Glimpses of Nature.

I.—THE COWS THAT ANTS MILK.

By Grant Allen.

DON'T let my title startle you; it was Linnæus himself who first invented it. Everybody knows the common little "green-flies" or "plant-lice" that cluster thick on the shoots of roses; and most people know that these troublesome small insects (from the human point of view) are the true source of that shining sweet juice, rather slimy and clammy, that covers so many leaves in warm summer weather, and is commonly called honey-dew. A good many people have heard, too, that ants use the tiny green creatures in place of cows, coaxing them with their feelers so as to make them yield up the sweet and nutritious juice which is the ants' substitute for butter at breakfast. But comparatively few are aware how strange and eventful is the brief life-history of these insignificant little beasts which we destroy by the thousand in our flower-gardens or conservatories with a sprinkle of tobacco-water. To the world at large, the aphides, as we call them, are mere nameless nuisances — pests that infest our choicest plants; to the eye of the naturalist, they are a marvellous and deeply interesting group of animals, with one of the oddest pedigrees, one of the queerest biographies, known to science.

I propose, therefore, in this paper briefly to recount their story from the cradle to the grave; or, rather, to be literally accurate, from the time when they first emerge from the egg to the moment when they are eaten alive (with some hundreds of their kind) by one or other of their watchful enemies. In this task, I shall be aided not a little by the clever and vivid dramatic sketches of the Aphides at Home, which have been prepared for me by my able and watchful collaborator, Mr. Frederick Enock, an enthusiastic and observant naturalist, who thinks nothing of sitting up all night, if so he may catch a beetle's egg at the moment of hatching; and who will keep his eye to the microscope for twelve hours at a stretch, relieved only by occasional light refreshment in the shape of a sandwich, if so he may intercept some rare chrysalis at its moment of bursting, or behold some special grub spin the silken cocoon within whose case it is to develop into the perfect winged insect.

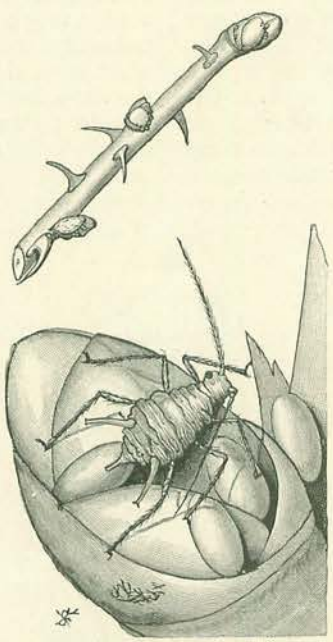
Rose-aphides, or "green-flies," as most people call them, are, to the casual eye, a mere mass of living "blight"—a confused group of tiny translucent insects, moored by their beaks or sucking-tubes to the shoots of the plant on which they have been born, and which they seldom quit unless forcibly ejected. For they are no Columbuses. The spray of rose-bush figured in sketch No. 1 shows a small part of one such numerous household, in quiet possession of its family tree, and engaged, as is its wont, in sucking for dear life at the juices of its own peculiar food-plant. You will observe that they are clustered closest at the growing-point. Each little beast of this complex family is coloured protectively green, so as to be as inconspicuous as possible to the keen eyes of its numerous enemies; and each sticks to its chosen twig with beak and sucker as long as there is anything left to drink in it, only moving away on its six sprawling legs when its native spot has been drained dry of all nutriment.

NO. 1.—A BRANCH OF THE FAMILY TREE.

We often talk metaphorically of vegetating:

the aphis vegetates. Indeed, aphides are as sluggish in their habits and manners as it is possible for a living and locomotive animal to be; they do not actually fasten for life to one point, like oysters or barnacles; but they are born on a soft shoot of some particular plant; they stick their sucking-tube into it as soon as they emerge; they anchor themselves on the spot for an indefinite period; and they only move on to a new "claim" when sheer want of food or *force majeure* compels them. The winged members are an exception: *they* are founders of new colonies, and are now on their way to some undiscovered Tasmania.

And, indeed, as we shall see, these stick-in-the-mud creatures have yet, in the lump, a most eventful history—a history fraught with strange loves, with hairbreadth escapes, with remorseless foes, with almost incredible episodes. They have enemies enough to satisfy Mr. Rider Haggard or the British schoolboy. If you look at No. 2, you will see the first stage in the Seven Ages of a rose-aphis family. The cycle of their life begins in autumn, with the annual laying of the winter eggs; these eggs are carefully deposited on the leaf-buds of some rose-bush, by a perfect wingless female, at the first approach of the cold weather. I say a perfect wingless female, because, as I shall explain hereafter, most aphides (and especially all the summer crops or generations that appear with such miraculous rapidity on our roses and fruit-trees) are poor fatherless creatures; waifs and strays, not born in the usual way from a male and female parent, but budded out vegetatively like the shoots of a plant from an unwedded mother.



NO. 2.—WORN-OUT MOTHER—LAYING HER LAST EGG.

About this strange retrogressive mode of reproduction, however, I shall have more to tell you in due time by-and-by; for the present, we will confine ourselves to the immediate history of the autumn brood, which is regularly produced in the legitimate fashion, as the result of an ordinary insect marriage between perfectly developed males and females. As October approaches, a special generation of such perfect males and females is produced by the unwedded summer green-flies; and the females of this brood, specially told off for the purpose, lay the winter eggs, which are destined to carry on the life of the species across the colder months, when no fresh shoots for food and drink are to be found in the frozen fields or gardens.

The eggs, so to speak, must be regarded as a kind of deferred brood, to bridge over the chilly time when living aphides cannot obtain a livelihood in the open. In No. 2 we see, above, a rose-twig with its leaf-buds, which are undeveloped leaves, inclosed in warm coverings, and similarly intended to bridge over the winter on behalf of the rose-bush. On this twig, then, we have the winter eggs of the aphis, mere dots represented in their natural size; they are providently laid on the bud, which in early spring will grow out into a shoot, and thus supply food at once for the young green-flies as they hatch and develop. So beautifully does Nature in her wisdom take care that blight in due season shall never be wanting to our Marshal Niels and our Gloires de Dijon!

In the same sketch, too, we have, below, a pathetic illustration, greatly magnified, of the poor old worn-out mother, a martyr to maternity, laying her last egg in the crannies of the bud she has chosen. I say "a martyr to maternity" in solemn earnest. You will observe that she is a shrivelled and haggard specimen of over-burdened motherhood. The duties of her station have clearly been too much for her. The reason is that she literally uses herself up in the production of offspring; which is not surprising, if you consider the relative size of egg and egg-layer. When this model mother began to lay, I can assure you she was fat and well-favoured, as attractive a young green-fly as you would be likely to come across in a day's march on the surface of a rose-twig. But once she sets to work, she lays big eggs with a will (big, that is to say, compared with her own size), till she has used up all her soft

internal material; and when she has finished, she dies—or, rather, she ceases to be; for there is nothing left of her but a dried and shrivelled skin, a mere mummified form or withered external skeleton.

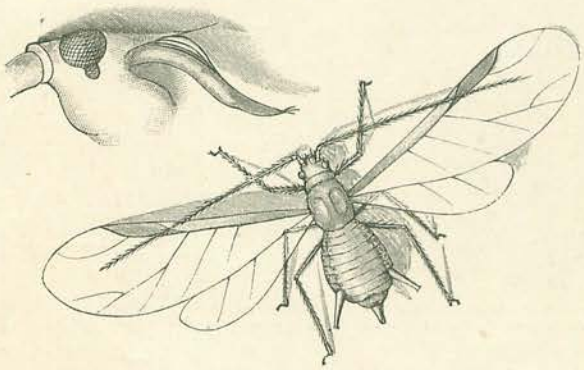
During the winter, indeed—in cold climates at least—the race of aphides dies out altogether for the time being, or only protracts an artificial existence in the heated air of green-houses and drawing-rooms. The species is represented at such dormant periods by the fertilized eggs alone, which lie snug among the folds or scales of the buds till March or April comes back again to wake them. Then, with the first genial weather, the eggs hatch out, and a joyous new brood of aphides emerges. And here comes in one of the greatest wonders: for these summer broods do not consist, like their parents in autumn, of males and females, but of imperfect mothers—all mothers alike, all brotherless sisters, and all budding out young as fast as they can go, without the trouble and expense of a father. They put forth their progeny as a tree puts forth leaves, by mere division. The new broods thus produced are budded out tail first, as shown in No. 3, so that all the members of the family stand with their heads in the same direction, the mother moving on as her offspring increases; and, since each new aphis instantly begins to fix its proboscis into the soft leaf-tissue, and in turn to bud out other broods of its own, you need not wonder that your favourite roses are so quickly covered with a close layer of blight in genial weather.

To say the truth, the rate of increase in aphides is so incredibly rapid that one dare hardly mention it without seeming to exaggerate. A single industrious little green-fly, which devotes itself with a quiet mind to eating and reproduction, may easily within its own lifetime become the ancestor of some billions of great-grandchildren. It is not difficult to see why this should be so. The original parent buds out little ones from its own substance at a prodigious rate; and each of these juniors, reaching maturity at a bound, begins at once to bud out others in turn, so that as long as food and fine weather remain the population increases in an almost unthinkable ratio. Of course, it is the extreme abundance of food and the ease of living that result in this extraordinary rate of fertility; the race has no Malthus to keep it in check—each aphis need only plunge its beak into the rose-shoots or leaves and suck; it can get enough food without the slightest trouble to maintain itself and a numerous progeny. It does not move about recklessly, or use up material in any excessive intellectual effort; all it eats goes at once to the production of more and more aphides in rapid succession. The plant in reality does all the work for it: the aphis just sits with its sucker plunged in a reservoir of sap, and lazily absorbs the manufactured food-stuffs.

Many things, however, conspire to show that aphides did not always lead so slothful a life: they are creatures with a past, the unworthy descendants of higher insects, which have degenerated to this level through the excessive abundance of their food, and through their adoption of what is practically a parasitic habit. When life is too easy, men and insects invariably degenerate: struggle is good for us. One of these little indications of a higher past Mr. Enock has given us in the upper part of sketch No. 3. For the members of the spring brood, hatched out of the winter eggs, and produced in the ordinary way of insect life by a father and mother, go through the regular stages of grub and chrysalis, like any other flies; or, if you wish to be accurately scientific, pass through the usual forms of larva and pupa, before they reach the full adult condition. This, of course, shows them to be the descendants of higher insects which underwent the common metamorphosis of their kind. But the budded-out, fatherless broods which follow them in summer are produced ready-made, so to speak, without the necessity for passing through larval or infantile stages. They are never grubs; they

NO. 3.—BUDDING MOTHER—PRODUCING A FATHERLESS BROOD.

are born fully formed, and proceed forthwith to moor themselves, to feed, and to bud out fresh generations, without sensible interval. In No. 3 we have various stages in the development of the spring brood. Above we see the pupa, or chrysalis, produced from a grub (not very grub-like in shape), which has sprung from an egg; and on the right, below, we see the shrivelled larval skin from which it has just freed itself. This particular aphis was thus born as a six-legged grub or larva from an autumn egg; it passes through the intermediate form of a pupa, or chrysalis; and it will finally develop into a winged "viviparous" female, such as you see in No. 4 below, putting out its young alive



NO. 4.—WINGED FEMALE—THE FOUNDRESS OF A COLONY.

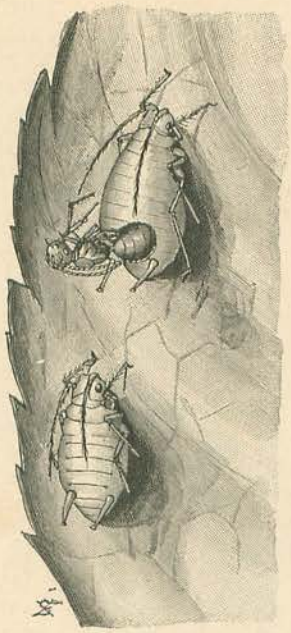
as fast as ever its wee body can bud them. You may observe, however, that in the case of aphides there is no great difference of form between the three successive stages.

In No. 4, again, we have a portrait from life of such a *winged* female, the mother of a numerous fatherless progeny: for both winged and wingless forms are produced through the summer. She is round and well-fed, as becomes a matron. Observe in particular the curious pair of tubes on the last few rings of her back; these are the organs for secreting nectar or *honey-dew*, a point about which I shall have a good deal more to say presently. A winged female like this may fly away to another rose-bush to become the foundress of a distant colony. The same illustration also shows, in a greatly enlarged form, her beak or sucking apparatus, which consists of four sharp lancet-like siphons, inclosed in a protective sheath or proboscis, and admirably adapted both for piercing the rose-twig and for draining the juices of your choicest crimson ramblers. The aphis sticks in the point as if it were a needle, and then sucks away vigorously at the rose-tree's life-blood. You can watch her so any day with a common small magnifier, and see how, like the lady at Mr. Stiggins' tea meeting, she "swells wisibly" in the process. Indeed, aphides are always beautiful objects for the microscope or pocket lens, with their pale, transparent green bodies, their bright black eyes, their jointed hairy legs, their delicate feelers, and their marvellous honey-tubes; and it will not be my fault if you still continue to regard them as nothing more than the "nasty blight" that destroys your roses.

Do not for a moment suppose, however, that you and your gardener, with his spray and his tobacco-water, are the only enemies the rose-aphis possesses. The name of her foes is legion. She is devoured alive, from without and from within, by a ceaseless horde of aggressive belligerents. The most destructive of these enemies are no doubt the lady-birds, which, both in their larval and their winged forms, live almost entirely on various kinds of green-fly. This practical fact in natural history is well known to hop-growers, for the dreaded "fly" on hops is an aphis; its abundance or otherwise governs the hop market, and Kentish farmers are keenly aware that a certain particular lady-bird eats the "fly" by millions, on which account they protect and foster the lady-bird, thus leaving the two insects, the parasite and the carnivore, to fight it out in their own way between them.

But No. 5 introduces us to a still more insidious though less dangerous foe: an internal parasite which lays its eggs inside the body of the bud-producing female. There the grub hatches out, and proceeds to eat up its unwilling hostess, alive, *from within*. In the sketch, we have an illustration, below, of an aphis which has thus been compelled to take in a stranger to board and lodge in her stomach; while the top figure shows you how the lodger, after eating his hostess out, eats himself out into the open air through her empty skin. If you look out closely for such haunted green-flies, inhabited by a parasite —most often an inchneumon fly—you will find them in abundance on the twigs of rose-bushes. They have a peculiar swollen, quiescent look, and a brownish colour.

No. 6 shows us another such fierce enemy at work. This formidable insect tiger is the larva of the wasp-fly; he is a savage carnivore, who moors himself by his tail end, stretches out to his full length, and swoops down upon his unsuspecting prey from above; and, being blessed with a good appetite, he can get rid of no fewer than 120 aphides in an hour. As he probably eats all day, with little intermission for rest and digestion, this gives a grand total of about 15,000 or 16,000 victims at a sitting. However, the remaining aphides go on budding away as fast as ever to make up the deficiency, so the loss to the race is by no means irreparable. "*Il n'y a pas d'homme nécessaire*," Napoleon used to say: and the principle is even more true as applied to green-flies. If a few millions die, their place is soon filled again.

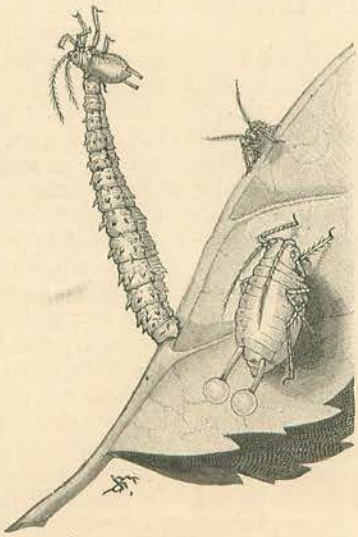


NO. 5.—UNNATURAL LODGER EATS HIS HOSTESS OUT OF HER SKIN.

Look once more at No. 6, and you will see that while the tiger-like enemy is engaged in hoisting and devouring one unfortunate aphis, its neighbour below, heedless of the tragedy, is quietly engaged in blowing off honey-dew.

This blowing-off of honey-dew leads me on direct to the very heart of my subject; for it is as manufacturers of honey-dew and as cows to the ants that aphides base their chief claim to attention. If they did not produce this Turkish delight of the insect world, nobody would have troubled to study them so closely. Let us go on to see, then, what is the origin and meaning of this curious and almost unique secretion.

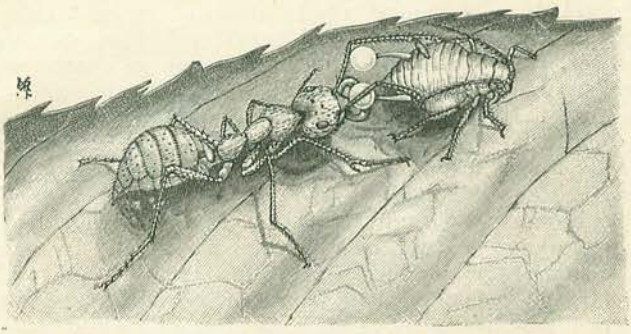
If you examine the leaves of a lime-tree or a rose-bush in warm summer weather, you will find them covered all over with a soft, sticky substance, sweet to the taste, and spread in a thin layer upon the surface of the foliage. This sweet stuff is honey-dew, and it is manufactured solely by various kinds of aphides, without whose trade-mark none other is genuine. Why do they make it? Not, you may be sure, out of pure unselfish moral desire to benefit the ants and other beasts that like it. In the animal world, nothing for nothing is the principle of conduct. The true secret of the origin of honey-dew appears to be this. Aphides live entirely off a light diet of vegetable juices; now, these juices are rich in compounds of hydrogen and carbon, especially sugar (or, rather, to be strictly scientific, glucose), but are relatively deficient in nitrogenous materials, which last are needed as producers of movement by all animals, however sluggish. In order, therefore, to procure enough nitrogenous matter for its simple needs, your aphis is obliged to eat its way through a quite superfluous amount of sweets, or of sugar-forming substances. It is almost as though we ourselves had to swallow daily a barrel of treacle, so as to reach at the bottom an ounce of beefsteak. To get rid of this surplus of sugar (or, rather, undigested glucose), almost all aphides (for they are a large family, with many separate kinds) have acquired a pair of peculiar organs, known as honey-tubes, on the backs of their bodies. Sometimes, when distended with superfluous food, they simply blow out the honey-dew secreted by these tubes on to the leaves below them.



NO. 6.—TRAGIC ENEMY WHO DEVOURS 120 PER HOUR.

The aphis in No. 6 is represented at the moment when it is thus ridding itself of its excessive sweetness. But honey-dew is sticky, and

apt to get in the way; it may clog one's legs, or interfere with one's proboscis: so the aphides prefer as a rule to retain it prudently till some friendly animal, with a taste for sweets, steps in to relieve them of the unpleasant tension. The animal which especially performs this kind office for the rose-aphis is the garden ant; and No. 7 represents such an ant in the very act of tapping and caressing



NO. 7.—AN ANT MILKING A ROSE-APHIS OF ITS HONEY-DEW.

an aphis with its feelers, in order to make her yield up on demand her store of honey. The process is ordinarily described as "milking."

You must understand, of course, that neither aphis nor ant is actuated by purely philanthropic considerations; this is a case of mutual accommodation. The aphis wants to get rid of a troublesome waste product which is apt to clog it. The ant wants to secure that waste product as a valuable food-stuff. Hence, from all time, an offensive and defensive alliance of the profoundest type has been mutually struck up between ants and aphides. How far this alliance has gone is truly wonderful. The ants not merely "milk" the aphides, but actually collect them together in herds and keep them in parks as domestic animals. Nay, more; as Sir John Lubbock has pointed out, different kinds of ants domesticate different breeds of aphides, as each is suited to the other's conditions. The common black garden ant attends chiefly to the aphides which frequent twigs and leaves, such as this very rose-aphis —for the black ant is a rover and a good tree-climber; he is much given to exploring expeditions over the surface of plants in search of honey, and he is not particular whether he happens to gather it from flowers or from insects. The brown ant, on the other hand, goes in rather for such species of aphides as frequent the crannies in the bark of trees; while the little yellow ant, an almost subterranean race, living underground among the grass roots in meadows, "keeps flocks and herds" (says Lubbock) "of the root-feeding aphides." All these facts you can verify for yourself with very little trouble in any English village.

It is most interesting to watch a black ant on the prowl after honey-dew. He is evidently led on to the herd by smell, for he mounts the stem where the aphides live in a business-like way, and goes straight to the point, as if he knew what he was after. When he finds an aphis that looks likely, he strokes and caresses her gently with his antennæ (as you see in the sketch), coaxing her to yield up the coveted nectar. The aphis, on her side, glad to receive his polite attentions, and accustomed to the signal, exudes a clear drop of her surplus sweet, which the ant licks up with its jaws greedily. But ants do much more than this in the way of aiding and protecting their "cows." They really appropriate them. Often they build, with mud, covered ways or galleries up to their particular herds, and erect earthen cowsheds above them; they also fight in defence of their flocks, as a Zulu will fight for his oxen, or an Arab for his camels. Their foresight is almost human: for when the winter eggs are laid, the ants will transport them into their nest, to keep them safe against frost; and when summer comes again, they will carry them out with care, and place them in the sun to hatch on the proper food-plant. Could man himself show greater prudence and forethought than these mites of herdsmen?

"The eggs," says Sir John Lubbock, "are laid early in October on the food-plant of the insect. They are of no direct use to the ants; yet they are not left where they are laid, exposed to the severity of the weather and to innumerable dangers, but brought into the nests, and tended with the utmost care through the long winter months till the following March"; when they are brought out again and placed on their special food-plant.

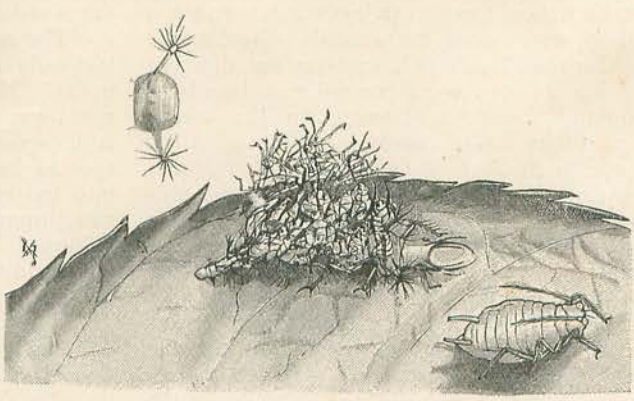
Lubbock even notes that ants have domesticated a far larger variety of other animals than we ourselves have. Our list includes at best the horse, the dog, the cat,

the cow, the camel, the sheep, the llama, the alpaca, the goat, the hen, the duck, the goose, the bee, the silkworm, and a dozen or so others; while ants have domesticated no fewer than 584 different kinds of crustaceans and insects, including beetles, flies, and mites, some of which have lived for so many generations in the dark galleries of the ant-hills that they have become totally blind, as happens almost always, in the long run, with underground animals.

During the live-long summer the aphides go on, eating and drinking, though not indeed marrying or giving in marriage, but budding out new broods with inexhaustible fertility. They settle down calmly on the spot where they were born, they stick to it for life, and they seldom move away from their native twig unless somebody pushes them, for though they have legs, they do not care to use them except on extreme provocation. But when autumn arrives, "a strange thing happens." Broods of perfect winged males and wingless females are then produced; and the males of these, like almost all other insects, take a marriage flight, find their predestined mates, and become with them the parents of the dormant eggs which outlive the year, and carry on the race to the succeeding summer. While warm weather lasts, few or no males are budded out; it is only when cold threatens to destroy the entire colony that little husbands are born, so as to give rise to eggs which may bridge over the gulf between summer and summer. If you keep the insects warm, however, and supply them with abundant food (as in a conservatory), they will go on producing imperfect females and fatherless broods, without intermission, for many years together. The egg-laying generation is thus shown to be merely a device for meeting the adverse chances of winter; the budding process suffices well enough, as long as warmth and food render the possibility of freezing or starvation unimportant.

On the other hand, the eggs and the brood born from them revert to the earlier habit of the race, when it was still an active, free-flying type, before it had been demoralized by acquiring its sedentary, parasitic habits. They hatch out into active little six-footed, or six-legged, grubs, which again give rise to very similar chrysalis forms, and finally develop into the "viviparous" or budding females. From this we can readily infer that only too great ease of living brought about the existing degeneracy of the race. Indeed, whenever a species earns its livelihood with too little exertion, it invariably degenerates, and often grows small, unintelligent, and vastly prolific; for superior races have relatively small families, while inferior races reproduce by the million. The mites which infest cheese and other food-stuffs are an exactly analogous case to that of the aphides, for they are degenerate spiders, grown small and prolific through the excessive ease of life afforded them by always settling in a cheese, all ready-made food for them, without the trouble or exertion of hunting.

Creatures which reproduce at such a rate, however, invariably pay the penalty for their rapid increase by an equally rapid and enormous death-rate; were it otherwise, the offspring of a single pair of codfish (with their million eggs) would soon turn the sea into one solid mass of cod; while the descendants of a single viviparous aphis would cover the earth with a 10ft. thick layer of teeming green-flies. However, Nature has remedies in store for them. Storms of rain and hail kill myriads of aphides; sudden changes of weather wilt them and nip them up; innumerable enemies make an honest livelihood out of them. Another of these ubiquitous foes is graphically represented in No. 8—the grub of the lace-wing fly, a sort of insect old-clothes man, which covers its back with the cast-off skins of its discarded victims. This is a clever device to enable it to escape observation. The larva, which is a fat and juicy morsel, catches aphides wholesale, and sucks their life-blood; when



NO. 8.—COMIC ENEMY WHO POSES AS OLD-CLOTHES MAN.

he has drained them dry, he hoists up their skins on to his back with his jaws, by way of overcoat. Then the hooks or spines on his back (shown above) hold them in place for a time, while the larva bends over and spins a few threads of web across them, to weave them into a neat and compact garment. Thus securely clad, he is hidden from view: he looks much like a twig covered with aphides, and avoids to some extent the too pressing attentions of his own enemies. Observe in this sketch the characteristic unconcern of the aphis who is destined to be his next victim.

Birds also destroy large numbers of aphides. You can see them picking them off in the bean-fields in summer.

It is lucky for us that these insect pests have so abundant a supply of natural enemies; for man, by himself, is almost powerless against them. Strange to say, and paradoxical as it sounds, it is the smallest enemies that we always find most difficult to extirpate. Lions and tigers we can kill off without difficulty; they can be shot and exterminated. Wolves and hyenas give us a little more trouble; while against rabbits, our resources are taxed to the utmost. A plague of rats and mice, or of tiny field-voles, can hardly be combated with any hope of success; while locusts and Colorado beetles devastate our crops with practical impunity.

When it comes to aphides, we are quite unable to cope with the infinite numbers of our infinitesimal foes; and if we take the microscopic creatures which cause cholera, typhoid fever, and other zymotic diseases, we may keep out of their way, it is true, or may isolate the objects in which they breed and store their germs, but we are practically without means to kill or hurt them. The larger the foe, the more easily is he met; the smaller our enemy, the more difficult is he to extirpate. We killed off the American buffalo (or bison) in a single generation; a thousand years would probably fail to kill off the insignificant little aphides that infest our roses.

In the case of one member of the family at least, the experiment has been tried on a gigantic scale in France, and as yet with comparatively small results. For the dreaded phylloxera which attacks the vines is, in fact, an aphis; and though immense rewards have been offered by the French Assembly for any good remedy against phylloxera, the only successful plan as yet proposed has been that of planting healthier and sturdier American vines, which resist the little beast a good deal better than the effete and worn-out European species. But many other members of the family wage war with distinguished success against the British farmer. The little black "colliers" which attack our bean crops are a species of aphis; so are the "blight" of apple-trees, the "fly" on turnips, and the most familiar parasites of the hop, the cabbage, the pear, and the potato. It is well for us, therefore, that the aphides have roused against them so many natural enemies among the birds and insects, or our crops would be destroyed by their persistent efforts. The ichneumon-flies alone kill their millions yearly; and the lady-birds well deserve their popular esteem for the good they do in keeping down the ever-increasing numbers of these voracious insects.

Yet, mischievous as they are, the tiny green aphides are well deserving of study both for their personal beauty and their singular life-history. Everybody can observe them, because they are practically everywhere. If you have a garden, they swarm on every bush. If you grow flowers in your window, they live in every pot. If you content yourself with an occasional bunch of roses or geraniums, you will find them, if you look, sucking away contentedly on the leaves of the rosebuds. Even in London parks or squares you may watch the industrious ants creeping slowly up the stems to milk their wee green cows; you may see with the naked eye, or still better with a pocket lens, the grateful aphis exude a tiny drop of limpid honey from its translucent tubes, and the ant lick it up with unmistakable gusto. So here, under our eyes, in every part of England, we may behold this quaint little drama in real life taking place, so familiar that it hardly attracts our attention, yet so marvellous that we scarce can credit it when we first behold it. Go out into the parks or gardens and examine it for yourself; for every one of the facts I have mentioned in this paper can be verified with ease (if only you have patience) in fields or meadows in all parts of Europe.