

In Nature's Workshop.

II.—FALSE PRETENCES.

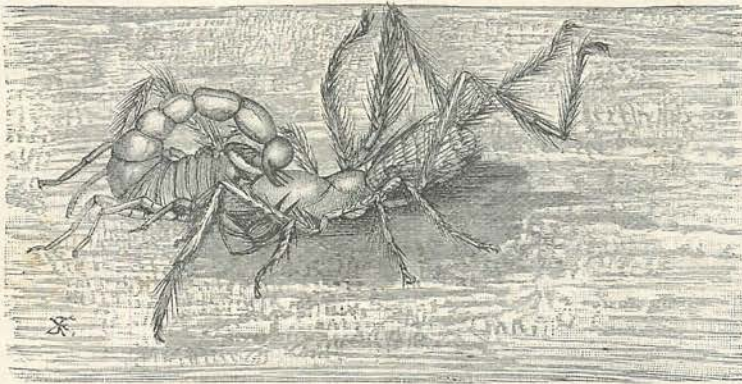
By GRANT ALLEN.



HUMAN life and especially human warfare are rich in deceptions, wiles, and stratagems. We dig pitfalls for wild beasts, carefully concealed by grass and branches; we take in the unsuspecting fish with artificial flies, or catch them with worms which conceal a hook treacherously barbed for their surer destruction. The savage paints his face and sticks feathers in his hair so that he may look more terrifying to his expected enemy; civilized men mask their batteries, and sometimes even paint muzzles of imaginary guns in the spaces between the gaping mouths of the real ones. *Chevaux de frise* block the way to points liable to attack; real troops lie in ambush and dart out unexpectedly

occur among fairly well-known English plants and animals. And I shall begin with our familiar and unsavoury old friend, the Devil's Coach-horse.

In order fully to understand his mode of procedure, however, I must first call your attention to another animal which really is what the Devil's Coach-horse mendaciously pretends to be: and that is the common scorpion. His mode of fighting is well known to most of us. In illustration No. 1 Mr. Enock has given us a delineation of a frantic death-struggle between such a scorpion and a large and powerful southern spider. The venomous creature with the stinging tail is on the left; the spider is on the right. As far as mere size goes, the antagonists are fairly well matched; but the



1.—A BATTLE ROYAL: SCORPION V. SPIDER: THE SCORPION STRIKING.

in the rear of the assailants. Trade in like manner is full of shams—a fact which I need hardly impress by means of special examples. But Nature we are usually accustomed to consider as innocent and truthful. Alas, too trustfully: for Nature too is a gay deceiver. There is hardly a device invented by man which she has not anticipated: hardly a trick or ruse in his stock of wiles which she did not find out for herself long before he showed her.

I propose in this paper to examine a few cases of such natural deceptions—not indeed the most striking or typical, but such as

scorpion is the best armed, both with offensive and defensive armour. His lobster-like or crab-like claws enable him to hold his enemy's limbs in his grip as in a vice; then, at the critical moment, he bends over his tail, in the extremity of which his sting is situated, and plunges it with force through the comparatively slight skin of the spider's body or thorax, injecting at the same moment a pungent drop of his deadly poison. This characteristic action of the scorpion in curving its tail over its body and raising its sting in a menacing attitude is well known to birds and other

enemies of the species: often the mere threat of a thrust is a sufficient deterrent: the dangerous beast just elevates its poisonous appendage or assumes an angry mien, and the inquisitive intruder is frightened away immediately. It is the same with ourselves. The bare sight of that uplifted sting suffices to repel us. Even a child who saw a scorpion once arch its back and prepare to strike with its reversed tail would instinctively understand that there was danger ahead, and would withdraw its hand before the venomous creature had time to pounce upon it.

Owing to these unamiable personal traits of the scorpion race, it is not popular among other animals. But to be feared is to be respected; and scorpions for the most part are left severely alone, under the stones where they love to lurk, by the various denizens of the districts they inhabit. Now, it is a fact in nature as in human life that to be successful is to have many imitators. Thus a number of harmless flies dress up like wasps in black and yellow bands, and so escape the too pressing attentions of insect-eating birds and other enemies. They have no stings, to be sure, but they look so like the wasps, and flaunt about so fearlessly in their borrowed uniform, that they are universally taken for the insects they mimic; even the cautious entomologist himself stares at them twice and makes quite sure of his specimen before he ventures to lay hands on any such doubtful masquerader. I hope in a future article to give some further account (with illustrations) of these facts of *mimicry*, as it is called: for the present we will stick close to our text, the Devil's Coach-horse. For

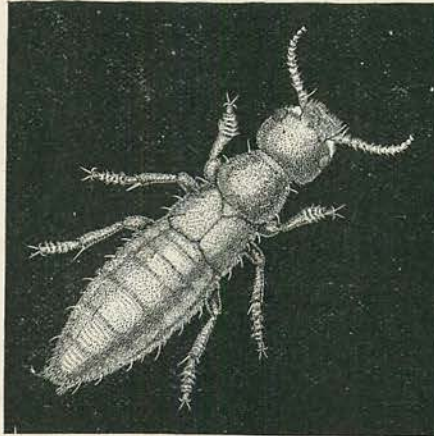
this familiar English beetle is an imitator of the scorpion, and obtains immunity from the attack of enemies to a great extent by pretending to powers which are not his in reality.

In No. 2 we have a portrait of the Coach-horse in his hours of ease, seen from above, engaged in doing nothing in particular. He does not *look* like a flying insect, but he is. He has a long pair of wings tucked away in folds under his horny wing-cases, and he can use them with great effect, for he is one of our swiftest and strongest fliers—the long-distance champion, I almost fancy, among the beetles of England, unless indeed the tiger-beetle be pitted against him. But

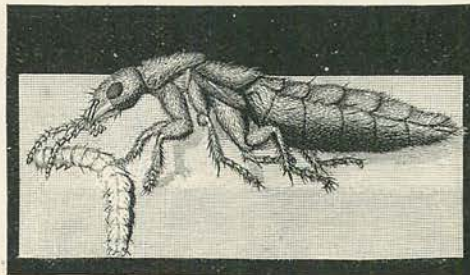
when crawling on the ground, and attacked or menaced, he does not take to flight or show the white feather: being a pugnacious and spirited little beast, he bristles up at once, and endeavours incontinently to terrify his assailant. In No. 2 you see him from above when he is merely engaged in crawling along the ground, looking as mild as milk, and as gentle as any sucking dove: you would hardly suppose he could show fight or raise his hand—I mean his antennæ—to injure anyone. But in No. 3 he is represented in his favourite act of attacking a caterpillar: for he is really a very voracious and courageous carnivore. In the autumn, when Devil's Coach-horses are usually most abundant, you can easily catch them by putting a piece of meat or a

dead frog under an empty flower-pot, and then tilting the edge up with a stone, so that the beetles can crawl in and get at the food thus temptingly laid out for them.

If you disturb the Coach-horse, however, while he is engaged in eating



2.—THE DEVIL'S COACH-HORSE IN HIS HOURS OF EASE



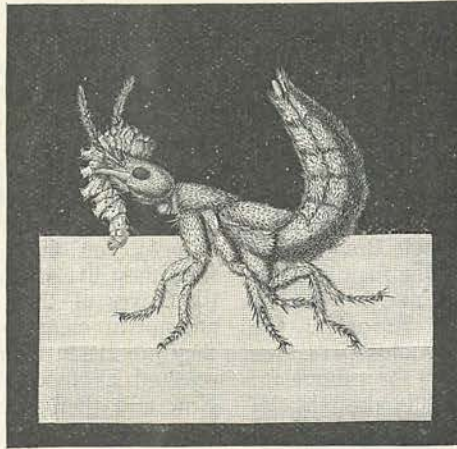
3.—THE DEVIL'S COACH-HORSE SAMPLING A CATERPILLAR.

his quiet meal, or even when he is walking at leisure along a country road, he puts himself at once into his "terrifying" attitude, and imitates the scorpion. No. 4 exhibits him in this military character, cocking up his tail and pretending he can sting—which is only his brag: he just does it to frighten you. But the attitude is so exactly like that of the scorpion, that it almost always produces an immediate effect: hardly anybody likes to molest a Devil's Coach-horse. If you put down your hand to touch him, and he rears in response, ten to one you will withdraw it in alarm at sight of him. In England these beetles often enough find their way into larders or cellars, seeking whom or what they may devour; and when the servants light upon them, they almost invariably decline to touch them: there is a general opinion about that the ugly and threatening black beasts are uncanny and poisonous, or else why should they turn up their tails at you in such an insulting fashion?

"But," you may object, "there are no scorpions in England: how then can the Devil's Coach-horse be benefited by imitating an animal which he has never seen, and of whose very existence he has not been able to read in pretty picture books?" Your objection has some force—though not so much as you imagine. It is quite true that there are no scorpions in England; but then, there are Devil's Coach-horses in many other countries, and the habit of tail-cocking need not necessarily have been acquired in these islands of Britain. That is not all, however: it suffices the beetle if the tactics it adopts happen to frighten and repel its enemies, no matter why. Now, in the first place, many of our migratory birds go in winter to Southern Europe and Africa—especially the insect-eaters, which can find no food in frozen weather. The hard-billed seed-eaters and fruit-eaters remain with us, but the soft-billed kinds retire to warmer climates, where food is plentiful. Of course,

however, it is just these insect-eating birds that the Devil's Coach-horse has most to fear from. The birds must be quite familiar with the habits and manners of scorpions in their southern homes; and they are not likely to inquire closely whether the dangerous beast they know on the Mediterranean has, or has not, been scheduled in Britain. We all of us dislike and distrust any insect that resembles a bee or wasp, and that buzzes or hums in a hostile manner; we give all such creatures a wide berth, wherever found, on the bare off-chance that they may turn out to be venomous—be hornets or so forth. Just in the same way, a bird, when it sees an unknown black beastie cock up its tail and assume a threatening attitude, is not likely to inquire too curiously

whether or not it is really a scorpion: the bare suspicion of a sting is quite enough to warn it off from interfering with any doubtful customer. Moreover, in the second place, even those birds or men who have never seen a scorpion at all are yet sure to be alarmed when an insect sticks up its forked tail menacingly, and shows fight, instead of skulking or flying away. As a general rule, if any animal



4.—THE DEVIL'S COACH-HORSE PRETENDS TO BE A SCORPION.

makes signs of resistance, we take it for granted he has adequate arms or weapons to resist with: and so this mere dumb-show of being a sort of scorpion proves quite sufficient to protect the Devil's Coach-horse from the majority of his enemies.

I ought to add that while our beetle thus frightens larger enemies, he is actively and offensively objectionable to small ones. The main use of his tail, indeed, is for folding away his wings, much as the earwig folds hers by aid of her pincers. But the Devil's Coach-horse makes it serve a double purpose. For he has a couple of yellow scent-glands in his tail, which secrete an unpleasant and acrid aromatic substance. These scent-glands are protruded in No. 4: you can just see them at the tip of the tail; and if the annoyance to which the beetle is subjected

seems to call for their intervention, a drop of the volatile body they distil is set free, and is at once discharged in the face of the enemy. Such a manœuvre is in essence like that of the skunk : it is defence by means of a nasty odour, and it occurs not only in the Coach-horse's case, but also among a number of beetles and other insects.

The odd little creatures known as Bombardier Beetles are still quaint in their habits : they carry the last-mentioned mode of defence to an even greater pitch of perfection. For, like miniature artillery-men, they actually fire off a regular volley of explosive gas in the faces of their pursuers. The gas is secreted as a liquid ; but it is very volatile, and it vaporizes at once on contact with the air, so as to form a small, white cloud of pungent smoke, resembling in its effects nitric acid. Our native English species of Bombardier roams about in large flocks or regiments : and when one member of a clan is disturbed, all the other beetles of the company let off their artillery at once, so that the scattered volley has something the appearance of platoon firing. The chief enemy of the Bombardiers is a much larger and very handsome carnivorous beetle known as *Calosoma*. When this insect tiger hunts down a single Bombardier, and has almost caught him, the fugitive waits till his pursuer is quite close, and then salutes him with a discharge of fire-arms : the pungent gas gets into the *Calosoma's* eyes and mouth and distracts him for a moment ; and the Bombardier escapes in the midst of the confusion thus caused, under cover of the cloud he himself has exploded. That is the most highly evolved mode of defence of which I know among the British insects.

There are few creatures, again, which one would so little suspect of any attempt to bully and bluff others as the soft-bodied caterpillars. They are as a rule so plump and squashy and defenceless : a mere peck from a bird's beak is enough to kill them, for when once their tight, thin skin is broken, were it but with a pin-prick, all the flabby contents burst out at once in the messiest fashion. Yet even caterpillars, strange to say, have their tricks of terrifying. They pretend to be dangerous characters. I will set out with some of the simplest and least developed cases, and then pass on to a more complex and wily class of deceivers.

To begin with, I must premise that two sets of caterpillars have two different ways of evading the unpleasant notice of birds and other insect-eaters. One way is that adopted

by the common "woolly-bear," a great hairy caterpillar, frequent in gardens, and covered from head to tail with long needles or bristles. These prickly points make the creature into a sort of insect hedgehog ; birds refuse to touch him, because the serried spikes, which to us are mere hairs, seem to them perfect spines or thorns, sticking into their tongues and throats, or clogging their gizzards. Protected caterpillars like the woolly-bears live quite openly, exposed on the leaves and branches of their food-plant ; they are not afraid of being seen : nay, they rather court observation than shun it, because they know nobody will attack them. The porcupine has no need to run away like the rabbit. Similar tactics are also adopted by many nasty-tasting caterpillars, in whose bodies natural selection has developed bitter or unpleasant juices. These caterpillars are rejected by birds and lizards—the great enemies of the race—and therefore they find it worth while to clothe themselves in gaudy and conspicuous red or yellow bands, so as to advertise all comers of their inedible qualities. Whenever you see such brilliantly-attired grubs (like those of the Magpie Moth, so common on gooseberry-bushes—a striking creature tricked out in belts of black and orange), you may be sure of two things : first, they live openly and undisguisedly on the leaves of their food-plant, without any attempt at mean concealment ; and second, they are nasty to the taste, and therefore rejected as food by insect-eating animals. Now and then a young and inexperienced bird may eat one, to be sure ; but it never tries twice, and the solitary martyr is sacrificed for the good of the race. Their bright colours and gaudy bands are just advertisements, as it were, of their inedible qualities. For, of course, nasty taste would do a caterpillar no good if the bird had always to sample it before rejecting it ; the broken skin alone would be enough to kill it. Hence almost all uneatable caterpillars have acquired bright colours by natural selection—that is to say, by the less bright being continuously devoured or killed ; and birds on their side have learned to know (after one trial, or, perhaps, even before it by inherited instinct) that red or yellow bands and belts in caterpillars are the outward and visible sign of uneatableness.

The second group or set of caterpillars is edible and tasty : it, therefore, governs itself accordingly, and has recourse to the exactly opposite tactics. Caterpillars of this class are smooth and naked : they never have the

brilliant "warning colours" of the nasty-tasted kinds: and they show a marked absence of the beautiful metallic sheen, the strange melting iridescent hues and spots which add beauty to the charms of so many among the uneatable species. Such fat and smooth-skinned edible caterpillars are, of course, very tempting juicy morsels to birds and other insect-eating animals. Their motions, like those of all grubs, are slow: and if they lived exposed on their food-plants, after the fashion of the protected hairy and bitter kinds, they would all be eaten up before they had time to turn into moths or butterflies. Here, therefore, natural selection has produced the contrary result from that which it produces among protected kinds. Caterpillars of this edible type which showed themselves too openly and imprudently have got picked off by birds, like sentries and pickets who make themselves too conspicuous to the enemy's sharpshooters. Only the most prudent, modest, and retiring grubs have survived to become moths or butterflies, and so be the parents of future generations, to whom they hand on their own peculiarities. In this way the edible caterpillars have acquired at last a fixed hereditary instinct of lurking under leaves, or in dark spots, and never showing themselves openly. The larvæ of the butterfly group as a whole thus fall into two great classes (as far as regards habits alone, I mean): the *protected*, which are either hairy or nasty, and which flaunt themselves openly; and the *unprotected*, which lurk and skulk, endeavouring to escape notice as sedulously as their rivals the protected endeavour to attract it.

Nor is that all. It would clearly be useless for a bright red or yellow caterpillar to hide under a green leaf, and then suppose by that simple device he was going to escape observation. Birds are always looking out for insects under leaves. The consequence is

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that skulking or lurking caterpillars are soon found out by sharp-eyed and hungry enemies, unless they closely resemble the foliage or stems upon which they lie. From generation to generation, accordingly, the less imitative insects get eaten, and the more imitative spared: so that nowadays, most unarmed caterpillars are green like the leaves or grey like the stems, and are even provided with markings of light and shade upon their skins which mimic the distribution of light and shade among the ribs and veins of the surrounding foliage. Such deceptive leaf-like caterpillars are always very difficult to find: so that careless observers as a rule know only those of the other type, the great hairy "woolly-bears" and the brilliant red and yellow-banded bitter kinds; they never observe the unobtrusive green and brown sorts, which harmonize so admirably with their native tree in colour and markings.

Many greenish caterpillars, however, when discovered and disturbed, fall back on their second line of defence: they endeavour to frighten their enemies by devices closely similar to those of the Devil's Coach-horse. The caterpillar of the Broad-bordered Bee-hawk, for example, forms a good instance of a very simple stage in the development of such brazen-faced "terrifying" tactics. This warlike grub is shown in No. 5, trying on its simple little attempt to make itself alarming. Though by no means an uncanny-looking or appalling insect, it will rear itself up on its haunches (so to speak) when attacked, raising the fore part of its body erect with a sudden jerk, and holding its head high, as if it meant to bite or sting, so as to give itself as formidable an aspect as possible. The mild ruse succeeds, too; for

birds will eye the harmless creature askance when it attempts this evolution, putting their heads on one side, and ruffling their crests in evidence of bluff, to be sure, but *il pays*; indeed,



5.—CATERPILLAR OF THE BROAD-BORDERED BEE-HAWK TRYING TO LOOK ALARMING.

bluff in warfare is often more than half the battle. If you put on a bold face in a row, and seem able to take care of yourself, people are apt to think you have a knife up your sleeve, and therefore to refrain from unnecessarily annoying you.

The cunning caterpillar which finally develops into the Privet Hawk-moth has a slightly more evolved mode of purely theatrical frightening. You see him in No. 6, a full-fed specimen, just ready to turn at once into a chrysalis. This grub feeds usually on

the vivid leaves of the privet; he is therefore protectively coloured a bright green, like that of the foliage about him. "But why those great purple stripes on his sides?" you will ask. "Surely they must make him an easy mark for birds?" Not at all: please notice that they run obliquely. There is method in that obliquity. When the caterpillar is smaller, he lurks unseen on the underside of the leaves, and this pattern of oblique purplish lines exactly imitates the general effect of the shadows cast by the ribs—so much so, that if you look for him on a privet-tree in spring, I doubt whether you will find him till I point him out to you. Even when he waxes fat and full fed, the purple stripes still aid him more or less by breaking up

the large green surface into smaller areas, as Professor Poulton has well noticed. He harmonizes better so with the broken masses of the leaves about him. Then again, when the time arrives for him to turn into a chrysalis, he descends to the ground, which, under a thickly-leaved privet bush, is most often brown. So, just as he is coming of age and reaching the proper moment for migration, his back all at once begins to turn brown, in order that he may be less observed as he walks about on the stem; while by the time he is quite ready to take to the earth he has grown brown all

over, thus matching the soil in which he has next to bury himself. You could hardly have a better example of the sort of colour-change which often accompanies altered habits of living.

In the illustration, however, you see this really harmless and undefended grub in the act of trying to pretend he is poisonous. He is now mature, and the stripes on his sides stand out conspicuously as he walks on the stem. A sparrow threatens him. He retorts by showing fight—fallaciously and deceptively, for he has nothing to fight with. He lifts his head with an aggressive air, and throws himself about from side to side, as if he knew he could bite, and meant to do it. He also lashes his tail in pretended anger—"I would have you to know, Sir Bird, I am not to be trifled with!" The empty demonstration usually succeeds: the sparrow gets alarmed and believes he means it. This policy is, in essence, that commonly known as "spirited": it consists in trying to frighten your enemy instead of fighting him.

The oddly-marked caterpillar of the Puss Moth carries the same plan of campaign to a much more artistic pitch. This very quaint insect is common on willows and poplars in England, and is on the whole protectively coloured. Black

at first, it looks like a mere speck or spot on the leaf; as it grows, it becomes gradually greener, relieved with broad purple patches on the back, which produce the effect of lines and shadows. When quite full-grown, as seen in No. 7, the adult caterpillar generally rests at ease on the twigs of the willow-tree. Our illustration shows it in this final stage of its larval life, just taking alarm and humping its back at the approach of some bird or other enemy. If the alarm continues, it goes through a most curious series of evolutions, admirably shown by Mr. Enock in No. 8. Here, the little



6.—FULL-GROWN CATERPILLAR OF THE PRIVET HAWK-MOTH, SIMILARLY OCCUPIED.



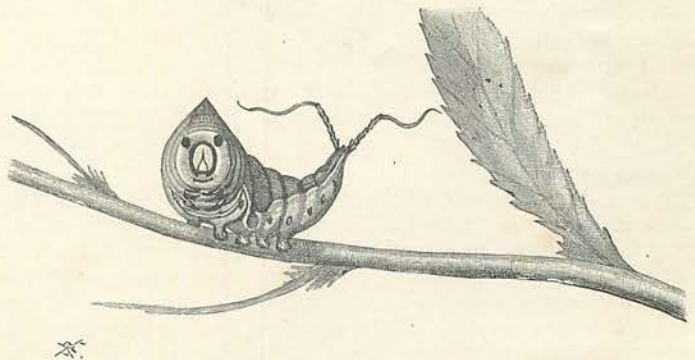
7.—CATERPILLAR OF THE PUSS MOTH PREPARING FOR ACTION.

beast is altogether on the defensive: it withdraws its head into the first ring of the body, and inflates the margin, which is bright red in colour. Two black spots, which are not really eyes, but which look absurdly eye-like, now give it a grotesque and terrifying appearance. In fact, the inflated ring resembles a hideous grinning mask, and gives the impression of a face with eyes, nose, and mouth, like that of some uncanny creeping creature. But the apparent face is not a face at all: it is artfully made up of lines and spots on the skin of the body. At the same time that the caterpillar thus assumes its mask, it stands on its eight hind legs as erect as it can, and whips out two pink bristles or tentacles from the forked prongs at the end of its tail—you can see them in the picture. It then bends forward the tail, and brandishes or waves about these pink bristles over its false head, so as to present altogether a most gruesome aspect. Indeed, even Mr. Enock's vigorous sketch of the

little brute in its tragic moments does not quite convey the full effect of its acting in the absence of colour: for the bright red margin and the swishing pink switches add not a little to the telling smirk and black goggle-eyes of the mask-like face thus produced *in terrorem*.

That is not all, either. The Puss Moth caterpillar has a rapid trick of facing about abruptly in the direction of the enemy as if it meant to bite: and this trick is always most disconcerting. If ever so lightly touched, it instantly assumes the terrifying attitude, and presents its pretended face to the astonished aggressor. From a harmless caterpillar it becomes all at once a raging bulldog. Touch it on the other side, and it faces round like lightning in the opposite direction. Professor Poulton tried the effect of its grimace on a marmoset, and found the marmoset was afraid to touch the mysterious creature. We are not marmosets, but I notice that most human beings recoil instinctively from a Puss Moth caterpillar when it assumes its mask. Even if you *know* it is harmless, there is something very alarming in its rapid twists and turns, and in the persistent way in which it grins and spits at you.

Really spits, too; for the insect has a gland in its head which ejects, at need, an irritating fluid. If this fluid gets into your eyes, they smart most unpleasantly. It contains formic acid, and is strong enough to be exceedingly stinging and painful. The discharge repels



8.—THE SAME CATERPILLAR TERRIFYING AN ENEMY.

lizards, and probably also birds, who are among the chief enemies of this as of other caterpillars.

The deadliest foe of the Puss Moth larva, however, is the ichneumon-fly, a parasitic

creature, which lays its eggs in living caterpillars, and lets its grubs hatch out inside them, so as to devour the host from within in the most ruthless fashion. There are many kinds of ichneumon-fly, some of them very minute: the one which attacks the Puss Moth in its larval stage is a comparatively big one. The fly lays its eggs behind the caterpillar's head, where the victim is powerless to dislodge them. In all probability the defensive attitude and the shower of formic acid are chiefly of use against these parasitic foes: for when an ichneumon-fly appears, the caterpillar assumes his "terrifying" attitude the moment it touches him, and faces full round to the foe with his false mask inflated. A very small quantity of the formic acid Professor Poulton found sufficient to kill an ichneumon: and there can be little doubt that this is its main object.

The last of these "bluffing" caterpillars with which I shall deal here is that of the Lobster Moth. In No. 9 you see a couple of these quaint and unwieldy creatures "demonstrating" before an enemy, as if he were the Sultan. The Lobster Moth in its larval stage frequents beech-trees, and you will see in the illustration that the two represented are on a twig of beech. When at rest, the caterpillar resembles a curled and withered beech-leaf, and by this unconscious mimicry escapes detection. But when discovered and roused to battle, oh, then he imitates the action of the spider. He holds up his short front legs in a menacing attitude, so as to suggest a pair of frightful gaping jaws: the four long legs behind these he keeps wide apart and makes them quiver with rage in the most alarming pantomimic indignation. His tail he turns topsyturvy over his head like a scorpion; while the forked appendages at its end seem

like frightful stings, with which he is just about to inflict condign punishment on whoever has dared to disturb his quiet. But it is all mere brag, though the whole effect is extremely terrifying. The performance does not, indeed, mimic any particular venomous beast, but it suggests most appalling and paralyzing possibilities. Many of these queer attitudes, indeed, owe their impressiveness just to their grotesque simulation of one knows not quite what: they are not definite and special, they are worse than that; they appeal to the imagination. And if only you reflect how afraid we often feel of the most harmless insects, merely because they *look* frightful, you will readily understand that such vague appeals to the imagination may be far more effectual than any real sting could ever be. We dread the unknown even more than the painful.

The funniest of all these false pretences, however, is one which Hermann Müller, I believe, was the first to point out in this same Lobster Moth caterpillar. When very much bothered by ichneumon-flies (to whose attacks it is particularly exposed), this bristling beast displays, for the first time, two black patches



9.—CATERPILLARS OF THE LOBSTER MOTH DEMONSTRATING IN FORCE BEFORE THE HOSTILE BATTALIONS.

on its side, till then concealed by a triangular flap. Now, these patches closely resemble the sort of wound made by the ichneumon when it deposits its eggs, so it is probable that they serve to take in the assailant, who is thus led to think that another fly of her own kind has been before her, and, therefore, that it is no use laying her eggs where a previous parasite is already in possession. There would not be enough Lobster Moth to feed *two* hungry ichneumon families. In fact, the caterpillar first begins by bluffing, and says, "If you touch me, I bite!" then, finding the bluff unsuccessful, it further pretends to throw up

the sponge, and cries out with a bounce: "Oh, if egg-laying is your game, *that's* no good: I'm already occupied!" For a combination of wiles, this crafty double game probably "licks creation."

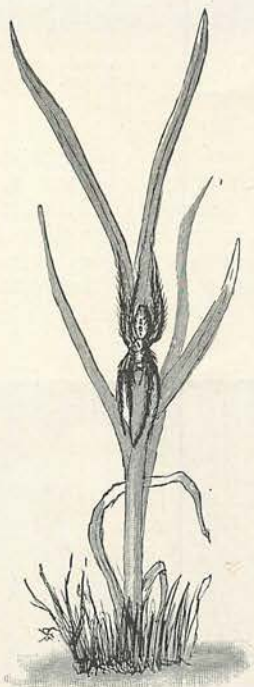
If the defenders are so cunning, however, the attackers can sometimes turn the tables upon them. Animals that hunt often disguise themselves, in order to avoid the notice of the prey, and so steal unobserved upon their victims. Such tactics are like those of the Kaffirs, who cut bits of bush, and then creep up slowly, slowly behind them, under cover of the branches, upon the gnus or antelopes which they wish to slaughter. In No. 10 we have one example of this method of hunting or stalking, as pursued by the intelligent English grass-spider. All spiders, of course, have eight legs, four on each side; but in most of the class, the various pairs of legs are evenly distributed, so as to lie about the body in a rough circle or something like it. The grass-spider, however, has his own views on this important matter. His form and attitude are quite peculiar. He lies in wait for his prey on the open, crouched against a stem of grass, with his two front pairs of legs extended before him, and his back pair behind, in an arrangement which is rather linear than circular. This position makes him almost invisible — much more invisible in real life, indeed, than you see him in the drawing; for if he were represented as inconspicuous as he looks you would say there was no spider there at all, only a naked grass-stem. The delusion is heightened by his lines and colours: he is mostly green or greenish, with narrow black or brown stripes which run more or less up and down his body, instead of cross-wise as usual, so that they harmonize beautifully with the up-and-down lines of the blades and stem in the tuft which he inhabits. When he is pressed close against a

bent of grass, on the look-out for flies, it is almost impossible for the quickest eye to distinguish him. Flies come near, never suspecting the presence of their hereditary foe; as soon as they are close to him, the grass-spider rushes out with a dash and secures them. His jaws are among the most terrible in all his terrible race: they are large and wide-spreading, with two rows of teeth on either side, and a pair of long fangs of truly formidable proportions.

In other ways, also, this particular spider is a clever fellow, for he lives near water; but when the rains are heavy and there is likely to be a flood, he shifts his quarters higher up the ground, and so escapes impending inundation.

Deceptions and false pretences of this sort are somewhat less common among plants than among animals; but still, they occur, and that not infrequently. "What? Plants deceive?" you cry. "The innocent little flowers? How can they do it? Surely that is impossible!" By no means. I have watched plant life pretty closely for a good many years now, and every year the conviction is forced upon me more and more profoundly that whatever animals do, plants do almost equally. There is no vile trick or ruse or stratagem that they cannot imitate: no base deception that they will not practise. They lie and steal with the worst; they hold out false baits for deluded insects, and hide real fly-traps with honeyed words and sweet secretions.

As a good illustration among English plants, look at the Grass of Parnassus, that beautiful, dishonest bog-herb, with glossy-green leaves and pure white blossoms, which is considered the especial guerdon of poets. I found a whole nest of it once in a swamp near Cromer, and carried off a bunch of the lovely flowers as an appropriate offering to Mr. Swinburne who

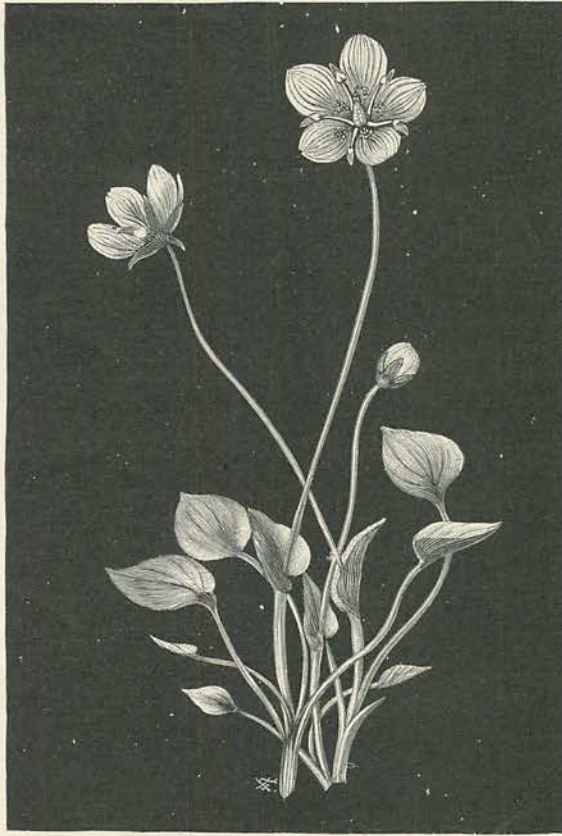


10.—GRASS-SPIDER, IN AMBUSH FOR FLIES.

was stopping at Sidestrand. Yet this poet's flower, dainty and delicate as it is—you see in No. 11 its counterfeit presentment—is not ashamed to deceive the poor bees and flies in a way which the Heathen Chinese would have considered unsportsmanlike. It is a sham, a commercial sham of the worst type. It lives for the most part on wet moors among mountains, or else in the boggy hollows between blown sand-hills by the sea: and when its milk-white flowers star the ground in such spots, it forms

one of the loveliest ornaments of our English flora. But trust it not, oh butterfly: it is fooling thee! From a distance, it looks as if it were full of honey; it advertises well: but at close quarters 'tis a wooden nutmeg; it turns out to be nothing better than an arrant humbug.

The deception is managed in this disgraceful fashion. Inside each petal lies a curious ten or twelve-fingered organ, which is in reality an abortive stamen. No. 12 shows you one such petal removed, with the false honey-glands drawn on a larger scale than in the other illustration. The ten-fingered stamen bears at its tip a number of translucent yellow drops, which look like pure nectar. But they are nothing of



11.—GRASS OF PARNASSUS, DISPLAYING AND ADVERTISING ITS IMITATION HONEY.

false pretences; it deserves fourteen days' without the option of a fine. As a rule, in similar cases, the flies are rewarded for their kind offices as carriers by the merited wage of a drop of honey. But the Grass of Parnassus, mendacious herb, pretends to be purveying a specially fine quantity and quality of nectar, while in reality it offers only a hard, glassy knob with nothing in it. This pays the plant, of course, because the blossoms do not have to go on producing honey fresh and fresh; a mere inexpensive show does just as well as the real article: "Our customers like it!" but the language of the flies when they discover the fraud is something just awful.

Nor is this by any means



12.—A SINGLE PETAL, TO SHOW THE CHARACTER OF THE SHAM HONEY.

a solitary example of plant depravity. The whole group of pitcher-plants, for instance, cruelly manure themselves by means of living insects in the most treacherous fashion. These lovely and wicked plants live, without exception, in wet and boggy soil, where they cannot get enough animal matter for manure in the ordinary way by the roots: so they lay themselves out instead to capture and absorb the tissues of insects. For this horrid purpose, they twist their leaves into deep pitchers which catch and hold the rain water, and so form reservoirs to drown their prey. Then they entice insects by bright colours to their traps, and allure them to enter by secreting honey at the top of the pitcher. Hairs point downward inside; these allow the flies to walk on to their fate, bribed as they go by lines of nectar: but if they try to return, ah, then they find their mistake: the hairs prevent them, after the fashion of a lobster-pot. Thus they walk on and on till they reach the water, when they are swamped and clotted in a decaying mass, from which the treacherous plant draws manure at last for its own purposes. The pitchers are thus at once traps to catch animals, and stomachs to digest them.

Another and still odder case of deceptiveness in plants is shown by a curious group of South African flowers, the *Hydnoras* and *Stapelias*. These queer and malodorous herbs have very large and rather handsome but fleshy blossoms, an inch or two across, dappled and spotted just like decaying meat. They live in the dry and almost desert region, where carrion-flies abound. Such flies lay their eggs and hatch out their grubs for the most part in half-eaten carcasses of antelopes or smaller animals killed and in part devoured by lions and other beasts of prey. So the flowers have taken to imitating dead meat. They are a lurid red in colour, with livid livery patches, and they have a strong and unpleasant smell of decaying animal matter. The flies, deceived by the scent, flock to them to lay their eggs, and in so doing carry out the real object of the plant by fertilizing the blossoms. But, of course, the whole thing is a vile sham; for when the maggots hatch out, the flower has died, and there is no food for them, so they perish

of starvation. Dr. Blackmore, of Salisbury, once gave me some of these curious plants and flowers: I noticed that in the sunlight, where they smelt just like decomposing meat, they attracted dozens of bluebottle flies and other carrion insects.

Protective resemblance also occurs among plants: for in the same dry South African region, where every green thing gets nibbled down in the rainless season, certain ice-plants and milk-weeds have acquired the trick of forming tubers or stems exactly like the pebbles among which they grow: so that when the leaves die down in the dry weather, the tuber is not distinguishable from the stones all round it. Such tubers are really reservoirs of living material destined to carry the life of the plant over the dead season: as soon as rain comes again, they put forth fresh green leaves at once, and grow on after their sleep as if nothing had happened. Even terrifying attitudes are not unknown in the vegetable world: for one of the uses of the movements in the Sensitive Plant is almost certainly to frighten animals. Browsing creatures that come near the bushes in their native woods see the leaves shrink back and curl up when touched, and are afraid to eat a tree that has so evidently a spirit in it. The Squirting Cucumber of the Mediterranean, again, alarms goats and cattle by discharging its ripe fruits explosively in their faces the moment the stem is touched. In this case the primary object is no doubt the dispersal of the seeds, which squirt out elastically as the fruit jumps off; but to frighten browsing enemies is a secondary advantage. There can be no question as to the reality of the plant's hostile intention, because the fruits also contain a pungent juice, which discharges itself at the same instant into the eyes of the assailant. As I have received a volley of this irritating liquid more than once in my own face (in the pursuit of science) I can testify personally on the best of evidence that it is distinctly painful. The tactics of the Squirting Cucumber in first frightening you, and then injecting acrid juice into your eyes, are thus exactly similar to the plan of action pursued by the angry larva of the Puss Moth.