

A LITTLE FRIEND OF THE ROSE.*

BY S. FRANK AARON.

The flower-loving insects are all friends in need; but the unhonevied flowers also have their insect friends, not agents of fertilization only, but protectors and champions that fight the battles of those that must depend on the flower stems and leaves and buds to survive. But though the flowers are voiceless, they tell us with none the less eloquence what their enemies are and how they suffer by them. Ask the rose. The withered, skeletoned leaves proclaim the enmity of the saw-fly slug; eaten leaves and others folded over tell of the larvæ of the golden-winged tortricid moth; while cankerous, eaten buds and flowers denounce the rose bug, the aphides, that crowd the green stems and leaves of the newer growth and swarm all over the tender buds.

Annihilate the aphides upon a dozen stems of a thrifty bush and keep others off; then let a dozen others go full of the lice, and watch results. The number and the beauty of the blossoms will be the answer. Now, Nature generally makes a wise effort to strike a proper balance, and though we have heard this denied concerning the potato beetle, yet it is true, more or less. Thus she has furnished several antidotes for the aphid; if she did not, the little pests would become a nuisance indeed, past all calculation. This salutary purpose is effected by the several larvæ of the syrphus fly, the lace-winged fly, the ladybug and a number of very small Hymenopterous parasites. Of these latter the most interesting and the most common



LITTLE FRIENDS OF THE ROSE AT WORK AMONG A HERD OF PLANT LICE.

Any one carefully and frequently inspecting the rose bushes and the aphides gathered on the green and tender new growth may see enacted the small tragedies between the parasite fly and its victims.

is the pretty little fly known to the scientists as Praon, which may be called the cocoon-making parasite of the aphid. Any one with sharp eyes may discover this little friend of the rose at work, and may follow, with a little care, its complete life history.

At the time when the plant lice are thickest a small insect resembling a miniature wasp, or an ichneumon fly, which it really is, may be seen making its way among the fat aphides, moving leisurely and with a dignity quite beyond its size, for it usually is not longer than an eighth of an inch. It approaches one of the larger aphides and touches it with its antennæ as a means of certain identification, scent far outranking sight in such matters among insects. If this were an ant the aphid would respond with a liberal supply of the coveted honeydew, but knowing friends from foes it now slings its body from side to side, quite violently indeed for such a lethargic creature, and the little fly is pushed aside. Not liking this it moves on to another or smaller aphid with a less vigorous movement, or pausing a moment attacks the same aphid again, with perhaps better results. Choosing its position deliberately and carefully, with its slender, stiltlike legs lifting it high, it widely straddles its victim, its fore legs often resting on the aphid's back, its slender body and long antennæ much jostled by the agitated plant louse. But now the fly is not to be dislodged. Its keen, swordlike ovipositor protrudes from its sheath, and in a moment is thrust deep into the

back of the plant louse, and is held for just another moment, until an egg, so tiny as to pass through the slender organ, is deposited into the very interior anatomy of the rose pest. Then withdrawing, the fly straddles off and proceeds at once to convert another aphid into an incubator, and so on, until no doubt the egg supply, perhaps fifty or more, becomes exhausted.

Of course the aphid so treated does not die at once, else Nature's plan would miscarry. It lives and goes on feeding and maintaining the same stiff and seemingly contented attitude for a little while. Meantime the egg hatches a minute, white, maggot-like larva, and this at once begins feeding on the soft muscular tissues of its host. Some little time is required for the larva to complete its growth—five or six days during very warm weather, longer when it is cool. With an instinct that has ever been a marvel to the naturalist the little larva does not touch the digestive organs, the vascular system or the more important nerves for a period, thus permitting the aphid to live and feed until the appetite and growth of the parasite warrant it to eat all before it. Then the aphid dies, of course, and rapidly becomes only an outer skin, with head and legs attached.

For some strange reason the aphid, not long before dying, forsakes its place among its fellows. As if ostracized for its condition, although its disease is hardly catching, it crawls away to one of the larger leaves, fastens upon it in exile and thus remains. It is obvious that this benefits the parasite; the aphid here is far less apt to be found and attacked by numerous other enemies that would endanger the life of its guest. But what can influence it? It departs from its habit, for it is altogether social and non-migratory. It removes to a less desirable pasture ground. Normally, if dislodged from the stem and falling on the leaves it crawls back as fast as its indolent legs permit to the stem again.

The parasite is alone benefited, but it is out of the world, so to speak; it can not get at its host's locomotory appendages; it is a legless, eyeless creature that at best would make a poor guide if it should get out and take the lead. But the little thing, as unintelligent as it looks, maggot-like, has perhaps a mind of its own, as we have seen. The habit is almost invariable; the victims crawl from their usual places and position themselves on the leaves. Out of seventy-one parasitized plant lice I found two on the stem and one on the tip end of a thorn, as if it thought a leaf ought to grow out there, but that was too far gone to search elsewhere.

Upon attaining its growth the parasite larva cuts open the aphid skin underneath and squirms part way out, so as to have full swing with its head end. Then it begins the construction of its cocoon, made, as with most insects, of its saliva, and eventually becoming, after a few hours' work, a silken, parchment-like, bulging, tent-shaped affair, upon which the now shrunken and distorted skin of the aphid rests as on a pedestal. The parasite enters the completed cocoon and becomes an inactive pupa or chrysalis, and in a few days thereafter, if it is warm, the perfect insect, the tiny fly, emerges and takes wing to work more mischief among the rose pests. The illustrations fully elucidate the facts set forth in the text. They present a wonderful insight into a small natural force, not the less masterful because of its mimic scale.

Two Valuable Inventions.

Two apparently valuable innovations are now being put on the market in Italy, the first of which seems to be highly suitable for use on board submarines. The Italian Health Society (Societa d'Igiene Italiana) is now exhibiting at the offices of the Federation of the Technical and Scientific Societies an apparatus which has just been patented in Italy, France, and Germany, and to which the inventor (Signor Bertini) has given the diverting name of the "Bertini noseroscope," or bad air detective.

Besides being a veritable indicator of the presence of foul and noxious air and vapors in general, this apparatus is likewise intended to prevent the occurrence of accidents due to the presence of dangerous and inflammable gases which might, during the night or unperceived at daytime, escape into rooms and compartments from stoves, cooking ranges, pipes, and the like, or accumulate in any other way due to stoppage of normal draft. When the pressure in the inner chamber of a stove, range, etc., is less than that of the external atmosphere, the gas or vapor cannot escape because a good draft is induced, whereby the combustion of the gases or their removal via the proper channels of escape is assured. To obtain a perfect draft and proper combustion, so as to prevent all noxious effluvia and gases from escaping into inclosed spaces and thus causing danger to health and life, it is thus essential that there should always be a slight

depression in the pressure prevailing in the combustion chamber. The duty of the noseroscope is to call attention at once to any stoppage or abnormality in this inner depression, an alarm bell being set ringing, which will not stop till the proper pressure has been restored.

The second invention is also one of special interest

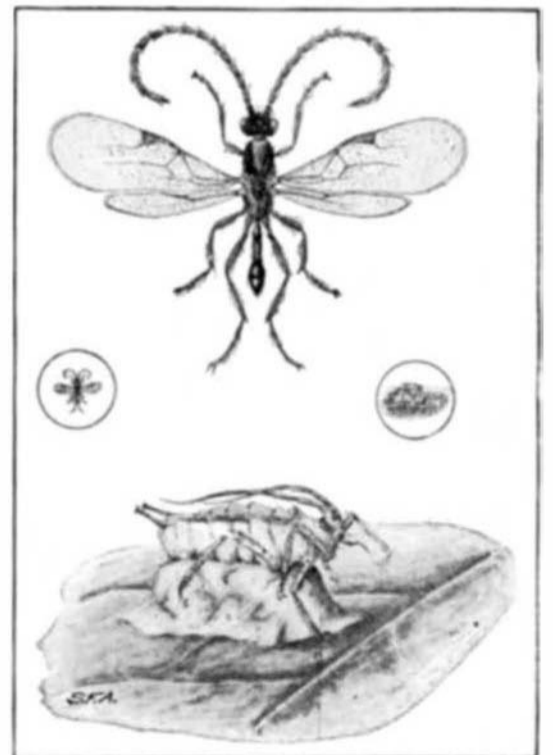


MINIATURE PIG STICKING, AS SEEN THROUGH MAGNIFYING GLASS.

The fly of the rose aphid parasite stinging and laying its egg in the body of a rose aphid. The plump little plant lice look like hybrids between a verdant goat and a green pig and they get about much like overfat swine. Their inactivity permits them to be readily attacked, and their only attempt at defense is in wagging their bodies from side to side, which sometimes for a moment disconcerts the parasite fly.

to all concerned in matters naval. At the oil and grease works of Messrs. E. Follzer & Cia., at Rivarolo (Liguria, Italy), trials are now being made with a new apparatus for the re-utilization of the oils used for lubricating marine engines; the inventors are two Italian engineers, Signori G. B. Bibolini and G. Baulini. The experiments are being carried out under the auspices of several well-known technical men, including engineers Varella and Jorge Howard, both members of the Mexican commission appointed to superintend the construction of the big transport "Progresso," which is now being built for the Mexican government by the Odero shipyards at Sestri Ponente.

The apparatus now being tested is intended for use on board one of the steamers belonging to the Italian General Navigation Company; it is extremely simple and automatic in action, while its value may be seen from the fact that it recuperates 70 per cent of the oil which has hitherto been wasted. Despite this it permits of more liberal lubrication of the engines, thus insuring their more perfect and continuous running. This new invention is perhaps called to meet with great success in its application on board of ships, steamers, battleships, *et hoc genus omne*, both at home and abroad.



THE PARASITE OF THE ROSE APHID, MUCH MAGNIFIED

The upper figure is the fly as seen from above; the colors, black, rufous red and yellow, have almost a metallic luster, and the delicate, transparent wings reflect a beautiful iridescence. The lower figure is the cocoon of the parasite beneath the dead, dried and distorted shell of a plant louse, the insides of which have been eaten by the parasite larva while attaining its growth, after which it makes the cocoon. The little figures in the circles indicate the natural size.

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