

Mind and Body of the Ants

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PARTS AND PASSIONS OF TINY THINGS.

Lubbock remarks that ants are very cleanly animals, and assist one another in this respect. He says he has often seen them licking one another, and that those which he painted for facility of recognition were gradually cleaned by their friends. Some of them seem to play—to have certain amusements or sportive exercises. Huber noticed on the surface of some ant hills individuals that raised themselves on their hind legs, caressed one another with their antennae, engaged in mock combats and almost seemed to be playing hide-and-seek. As already shown, some kinds make regular roads, chiefly by the removal of obstacles, and others arch their roadways over with earth. Their personal industry compares favorably with that exhibited in their community life.

Dainty Little Folk.

If you watch closely, you will find that ants are among the daintiest of living creatures. They keep their bodies scrupulously clean. Though they al-

times naked (for some larvae do not spin) and sometimes covered with a silken cocoon. The older ants finally help to extricate the younger from these coverings, "carefully unfolding their legs and smoothing out the wings with truly feminine tenderness and delicacy." The larval stage is the period of growth; the chrysalis period is the time of internal change; the adult period the time of work. The males usually die after the marriage flight, but sometimes live through the winter.

The Ant's Limbs and Body.

The body of ants consists of three parts: The head, which bears the principal organs of sense; the thorax, which supports the legs and also the wings, when the latter are present, and the abdomen.

Of the organs borne by the head, the antennae are the most important. They consist of a short spherical basal piece, a long shaft known as the scape, and a flagellum, usually of from ten to thirty segments. The antennae are large

strong jaws, corresponding in function to the claws of the lobster. They work mainly with their heads, but male and female ants have small heads, for they do not dig tunnels or drag heavy weights. They have bodies with large middle segments, because these have to work the wings, while the wingless workers have the middle segment small. The thorax has three divisions: prothorax, mesothorax and metathorax. It bears three spiracles, or breathing pores, and three pairs of legs, each consisting of a femur, trochanter, femur, tibia and tarsus, the latter composed of five segments and terminating in a pair of strong claws.

The males and females have each two pairs of wings, which they strip off after the marriage flight. The workers have no wings.

The abdomen has six segments in queens and workers, and seven in males.

Are Ants Intelligent?

From all that has preceded and from similar material, we indeed learn that the community life of ants is perfect—their social organization is much better as a working machine than the organized social life of the most civilized human societies. In the perfect republic of the ant world, each works for the general good, and is ready to sacrifice himself at any time for the good of all. Some have therefore concluded that the intelligence of ants must be very great, and Darwin supposed that the brain of any of these creatures must be the most wonderful atom of matter in the world. But is this the necessary conclusion? Is it even probably true? The best naturalists seem now inclined to believe that the stupidity of ants is more noticeable than their exhibitions of apparent intelligence, and that the vast inferences as to ant knowledge drawn from instinctive actions are unwarranted. Thus the German writer Betho declines to be-

lieve that anything highly psychical has yet been proved about the ants. "They learn nothing," he says, "but act mechanically in whatever they do, their complicated reflexes being set off by simple physiological stimuli." All we know about them is that they are influenced by light. Mark Twain, years before, in his "Tramp Abroad," came to a similar conclusion. Note what he saw of an ant: "During many summers I have watched him, when I ought to have been in better business, and I have not yet come across a living ant that seemed to have any more sense than a dead one. . . . He goes out foraging, he makes a capture, and then what does he do? Go home? No; he goes anywhere but home. He doesn't know where home is. His home may be only three feet away,—no matter, he can't find it. He makes his capture as I have said; it is generally something which can be no sort of use to himself or anybody else; it is usually seven times bigger than it ought to be; he hunts out the awkwardest place to take hold of it; he lifts it bodily into the air by main force, and starts; not toward home, but in the opposite direction; not calmly and wisely, but with a frantic haste which is wasteful of his strength; he fetches up against a pebble, and instead of going around it he climbs over it backwards dragging his booty after him; tumbles down on the other side, jumps up in a passion, kicks the dust off his clothes, moistens his hands, grabs his property victoriously, yanks it this way, then that, shoves it ahead of him for a moment, turns tail and lugs it after him a moment, gets madder, then presently hoists it into the air and goes tearing away in an entirely new direction; comes to a weed; it never occurs to him to go around it, he must climb it; and he does climb it, dragging his worthless booty to the top—which is as bright a thing to do as it would be for me to carry a sack of flour from Heidelberg to Paris by way of Strasburg steeple; when he gets up there he finds that is not the place; takes a cursory glance at the scenery and either climbs down again or tumbles down, and starts off again—as usual in a new direction. At the end of half an hour he fetches up within six inches of the place he started from and lays his burden down." After

continuing this charmingly aimless work for some time and meeting another ant and fighting him about nothing, "each starts off in a different direction to see if he can't find an old nail or something else that is heavy enough to afford entertainment and at the same time valueless enough to make an ant want to own it."

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A TOUR THROUGH JAPAN.

Continued from Page 3.

The coolies to coal cars or the locomotive tender. Even in moving dirt in grading for a new track, the coolies rake the dirt into rope baskets and with a pole two men carry a large basket full to the dumping place, or one man suspends two small baskets on the ends of a pole over his shoulders. Such primitive methods of doing large pieces of work which we see on every hand, on railways, in factories, and on farms, are the most striking examples of adherence to ancient customs by a people that has accepted the methods of modern civilization in so many other respects.

While America has set an excellent example to Japan in the way of railroad conveniences, we do not proceed out of Yokohama or other open port cities before we see other evidences of American influences of which we cannot be so proud. Beautiful landscapes are disfigured by unsightly advertising signs intruding themselves upon our vision like a persistent begging peddler who hangs on entirely regardless of whether we have any interest in his wares. Happy the general public, when the nations that make pretense of being civilized reach that higher plane of civilization to demand that all these disfiguring signs be consigned to one place, and that the burning rubbish heap. May we hope that our sister nation of Japan will come to her senses in time to prevent this outrage being perpetuated throughout the interior of her pretty empire as is now the unfortunate plight of our country.

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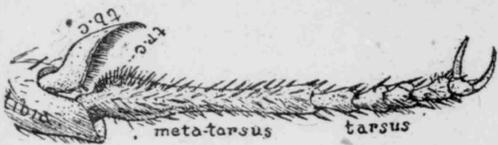
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PART OF AN ANT'S FORE LEG, SHOWING ITS TOILET APPARATUS



ODD TOILET ATTITUDES
Ants cleansing the legs and the stinging organs



TOILET ACCESSORIES OF ANTS (greatly magnified)
a, secondary spur or comb
b, teeth of tibial comb
—Illustrations from McCook.

ways move in the midst of dirt and what appears to us to be mere offal, they take such care of their bodies that their daintiness has become almost proverbial. Their dainty toilet habits are exhibited at almost any time—when they awaken or before going to work, or after eating. The tongue, roughened as if for this purpose, is used as bath sponge and brush. The tibial comb or fespur, on the front pair of legs, has about sixty-five teeth, stiff and elastic, and is deftly fitted into the tarsus opposite, which has about forty-five coarser, scattered teeth. With this and the tongue the fine hair which covers the entire body is combed, brushed and cleaned. The legs themselves are cleaned by being drawn through the saw-toothed mandibles. A saliva takes the place of soap, and the ants are observed shampooing each other, sometimes brushing and massaging, as it were, their comrades from head to foot. All this while the attitude of the cleansed ant is one of intense satisfaction. The ant stretches out her limbs, and, as her friend takes them successively into hand, yields them limp and supple to her manipulation. She rolls slowly over upon her side, even quivers over upon her back, and with all her limbs relaxed presents a perfect picture of muscular surrender and ease.

—McCook. Their gymnastics in combing and cleansing themselves are remarkable. They cling to a spear of grass with one hind or fore leg, meanwhile using brush and comb, antennae, and tongue, with great ingenuity. The tibiae of the second and third pairs of legs have a secondary brush and comb apparatus similar to that on the fore legs; so that the body of the ant, protected in the first place by the fine pubescence that covers it, comes without stain through all its operations in soil and dirt. It leads, after all, a clean and tidy life, as, indeed, is the case with all the burrowing insects.

Let us further examine the body parts of our little friends; for the other organs are scarcely less interesting, at this stage, than are the fine and the coarse toothed combs, the hair brushes and the sponges, of the wash and soap, already mentioned.

The Ant's Life Stages.

We have said that the metamorphosis of the termites is incomplete. That of true ants is complete, and very interesting. The life of an ant is divided into four well marked periods: Those of the egg, of the larva, or grub, of the pupa, or chrysalis, and of the perfect insect, or imago. The eggs are white or yellowish and somewhat elongated; they hatch in from fifteen to thirty days. The larvae are small, white, legless grubs, somewhat conical in form, being narrow toward the head. They are carefully tended and fed, being carried about from chamber to chamber or out into the sunshine by the workers, probably for the sake of requisite heat and moisture. After a month or so, or after living through the winter, they turn into pupae, which are some-

times well developed appendages. They turn in a beautiful ball and socket joint, which enables them to move freely in every direction. Besides being the special organs of smell and feeling, antennae are the organs of speech, or at least, of communication, in ants. Considering the importance of these organs, it is little wonder that the cleanly little ants have a special instrument, like the bees and wasps, for keeping them in order. Near the end of the tibia on the first pair of legs, there is a peculiar combing and brushing apparatus. With this the ants comb, brush and wash themselves and each other, paying particular attention to the precious antennae.

The Mouth Parts.

The mouth parts are the labium, or upper lip; the first pair of jaws, or mandibles; the second pair of jaws, or maxillae, which are provided with a pair of palps, or feelers, and the lower lip, or labrum, also bearing a pair of palps. The mouth parts are formed for biting. The jaws are separate and independent in their action, so that the ant can open or close its jaws without opening or closing its mouth.

The Eyes of Ants.

Blindness, which is almost the condition of the worker ants, is no disadvantage to them. Sight would be of little use to these underground workers. Like all hunting animals, they find their food, as the hound finds the fox, by smell. Since, however, the flying males and females have a use for the sense of sight, they have not lost it, and they can see. The eyes of ants are of two kinds; two large compound ones, and never more than three smaller, simple ones called ocelli. The compound eyes are made up of from a few, occasionally only one, to as many as 1,200 facets in each eye. Some species have no ocelli, others have but one, called the ocellus.

Wings and Waist.

The ants are included in the family Hymenoptera, to which belong also the bees and the wasps. This large order is characterized by the possession of four membranous wings that are mostly without cross veins, the hind wings being the larger pair.

The ants themselves form a family called Formicidae. They may be distinguished from other insects by the forms of the abdomen. Its first segment is very narrow and forms an isthmus, or pedicel, connecting the abdomen with the thorax. The pedicel may consist of two pieces, which rub upon each other and produce sound, whence it is inferred that ants can hear, but their hearing organs have not been located. This isthmus when of two pieces may bear a scale peculiar to the ant family. The thin waist explains that extraordinary flexibility of body which enables ants so freely to bend about and to surmount obstacles with their clumsy ingenuity.

Workers have large heads and

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