged along, belly upwards, by one leg. I did not interfere. Presently the Wasp reappeared on the surface and carelessly pushed in front of the hole the bits of mortar which she had just extracted from it. Then she flew away. It was all over. The egg was laid; the insect had finished for better or for worse; and I was able to proceed with my examination of the burrow and its contents.

The Pompilus has done no digging. It is really an accidental hole with spacious winding passages, the result of the mason's negligence and not of the Wasp's industry. The closing of the cavity is quite as rough and summary. A few crumbs of mortar, heaped up before the doorway, form a barricade rather than a door. A mighty hunter makes a poor architect. The Tarantula's murderess does not know how to dig a cell for her larva; she does not know how to fill up the entrance by sweeping dust into it. The first hole encountered at the foot of a wall contents her, provided that it be roomy enough; a little heap of rubbish will do for a door. Nothing could be more expeditious.

I withdraw the game from the hole. The egg is stuck to the Spider, near the beginning of the belly. A clumsy movement on my part makes it fall off at the moment of extraction. It is all over: the thing will not hatch; I shall not be able to observe the development of the larva. The Tarantula lies motionless, flexible as in life, with not a trace of a wound. In short, we have here life without movement. From time to time the tips of the tarsi quiver a little; and that is all. Accustomed of old to these deceptive corpses, I can see in my mind's eye what has happened: the Spider has been stung in the region of the thorax, no doubt once only, in view of the concentration of her nervous system. I place the victim in a box in which it retains all the pliancy and all the freshness of life from the 2nd of August to the 20th of September, that is to say, for seven weeks. These miracles are familiar to us (Cf. "The Hunting Wasps": passim. —Translator's Note.); there is no need to linger over them here.

The most important matter has escaped me. What I wanted, what I still want to see is the Pompilus engaged in mortal combat with the Lycosa. What a duel, in which the cunning of the one has to overcome the terrible weapons of the other! Does the Wasp enter the burrow to surprise the Tarantula at the bottom of her lair? Such temerity would be fatal to her. Where the big Bumble-bee dies an instant death, the audacious visitor would perish the moment she entered. Is not the other there, facing her, ready to snap at the back of her head, inflicting a wound which would result in sudden death? No, the Pompilus does not enter the Spider's parlour, that is obvious. Does she surprise the Spider outside her fortress? But the Lycosa is a stay-at-home animal; I do not see her straying abroad during the summer. Later, in the autumn, when the Pompili have disappeared, She wanders about; turning gipsy, she takes the open air with her numerous family, which she carries on her back. Apart from these maternal strolls, she does not appear to me to leave her castle; and the Pompilus, I should think, has no great chance of meeting her outside. The problem, we perceive, is becoming complicated: the huntress cannot make her way into the burrow, where she would risk sudden death; and the Spider's sedentary habits make an encounter outside the burrow improbable. Here is a riddle which would be interesting to decipher. Let us endeavour to do so by observing other Spider-hunters; analogy will enable us to draw a conclusion.

I have often watched Pompili of every species on their hunting-expeditions, but I have never surprised them entering the Spider's lodging when the latter was at home.

Whether this lodging be a funnel plunging its neck into a hole in some wall, an awning stretched amid the stubble, a tent modelled upon the Arab's, a sheath formed of a few leaves bound together, or a net with a guard-room attached, whenever the owner is indoors the suspicious Pompilus holds aloof. When the dwelling is vacant, it is another matter: the Wasp moves with arrogant ease over those webs, springes and cables in which so many other insects would remain ensnared. The silken threads do not seem to have any hold upon her. What is she doing, exploring those empty webs? She is watching to see what is happening on the adjacent webs where the Spider is ambushed. The Pompilus therefore feels an insuperable reluctance to make straight for the Spider when the latter is at home in the midst of her snares. And she is right, a hundred times over. If the Tarantula understands the practice of the dagger-thrust in the neck, which is immediately fatal, the other cannot be unacquainted with it. Woe then to the imprudent Wasp who presents herself upon the threshold of a Spider of approximately equal strength!

Of the various instances which I have collected of this cautious reserve on the Spider-huntress' part I will confine myself to the following, which will be sufficient to prove my point. By joining, with silken strands, the three folioles which form the leaf of Virgil's cytisus, a Spider has built herself a green arbour, a horizontal sheath, open at either end. A questing Pompilus comes upon the scene, finds the game to her liking and pops in her head at the entrance of the cell. The Spider immediately retreats to the other end. The huntress goes round the Spider's dwelling and reappears at

the other door. Again the Spider retreats, returning to the first entrance. The Wasp also returns to it, but always by the outside. Scarcely has she done so, when the Spider rushes for the opposite opening; and so on for fully a quarter of an hour, both of them coming and going from one end of the cylinder to the other, the Spider inside and the Pompilus outside.

The quarry was a valuable one, it seems, since the Wasp persisted for a long time in her attempts, which were invariably defeated; however, the huntress had to abandon them, baffled by this perpetual running to and fro. The Pompilus made off; and the Spider, once more on the watch, patiently awaited the heedless Midges. What should the Wasp have done to capture this much-coveted game? She should have entered the verdant cylinder, the Spider's dwelling, and pursued the Spider direct, in her own house, instead of remaining outside, going from one door to the other. With such swiftness and dexterity as hers, it seemed to me impossible that the stroke should fail: the quarry moved clumsily, a little sideways, like a Crab. I judged it to be an easy matter; the Pompilus thought it highly dangerous. To-day I am of her opinion: if she had entered the leafy tube, the mistress of the house would have operated on her neck and the huntress would have become the quarry.

Years passed and the paralyser of the Spiders still refused to reveal her secret; I was badly served by circumstances, could find no leisure, was absorbed in unrelenting preoccupations. At length, during my last year at Orange, the light dawned upon me. My garden was

enclosed by an old wall, blackened and ruined by time, where, in the chinks between the stones, lived a population of Spiders, represented more particularly by Segestria perfidia. This is the common Black Spider, or Cellar Spider. She is deep black all over, excepting the mandibles, which are a splendid metallic green. Her two poisoned daggers look like a product of the metal-worker's art, like the finest bronze. In any mass of abandoned masonry there is not a quiet corner, not a hole the size of one's finger, in which the Segestria does not set up house. Her web is a widely flaring funnel, whose open end, at most a span across, lies spread upon the surface of the wall, where it is held in place by radiating threads. This conical surface is continued by a tube which runs into a hole in the wall. At the end is the dining-room to which the Spider retires to devour at her ease her captured prey.

With her two hind-legs stuck into the tube to obtain a purchase and the six others spread around the orifice, the better to perceive on every side the quiver which gives the signal of a capture, the Segestria waits motionless, at the entrance of her funnel, for an insect to become entangled in the snare. Large Flies, Drone-flies, dizzily grazing some thread of the snare with their wings, are her usual victims. At the first flutter of the netted Fly, the Spider runs or even leaps forward, but she is now secured by a cord which escapes from the spinnerets and which has its end fastened to the silken tube. This prevents her from falling as she darts along a vertical surface. Bitten at the back of the head, the Drone-fly is dead in a moment; and the Segestria carries him into her lair.

Thanks to this method and these hunting-appliances—an ambush at the bottom of a silken whirlpool, radiating snares, a life-line which holds her from behind and allows her to take a sudden rush without risking a fall—the Segestria is able to catch game less inoffensive than the Drone-fly. A Common Wasp, they tell me, does not daunt her. Though I have not tested this, I readily believe it, for I well know the Spider's boldness.

This boldness is reinforced by the activity of the venom. It is enough to have seen the Segestria capture some large Fly to be convinced of the overwhelming effect of her fangs upon the insects bitten in the neck. The death of the Drone-fly, entangled in the silken funnel, is reproduced by the sudden death of the Bumble-bee on entering the Tarantula's burrow. We know the effect of the poison on man, thanks to Antoine Duges' investigations. (Antoine Louis Duges (1797-1838), a French physician and physiologist, author of a "Traite de physiologie comparee de l'homme et des animaux" and other scientific works.—Translator's Note.) Let us listen to the brave experimenter:

"The treacherous Segestria, or Great Cellar Spider, reputed poisonous in our part of the country, was chosen for the principal subject of our experiments. She was three-quarters of an inch long, measured from the mandibles to the spinnerets. Taking her in my fingers from behind, by the legs, which were folded and gathered together (this is the way to catch hold of live Spiders, if you would avoid their bite and master them without mutilating them), I placed her on various objects and on my clothes, without her manifesting the least desire to do any harm; but hardly was

she laid on the bare skin of my fore-arm when she seized a fold of the epidermis in her powerful mandibles, which are of a metallic green, and drove her fangs deep into it. For a few moments she remained hanging, although left free; then she released herself, fell and fled, leaving two tiny wounds, a sixth of an inch apart, red, but hardly bleeding, with a slight extravasation round the edge and resembling the wounds produced by a large pin.

"At the moment of the bite, the sensation was sharp enough to deserve the name of pain; and this continued for five or six minutes more, but not so forcibly. I might compare it with the sensation produced by the stinging-nettle. A whitish tumefaction almost immediately surrounded the two pricks; and the circumference, within a radius of about an inch, was coloured an erysipelas red, accompanied by a very slight swelling. In an hour and a half, it had all disappeared, except the mark of the pricks, which persisted for several days, as any other small wound would have done. This was in September, in rather cool weather. Perhaps the symptoms would have displayed somewhat greater severity at a warmer season."

Without being serious, the effect of the Segestria's poison is plainly marked. A sting causing sharp pain and swelling, with the redness of erysipelas, is no trifling matter. While Duges' experiment reassures us in so far as we ourselves are concerned, it is none the less the fact that the Cellar Spider's poison is a terrible thing for insects, whether because of the small size of the victim, or because it acts with special efficacy upon an organization which differs widely from our own. One Pompilus, though greatly inferior

to the Segestria in size and strength, nevertheless makes war upon the Black Spider and succeeds in overpowering this formidable quarry. This is Pompilus apicalis, VAN DER LIND, who is hardly larger than the Hive-bee, but very much slenderer. She is of a uniform black; her wings are a cloudy brown, with transparent tips. Let us follow her in her expeditions to the old wall inhabited by the Segestria: we will track her for whole afternoons during the July heats; and we will arm ourselves with patience, for the perilous capture of the game must take the Wasp a long time.

The Spider-huntress explores the wall minutely; she runs, leaps and flies; she comes and goes, flitting to and fro. The antennae quiver; the wings, raised above the back, continually beat one against the other. Ah, here she is, close to a Segestria's funnel! The Spider, who has hitherto remained invisible, instantly appears at the entrance to the tube; she spreads her six fore-legs outside, ready to receive the huntress. Far from fleeing before the terrible apparition, she watches the watcher, fully prepared to prey upon her enemy. Before this intrepid demeanour the Pompilus draws back. She examines the coveted game, walks round it for a moment, then goes away without attempting anything. When she has gone, the Segestria retires indoors, backwards. For the second time the Wasp passes near an inhabited funnel. The Spider on the lookout at once shows herself on the threshold of her dwelling, half out of her tube, ready for defence and perhaps also for attack. The Pompilus moves away and the Segestria reenters her tube. A fresh alarm: the Pompilus returns; another threatening demonstration on the part of the Spider. Her neighbour, a

little later, does better than this: while the huntress is prowling about in the neighbourhood of the funnel, she suddenly leaps out of the tube, with the lifeline which will save her from falling, should she miss her footing, attached to her spinnerets; she rushes forward and hurls herself in front of the Pompilus, at a distance of some eight inches from her burrow. The Wasp, as though terrified, immediately decamps; and the Segestria no less suddenly retreats indoors.

Here, we must admit, is a strange quarry: it does not hide, but is eager to show itself; it does not run away, but flings itself in front of the hunter. If our observations were to cease here, could we say which of the two is the hunter and which the hunted? Should we not feel sorry for the imprudent Pompilus? Let a thread of the trap entangle her leg; and it is all up with her. The other will be there, stabbing her in the throat. What then is the method which she employs against the Segestria, always on the alert, ready for defence, audacious to the point of aggression? Shall I surprise the reader if I tell him that this problem filled me with the most eager interest, that it held me for weeks in contemplation before that cheerless wall? Nevertheless, my tale will be a short one.

On several occasions I see the Pompilus suddenly fling herself on one of the Spider's legs, seize it with her mandibles and endeavour to draw the animal from its tube. It is a sudden rush, a surprise attack, too quick to permit the Spider to parry it. Fortunately, the latter's two hind-legs are firmly hooked to the dwelling; and the Segestria escapes with a jerk, for the other, having delivered her shock attack,

hastens to release her hold; if she persisted, the affair might end badly for her. Having failed in this assault, the Wasp repeats the procedure at other funnels; she will even return to the first when the alarm is somewhat assuaged. Still hopping and fluttering, she prowls around the mouth, whence the Segestria watches her, with her legs outspread. She waits for the propitious moment; she leaps forward, seizes a leg, tugs at it and springs out of reach. More often than not, the Spider holds fast; sometimes she is dragged out of the tube, to a distance of a few inches, but immediately returns, no doubt with the aid of her unbroken lifeline.

The Pompilus' intention is plain: she wants to eject the Spider from her fortress and fling her some distance away. So much perseverance leads to success. This time all goes well: with a vigorous and well-timed tug the Wasp has pulled the Segestria out and at once lets her drop to the ground. Bewildered by her fall and even more demoralized by being wrested from her ambush, the Spider is no longer the bold adversary that she was. She draws her legs together and cowers into a depression in the soil. The huntress is there on the instant to operate on the evicted animal. I have barely time to draw near to watch the tragedy when the victim is paralysed by a thrust of the sting in the thorax.

Here at last, in all its Machiavellian cunning, is the shrewd method of the Pompilus. She would be risking her life if she attacked the Segestria in her home; the Wasp is so convinced of it that she takes good care not to commit this imprudence; but she knows also that, once dislodged from her dwelling, the Spider is as timid, as cowardly as she was

bold at the centre of her funnel. The whole point of her tactics, therefore, lies in dislodging the creature. This done, the rest is nothing.

The Tarantula-huntress must behave in the same manner. Enlightened by her kinswoman, Pompilus apicalis, my mind pictures her wandering stealthily around the Lycosa's rampart. The Lycosa hurries up from the bottom of her burrow, believing that a victim is approaching; she ascends her vertical tube, spreading her fore-legs outside, ready to leap. But it is the Ringed Pompilus who leaps, seizes a leg, tugs and hurls the Lycosa from her burrow. The Spider is henceforth a craven victim, who will let herself be stabbed without dreaming of employing her venomous fangs. Here craft triumphs over strength; and this craft is not inferior to mine, when, wishing to capture the Tarantula, I make her bite a spike of grass which I dip into the burrow, lead her gently to the surface and then with a sudden jerk throw her outside. For the entomologist as for the Pompilus, the essential thing is to make the Spider leave her stronghold. After this there is no difficulty in catching her, thanks to the utter bewilderment of the evicted animal.

Two contrasting points impress me in the facts which I have just set forth: the shrewdness of the Pompilus and the folly of the Spider. I will admit that the Wasp may gradually have acquired, as being highly beneficial to her posterity, the instinct by which she first of all so judiciously drags the victim from its refuge, in order there to paralyse it without incurring danger, provided that you will explain why the Segestria, possessing an intellect no less gifted than that of the Pompilus, does not yet know how to counteract the trick

of which she has so long been the victim. What would the Black Spider need to do to escape her exterminator? Practically nothing: it would be enough for her to withdraw into her tube, instead of coming up to post herself at the entrance, like a sentry, whenever the enemy is in the neighbourhood. It is very brave of her, I agree, but also very risky. The Pompilus will pounce upon one of the legs spread outside the burrow for defence and attack; and the besieged Spider will perish, betrayed by her own boldness. This posture is excellent when waiting for prey. But the Wasp is not a quarry; she is an enemy and one of the most dreaded of enemies. The Spider knows this. At the sight of the Wasp, instead of placing herself fearlessly but foolishly on her threshold, why does she not retreat into her fortress, where the other would not attack her? The accumulated experience of generations should have taught her this elementary tactical device, which is of the greatest value to the prosperity of her race. If the Pompilus has perfected her method of attack, why has not the Segestria perfected her method of defence? Is it possible that centuries upon centuries should have modified the one to its advantage without succeeding in modifying the other? Here I am utterly at a loss. And I say to myself, in all simplicity: since the Pompili must have Spiders, the former have possessed their patient cunning and the other their foolish audacity from all time. This may be puerile, if you like to think it so, and not in keeping with the transcendental aims of our fashionable theorists; the argument contains neither the subjective nor the objective point of view, neither

adaptation nor differentiation, neither atavism nor evolutionism. Very well, but at least I understand it.

Let us return to the habits of Pompilus apicalis. Without expecting results of any particular interest, for in captivity the respective talents of the huntress and the quarry seem to slumber, I place together, in a wide jar, a Wasp and a Segestria. The Spider and her enemy mutually avoid each other, both being equally timid. A judicious shake or two brings them into contact. The Segestria, from time to time, catches hold of the Pompilus, who gathers herself up as best she can, without attempting to use her sting; the Spider rolls the insect between her legs and even between her mandibles, but appears to dislike doing it. Once I see her lie on her back and hold the Pompilus above her, as far away as possible, while turning her over in her fore-legs and munching at her with her mandibles. The Wasp, whether by her own adroitness or owing to the Spider's dread of her, promptly escapes from the terrible fangs, moves to a short distance and does not seem to trouble unduly about the buffeting which she has received. She quietly polishes her wings and curls her antennae by pulling them while standing on them with her fore-tarsi. The attack of the Segestria, stimulated by my shakes, is repeated ten times over; and the Pompilus always escapes from the venomous fangs unscathed, as though she were invulnerable.

Is she really invulnerable? By no means, as we shall soon have proved to us; if she retires safe and sound, it is because the Spider does not use her fangs. What we see is a sort of truce, a tacit convention forbidding deadly strokes, or rather the demoralization due to captivity; and the two

adversaries are no longer in a sufficiently warlike mood to make play with their daggers. The tranquillity of the Pompilus, who keeps on jauntily curling her antennae in face of the Segestria, reassures me as to my prisoner's fate; for greater security, however, I throw her a scrap of paper, in the folds of which she will find a refuge during the night. She instals herself there, out of the Spider's reach. Next morning I find her dead. During the night the Segestria, whose habits are nocturnal, has recovered her daring and stabbed her enemy. I had my suspicions that the parts played might be reversed! The butcher of yesterday is the victim of to-day.

I replace the Pompilus by a Hive-bee. The interview is not protracted. Two hours later, the Bee is dead, bitten by the Spider. A Drone-fly suffers the same fate. The Segestria, however, does not touch either of the two corpses, any more than she touched the corpse of the Pompilus. In these murders the captive seems to have no other object than to rid herself of a turbulent neighbour. When appetite awakes, perhaps the victims will be turned to account. They were not; and the fault was mine. I placed in the jar a Bumble-bee of average size. A day later the Spider was dead; the rude sharer of her captivity had done the deed.

Let us say no more of these unequal duels in the glass prison and complete the story of the Pompilus whom we left at the foot of the wall with the paralysed Segestria. She abandons her prey on the ground and returns to the wall. She visits the Spider's funnels one by one, walking on them as freely as on the stones; she inspects the silken tubes, dipping her antennae into them, sounding and exploring

them; she enters without the least hesitation. Whence does she now derive the temerity thus to enter the Segestria's haunts? But a little while ago, she was displaying extreme caution; at this moment, she seems heedless of danger. The fact is that there is no danger really. The Wasp is inspecting uninhabited houses. When she dives down a silken tunnel, she very well knows that there is no one in, for, had the Segestria been there, she would by this time have appeared on the threshold. The fact that the householder does not show herself at the first vibration of the neighbouring threads is a certain proof that the tube is vacant; and the Pompilus enters in full security. I would recommend future observers not to take the present investigations for hunting-tactics. I have already remarked and I repeat: the Pompilus never enters the silken ambush while the Spider is there.

Among the funnels inspected one appears to suit her better than the others; she returns to it frequently in the course of her investigations, which last for nearly an hour. From time to time she hastens back to the Spider lying on the ground; she examines her, tugs at her, drags her a little closer to the wall, then leaves her the better to reconnoitre the tunnel which is the object of her preference. Lastly she returns to the Segestria and takes her by the tip of the abdomen. The quarry is so heavy that she has great difficulty in moving it along the level ground. Two inches divide it from the wall. She gets to the wall, not without effort; nevertheless, once the wall is reached, the job is quickly done. We learn that Antaeus, the son of Mother Earth, in his struggle with Hercules, received new strength as often as his feet touched the ground; the Pompilus, the

daughter of the wall, seems to increase her powers tenfold once she has set foot on the masonry.

For here is the Wasp hoisting her prey backwards, her enormous prey, which dangles beneath her. She climbs now a vertical plane, now a slope, according to the uneven surface of the stones. She crosses gaps where she has to go belly uppermost, while the quarry swings to and fro in the air. Nothing stops her; she keeps on climbing, to a height of six feet or more, without selecting her path, without seeing her goal, since she goes backwards. A lodge appears no doubt reconnoitred beforehand and reached, despite the difficulties of an ascent which did not allow her to see it. The Pompilus lays her prey on it. The silken tube which she inspected so lovingly is only some eight inches distant. She goes to it, examines it rapidly and returns to the Spider, whom she at length lowers down the tube.

Shortly afterwards I see her come out again. She searches here and there on the wall for a few scraps of mortar, two or three fairly large pieces, which she carries to the tube, to close it up. The task is done. She flies away.

Next day I inspect this strange burrow. The Spider is at the bottom of the silken tube, isolated on every side, as though in a hammock. The Wasp's egg is glued not to the ventral surface of the victim but to the back, about the middle, near the beginning of the abdomen. It is white, cylindrical and about a twelfth of an inch long. The few bits of mortar which I saw carried have but very roughly blocked the silken chamber at the end. Thus Pompilus apicalis lays her quarry and her eggs not in a burrow of her own making, but in the Spider's actual house. Perhaps the silken tube

belongs to this very victim, which in that event provides both board and lodging. What a shelter for the larva of this Pompilus: the warm retreat and downy hammock of the Segestria!

Here then, already, we have two Spider-huntresses, the Ringed Pompilus and P. apicalis, who, unversed in the miner's craft, establish their offspring inexpensively in accidental chinks in the walls, or even in the lair of the Spider on whom the larva feeds. In these cells, acquired without exertion, they build only an attempt at a wall with a few fragments of mortar. But we must beware of generalizing about this expeditious method of establishment. Other Pompili are true diggers, valiantly sinking a burrow in the soil, to a depth of a couple of inches. These include the Eight-spotted Pompilus (P. octopunctatus, PANZ.), with her black-and-yellow livery and her amber wings, a little darker at the tips. For her game she chooses the Epeirae (E. fasciata, E. sericea) (For the Garden-spiders known as the Banded Epeira and the Silky Epeira cf. "The Life of the Spider": chapters 11, 13, 14 et passim.—Translator's Note.), those fat Spiders, magnificently adorned, who lie in wait at the centre of their large, vertical webs. I am not sufficiently acquainted with her habits to describe them; above all, I know nothing of her hunting-tactics. But her dwelling is familiar to me: it is a burrow, which I have seen her begin, complete and close according to the customary method of the Digger-wasps.

CHAPTER 2. THE SCOLIAE.

Table of Contents

Were strength to take precedence over the other zoological attributes, the Scoliae would hold a predominant place in the front rank of the Wasps. Some of them may be compared in size with the little bird from the north, the Golden-crested Wren, who comes to us at the time of the first autumn mists and visits the rotten buds. The largest and most imposing of our sting-bearers, the Carpenter-bee, the Bumble-bee, the Hornet, cut a poor figure beside certain of the Scoliae. Of this group of giants my district possesses the Garden Scolia (S. hortorum, VAN DER LIND), who is over an inch and a half in length and measures four inches from tip to tip of her outspread wings, and the Hemorrhoidal Scolia (S. haemorrhoidalis, VAN DER LIND), who rivals the Garden Scolia in point of size and is distinguished more particularly by the bundle of red hairs bristling at the tip of the abdomen.

A black livery, with broad yellow patches; leathery wings, amber-coloured, like the skin of an onion, and watered with purple reflections; thick, knotted legs, covered with sharp hairs; a massive frame; a powerful head, encased in a hard cranium; a stiff, clumsy gait; a low, short, silent flight: this gives you a concise description of the female, who is strongly equipped for her arduous task. The male, being a mere philanderer, sports a more elegant pair of horns, is more daintily clad and has a more graceful figure, without altogether losing the quality of robustness which is his consort's leading characteristic.

It is not without a certain alarm that the insect-collector finds himself for the first time confronted by the Garden Scolia. How is he to capture the imposing creature, how to avoid its sting? If its effect is in proportion to the Wasp's size, the sting of the Scolia must be something terrible. The Hornet, though she unsheath her weapon but once, causes the most exquisite pain. What would it be like if one were stabbed by this colossus? The prospect of a swelling as big as a man's fist and as painful as the touch of a red-hot iron passes through our mind at the moment when we are bringing down the net. And we refrain, we beat a retreat, we are greatly relieved not to have aroused the dangerous creature's attention.

Yes, I confess to having run away from my first Scoliae, anxious though I was to enrich my budding collection with this magnificent insect. There were painful recollections of the Common Wasp and the Hornet connected with this excess of prudence. I say excess, for to-day, instructed by long experience, I have quite recovered from my former fears; and, when I see a Scolia resting on a thistle-head, I do not scruple to take her in my fingers, without any precaution whatever, however large she may be and however menacing her aspect. My courage is not all that it seems to be; I am quite ready to tell the Wasp-hunting novice this. The Scoliae are notably peaceable. Their sting is an implement of labour far more than a weapon of war; they use it to paralyse the prey destined for their offspring; and only in the last extremity do they employ it in self-defence. Moreover, the lack of agility in their movements nearly always enables us to avoid their sting; and, even if we be

stung, the pain is almost insignificant. This absence of any acute smarting as a result of the poison is almost constant in the Hunting Wasps, whose weapon is a surgical lancet and devised for the most delicate physiological operations.

Among the other Scoliae of my district I will mention the Two-banded Scolia (S. bifasciata, VAN DER LIND), whom I see every year, in September, working at the heaps of leaf-mould which are placed for her benefit in a corner of my paddock; and the Interrupted Scolia (S. interrupta, LATR.), the inhabitant of the sandy soil at the foot of the neighbouring hills. Much smaller than the two preceding insects, but also much commoner, a necessary condition of continuous observation, they will provide me with the principal data for this study of the Scoliae.

I open my old note book; and I see myself once more, on the 6th of August, 1857, in the Bois des Issards, that famous copse near Avignon which I have celebrated in my essay on the Bembex-wasps. (Cf. "The Hunting Wasps": chapter 14.—Translator's Note.) Once again, my head crammed with entomological projects, I am at the beginning of my holidays which, for two months, will allow me to indulge in the insect's company.

A fig for Mariotte's flask and Toricelli's tube! (Edme Mariotte (1620-1684), a French chemist who discovered, independently of Robert Boyle the Irishman (1627-1691), the law generally known as Boyle's law, which states that the product of the volume and the temperature of a gas is constant at constant temperature. His flask is an apparatus contrived to illustrate atmospheric pressure and ensure a constant flow of liquid.—Translator's Note.) (Evangelista

Toricelli (1608-1647), a disciple of Galileo and professor of philosophy and mathematics at Florence. His "tube" is our mercury barometer. He was the first to obtain a vacuum by means of mercury; and he also improved the microscope and the telescope.—Translator's Note.) This is the thrice-blest period when I cease to be a schoolmaster and become a schoolboy, the schoolboy in love with animals. Like a madder-cutter off for his day's work, I set out carrying over my shoulder a solid digging-implement, the local luchet, and on my back my game-bag with boxes, bottles, trowel, glass tubes, tweezers, lenses and other impedimenta. A large umbrella saves me from sunstroke. It is the most scorching hour of the hottest day in the year. Exhausted by the heat, the Cicadae are silent. The bronze-eyed Gad-flies seek a refuge from the pitiless sun under the roof of my silken shelter; other large Flies, the sobre-hued Pangoniae, dash themselves recklessly against my face.

The spot at which I have installed myself is a sandy clearing which I had recognized the year before as a site beloved of the Scoliae. Here and there are scattered thickets of holm-oak, whose dense undergrowth shelters a bed of dead leaves and a thin layer of mould. My memory has served me well. Here, sure enough, as the heat grows a little less, appear, coming I know not from whence, some Two-banded Scoliae. The number increases; and it is not long before I see very nearly a dozen of them about me, close enough for observation. By their smaller size and more buoyant flight, they are easily known for males. Almost grazing the ground, they fly softly, going to and fro, passing and repassing in every direction. From time to time one of