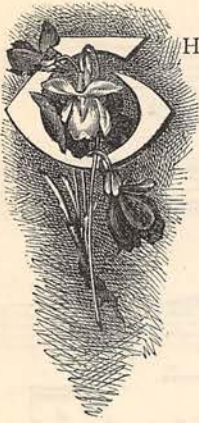


THE WAYS OF THE ANT.



THE Hebrew king's injunction to "consider the ant" has been of late years faithfully obeyed by a multitude of European and American naturalists, but by none more implicitly than Sir John Lubbock, banker, ethnologist, and Member of Parliament. Unlike his predecessors, however, he has not been content to pitch his camp by the side of an ant's nest, and there pick up what facts or apparent facts were possible. On the contrary, he has collected a

sort of insect menagerie, where under strict surveillance the ways of bees and ants may be observed with ease, their humours noted, and their moral and mental qualities subjected to the trying test of experiment. The results are sufficiently interesting to merit the popularity which they have at once obtained, whilst the method adopted has proved so efficient, that if followed by other equally careful students, the sum of our knowledge will in the course of a few years be enormously increased.

Bees have hitherto been regarded as the most remarkable example of insect intelligence—for between intelligence and instinct Sir John Lubbock very properly declines to draw any such hard and fast line as that so arbitrarily interposed by the older writers—but it is questionable if ants do not afford even better objects for study. They are more convenient for experimental purposes, being easily housed, nests and all, under plates of glass placed on a table; and "I think," their enthusiastic historian observes, "they have also more power and flexibility of mind. They are certainly far calmer and less excitable;" though, indeed, there is not much to choose between a hive of enraged bees and an army of those terrible driver ants, before which the most callous of West Africans flee house and home, or the marauding ecitons of South America, whose forays, according to Mr. Bates, set the whole animal world in commotion.

Doubtless, much nonsense has been indited regarding ants, though the reality of their ways actually transcends the fiction of which they have been the heroes. In this country alone we have more than thirty species, but as warmer regions are approached the variety increases, until in the tropics, which form their proper home, more than a thousand different kinds are known; even then, it must not be supposed that anything like the entire number of these curious insects is ascertained, or that we have exhausted the outline of their habits, since almost every species, and certainly every family, have habits of life peculiar to themselves, and in many important respects different from those of their near neighbours. In truth, they are all painfully human. They work and idle, fight and make love, hate their enemies and show a

qualified regard for their friends; build houses more substantial than the average suburban villa, and drive "adits" as well as any engineer, construct bridges across valleys, and even tunnel, like so many Brunels, under broad rivers. They keep cows and milk them; gather in their winter food and stow it in water-tight granaries; are addicted to what in America used to be known as "our peculiar institution," though in truth it is (or was) one of the widest-spread of evil things, and work their willing slaves with systematic mercilessness. Their sense of smell is powerful, and their sight as keen as that of their class generally. But it is doubtful whether they have the power of communicating information to each other; and if they hear, their sense of hearing is different from that of the higher animals, and it is quite possible that they may be able to perceive sounds above or below the range of the human organ. Finally—though this by no means exhausts the curious capabilities of these tiny insects—they seem to have a sense of humour, or at all events, of fun, for they indulge in the antics which for some most inexplicable reason have been called "horse-play," without the most utilitarian mind being able to find any other purpose than a desire of amusing themselves.

A philosopher, according to Hudibras, "did declare, the world was composed of fighting and of love," and at all events that of the ants is largely made up of the former element. As warriors they have no superiors in the animal world, and as strategists and engineers even Moltke and Vauban might bear comparison with them. Each species has a different way of attacking its enemies or its victims, and few of the genera build their habitations in exactly the same manner; and though in one nest there will often be as many as half a million individuals, each little citizen knows every one of its fellow-townsmen, and ignoring all ideas of the "solidarité" of nations, or of free trade, speedily ousts any intruder within his bounds. According to antly notions the stranger's head is the final purpose of the half-brick. When the nest becomes too small for its inhabitants—and sometimes it will extend for a distance of seventy or eighty yards from the entrance—it sends out colonies, and if the emigrants are sufficiently powerful they never hesitate at exterminating any rival species which try to occupy the same area. The ants make roads, and sometimes even, when the nature of the ground renders this advisable, tunnels through which to march to their habitations, their feeding-grounds, and the territory chosen for their hunts and marauding campaigns. In certain cases these subways are merely paths arched over with earth; in other instances they are regularly excavated tunnels, extending often for a considerable distance.

But if the ants make war on other species, and pursue their prey like packs of beagles, they have numerous enemies. If a nest of brown ants, so common in our woods, is disturbed at any time during

the summer, some small flies may probably be seen hovering over it, and every now and then making a dash at some particular ant. These *Phora*—as they are named—lay their eggs on the ants, inside which their maggots live. Mites also attack them, and if they do not eventually kill their victims, they inflict on them, during the period of sharing their involuntary hospitality, the most excruciating torture. Morally—if it is allowable to contrast this with mentally—different species of ants, though closely allied to each other, differ widely. For instance: *Formica fusca*, being pre-eminently a slave ant, is extremely timid, as all serfs are, while *Formica cinerea*, which is nearly connected with it, has a considerable dash of audacity. The horse-ant, another species of the same genus, lacks initiative, and always moves in troops. *Formica pratensis* worries its enemies, which *Formica sanguinea* never does. The slave-making ant (*Formica rufescens*) is perhaps the bravest of all. "If a single individual," Sir John Lubbock remarks, "finds herself surrounded by enemies, she never attempts to fly, as any other ant would, but transfixes her opponents one after another, springing right and left with great agility, till at length she succumbs overpowered with numbers." *Myrmecina scabrinodis* is cowardly and thievish; during wars among the larger species, they haunt the battle-fields and devour the dead. So widely do the different genera differ in temperament, that while one may be greedy, another is notoriously phlegmatic.

The traditional industry of ants has not been exaggerated. They work all day, and in warm weather, if need be, all night. Advocates of the eight hours' movement will be shocked to learn that one ant was seen to toil without any intermission, even for food, from six in the morning till a quarter to ten at night, and that it is nothing uncommon for one of these unwearied little labourers to start to work the moment she is freed from imprisonment, as if impatient at the enforced pause in the tasks of her brief life. Sir John Lubbock confined one under a bottle for a week, but the instant the brave little creature was released she picked up a larva, carried it off to the nest, and after half an hour returned for another, until she had finished the duty in which her gaoler had interrupted her.

But, as we have already said, it is not all work and no play with the ants. They have been noticed engaged in "sports," and scenes observed on certain hill-sides can only be characterised as gymnastic exercises. "The ants raised themselves on their hind legs, caressed one another with their antennæ, engaged in mock combats, and almost seemed to be playing hide and seek." In their habits they are cleanly, for they often lick one another, and those which Sir John painted for facility of recognition were gradually divested of their unwonted coloration by the good offices of their friends. Nor are they without aids in their daily life, apart of course from the slaves which so many of them possess. The green-fly, or *aphis*, which is so familiar on hops and roses, is often termed the ant's cow, and with some

reason too. The aphides exude a sweet juice, known as honey-dew, on which the ants are fond of feeding. It is indeed an advantage for the aphides to have the sticky substance removed from their bodies. When Linnæus styled the aphid the "ants' cow," he devised a name for it more literally true than might be imagined, for the aphides generally retain the honey-dew until the ants are ready to receive it. Then the ants stroke and caress the aphides with their antennæ, until they emit their sweet "milk." Various species of other insects are utilised in the same way, and only lately Mr. H. Edwards, a tragedian, who amuses himself with entomology, and Mr. Mc Cook, a clergyman, who spends his vacations in the same study, have observed ants licking the caterpillars of an American species of butterfly.

After studying these and other equally startling features of ant life, it is certainly hard to deny them the attribute of reason. On the other hand, the slightest variation in the routine-work of some of the species quite throws them out, and renders perfectly helpless the insects which seemed a second before to work with a sagacity almost human. The way they divide the labour of their lives is very remarkable; so is their foresight in hoarding up supplies of food, and appointing foragers to seek it, and store-keepers to distribute it when required. For long it was doubted whether the royal entomologist of Israel was not indulging in an Oriental figure of speech, when he spoke of the ant storing up grain. But we now know that in various parts of the world there are villages of agricultural ants who follow this prescient practice. Still more astonishing is the fact, for fact it has proved to be, that while some ants prevent their grain from germinating by nipping off the young rootlet, M. Forel, a Swiss observer, declares that *Atta structor* allows the seeds in its granaries to commence the process of germination, or malting, for the sake of the sugar which is produced during that operation.

But of all the hideously human traits possessed by ants, none is so remarkable as their addiction to slavery, a circumstance which has long been one of the most familiar features in their history. Some of the slave-keeping species attack the nests of their victims, steal their larvæ and pupæ, and carry them off to be reared for a condition of servitude. One species is entirely dependent on its slaves; others can partially "do" for themselves, and even, on a push, carry on the functions of the nest without the aid of their auxiliaries. Sir John Lubbock ventures the belief that slavery exercises on ants the demoralising influence it has always been understood to exercise on those nations of men among whom it is found. In time the slave-owners become helpless dependents on their servants. Their bodily structure has, in course of untold ages, undergone a change; the mandibles have lost their teeth, and become mere nippers, deadly enough in war, but useless for every other purpose. They have lost the power of building, and display no care for their young; the slaves performing every domestic office, including the providing of food, and carriage of their

masters from place to place. They have even lost the habit of feeding, and were it not for their anxious slaves, would perish of hunger with plenty in their close vicinity. Mr. Grote considers that no society can exist without the sentiment of morality, but in an ant society that species of morality which consists of love for relatives, and regard for the unfortunate of their race, is hardly found. They will pass a maimed or wounded compatriot and fellow-citizen without the slightest notice. This callousness to the distress of each other is the more remarkable since it is notorious that they retain with extraordinary tenacity their hold on an enemy they have once seized. M. Mocquerys tells us that the Brazilian Indians utilise this quality in the cure of wounds. If their limbs are gashed, they force an ant to bite the two lips of the cut, and thus bring them together, after which they snip off the ant's head, which thus holds the lips together. He asserts that he has often seen natives with wounds in course of healing, with the assistance of seven or eight ants' heads, playing the part of the surgeon's sutures. Strange ants are put to death, and intoxicated members of the same nest are immediately extruded by their sober, cleanly-living comrades. Ants easily recognise their friends, and in their wars the young, especially if they belong to the same species, are spared; and they will even hail as relatives the pupæ of their nest stolen and brought up among strangers, when restored to them. As a rule, however, hatred is with them a stronger passion than affection.

But we must draw these notes to a close. Before doing so, however, it is worth remarking that ants

can distinguish different colours. Only a fact here and a fact there has been picked out of the vast mass from which we had to choose.* But one anecdote more, and we have finished our foray in a field, the wealth of which for the humblest of students is inexhaustible, provided only that he possesses patience, keen eyesight, and a conscientious desire to admit nothing into the category of knowledge which is not worthy of that honourable station. Dr. Büchner is our authority for the following remarkable story. He obtained it from Herr Theuerkauff, who in his turn relates it on the faith of the eye-witness. "A maple-tree standing on the ground of the manufacturer, Vollbaum, of Elbing (now of Dantzig), swarmed with aphides and ants. In order to check the mischief, the proprietor smeared about a foot-width of the ground round the tree with tar. The first ants who wanted to cross naturally stuck fast. But what did the rest do? They turned back to the tree and carried down aphides, which they stuck down on the tar one after another until they had made a bridge over which they could cross the tar ring without danger." The facts of this tale may, no doubt, be correctly stated, but the interpretation is so contradictory of the automatic-like actions of ants, that it is likely enough Herr Vollbaum, while accurate enough in his premises, is wrong in his inferences.

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* "Ants, Bees, and Wasps: A Record of Observations on the Habits of the Social Hymenoptera." By Sir John Lubbock, Bart., M.P., F.R.S., &c., President of the Linnean Society. London: Kegan Paul, Trench, & Co. 1882.

THE MISSING WITNESS.



"I'm afraid it's a bad case," I said to myself as I laid down my brief after reading it over for the third or fourth time, and leaned back in my chair to reconsider it for about the twentieth. "A bad case, and I am sorry for it."

I was a barrister, young both in years and in professional standing, and this was the first brief of any importance I had ever held. My client was an Italian sailor named Luigi Bernini, and the crime of which he was accused was robbery; the plunder being the life-long savings of a woman upwards of eighty years of age, which the poor creature kept hidden in the thatch of her little cabin.

The witnesses were the old woman herself, who had been stunned by a severe blow from the perpetrator of the theft; and a neighbour who deposed to having met the prisoner in the immediate vicinity of the cabin. When Bernini was arrested some days later, a curious foreign coin, identified as part of the

stolen hoard, was found in his pocket. This however he accounted for, by saying that he had picked it up on the road. The weak point in the chain of evidence was a scarcely perceptible hesitation on the part of one of the witnesses. She had at first declared positively that the prisoner was the man whom she had seen going towards old Joan's cabin, and had afterwards adhered to this statement, with what appeared to be dogged obstinacy, rather than real conviction.

The prisoner himself positively denied having been in the neighbourhood at all on the day of the murder, but unfortunately he could not speak with certainty as to his whereabouts. He had been lately dismissed from hospital, scarcely convalescent, after a bad fever; his own ship had left the port, and he had been rejected by the captains to whom he had offered his services, as not being sufficiently robust for a sailor's work. He had a little money left, and he therefore took to wandering aimlessly about the country, intending, as soon as the *Columba* returned, to ship aboard of her again. His mind had been weakened and confused by his illness, and although he knew