

THE PARASITES OF ANTS.

Formicaries are inhabited by a large number of animals that are different from the legitimate owners thereof, and that seem to live therein as if they were at home. What are the exact relations of these aliens with the ants? Are they parasites, commensals or mutualists? What is their mode of life? Such are the questions that M. Charles Janet has undertaken to solve, with a patience and perseverance worthy of Reaumur. We are going briefly to make known some of the results obtained.

In the first place, in order to collect ants, along with their progeny and their myrmecophiles (as the foreign guests of formicaries are called), M. Janet employs a very ingenious process. In order to obtain specimens of the inhabitants from the deep portions of the formicary without injury to the latter, he introduces wooden traps into them and leaves these in place until he wishes to make observations. These apparatus are formed of a strip of hard wood of round or rectangular section, containing a series of small independent chambers, each of which is provided with a gallery by means of which it may be reached. At the moment of setting this trap, honey or sugar may be put into some of the chambers. After such a trap (which naturally can be employed only on earth nearly free from stones) has remained in place in a formicary for several weeks, it is found that the ants have taken possession of some of the chambers, along with their progeny and myrmecophiles, just as they would have done in galleries excavated in the heart of an old root. Quite a convenient variant of this apparatus is that in which the piece of wood provided with the holes that allow of entrance to the chambers may slide to a certain extent, so that at the moment at which it is removed the holes that are at the right of the chambers may be brought to the right of the partitions. In this way, it is possible to imprison the clod and carry it intact to the laboratory, where it may be studied at leisure.

One of the most common parasites of the ants of the genus *Lasius* is an acarid, the *Antennophorus Uhlmanni*. This does not move around in the formicary, but lives constantly upon the body of the ants. As a general thing, an ant carries one acarid under the head and two to the right and left of the abdomen. If an antennophorus be detached and laid upon the bottom of an artificial formicary, it will be seen to extend and agitate its antennæ (or, more accurately, its antenniform legs), in order to ascertain whether any ants are approaching; and it will extend and agitate them still more if an ant happens to pass in front of it. At the same time, it rises upon its two hind pairs of legs and stretches out the pendent pair in front of it. But, whatever be their position, it always manages to place at least one of the legs of its first pair either upon the head or abdomen of an ant or upon the back of an antennophorus already installed. The substance exuded upon the surface of the extremity of the legs is strongly adhesive. Owing to this property, the acarid instantly adheres to the ant upon which it has managed to place one of its legs. As soon as the antennophorus has succeeded in creeping upon the ant, the latter, even in cases in which it is already carrying several of these parasites, struggles vigorously. It threatens with its mandibles, rubs itself with its legs, and especially curves its abdomen in order to touch the new comer with its anal appendage moistened with venom. But the parasite has usually had time to take one of its normal positions, and the ant soon resigns itself to the labor of carrying its new burden. The parasites easily pass from one ant to another. When the ants are grouped one against another, the parasites are often observed to stand erect upon their hind legs and stretch out their front ones (and particularly their antenniform ones) toward the ants in the vicinity; and, at times, there is seen

one that has decided to effect the passage. If a goodly number of ants, each carrying a single antennophorus, be placed apart in an artificial formicary, it will be observed after a few hours that some of the ants are free from the parasites, while others are carrying two or three.

The exclusive food of the antennophorus is the nutritive liquid that the ants secrete in their crop. These parasites do not feed while the ant that carries them is collecting food, but are observed to take a portion of the nutritive liquid that the ant is made to disgorge by one of its companions. These acarids know how to obtain food (aside from the disgorgement from ant to

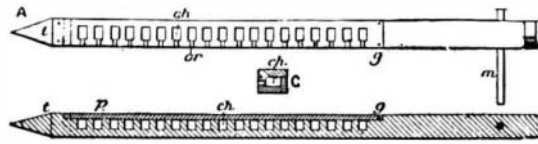


Fig. 2.—TRAP FOR CATCHING ANTS AND THEIR PARASITES.

ant), either by demanding it from their host or from an ant that happens to be near them. Although the parasites are, as a general thing, not very cordially received by the ant upon which they creep, they are no longer maltreated after they have installed themselves upon their host. In artificial formicaries an ant is often observed in the act of carefully licking the body of one of its companions. If, during such operation, it comes near an antennophorus, it manifests no surprise, but, continuing its work, licks the back of the parasite, and, if it comes near the latter's mouth, cheerfully gives up to it a drop of liquid food.

Another acarid, the *Discopoma comata*, is also fre-

The ants resign themselves to their fate and tolerate these parasites as soon as they have installed themselves upon the abdomen, where they generally place themselves in threes—one on each side and one in the middle. These parasites live by thrusting their buccal organs through the ant's cuticle and sucking the internal liquids.

All the myrmecophilous hosts, fortunately for the ants, are not so dangerous. One of the most benign is certainly the *Lepismina polyopa*, which moves about among the ants, but takes good care never to remain immovable in their neighborhood.

If the receptacle filled with honey that is placed in an artificial formicary be removed for a few days, and then be put back, several ants will be observed to visit it and make a long repast; and when these, after their crops are well filled, re-enter the inhabited chambers, they will be assaulted by their companions, which come to demand a part of the food. The division begins at once. The giver and taker rise slightly one in front of the other. The first separates its mandibles and sticks out its tongue, which its companion seizes with its jaws and causes the disgorgement of a few drops, which are immediately absorbed. As soon as the first food suppliers have re-entered the formicary, the *Lepismina* show that they have perceived the odor of the honey. A goodly number of ants soon group themselves in couples for the disgorgement, leaving a certain space between them beneath the head. As soon as a *lepismina* comes near such a couple it rushes into this space, quickly seizes the drop that is passing before it, and then hastily makes off as if to escape pursuit. But the ants, standing one against another, are not free enough in their movements even simply to threaten the bold thief, which immediately goes to put another couple under contribution; and thus it continues its quest of food until its hunger is appeased.—*La Nature*.

Nature as an Educator.

Dr. M. L. Holbrook gives the following excellent advice as to the education of children: "So far as possible, a love of nature should be early and continuously inculcated. Nature is, in a physical sense, the father and mother of us all, and a child that grows up to maturity with a genuine love of rocks and trees, flowers and insects, animals and plants, storms and sunshine, cold and heat, fresh air or the ocean wave; of every varying landscape and mood of nature and all the activities around us, stands not only a better chance of possessing a healthy nervous system, but of maintaining it during life. than if the opposite has been the case. I am not at all in sympathy with any system of education which takes children far away from nature. Nature is a book, a great library of books, whose authorship is the Infinite. Our little works, our libraries, vast and valuable as they are, cannot be compared with it. They are poor transcripts at best of the thoughts of half developed human beings."

At the last quarterly meeting of the American Statistical Association, Dr. S. W. Abbott, secretary of the Massachusetts Board of Health, presented some interesting figures regarding the proportion of pulmonary tuberculosis in males

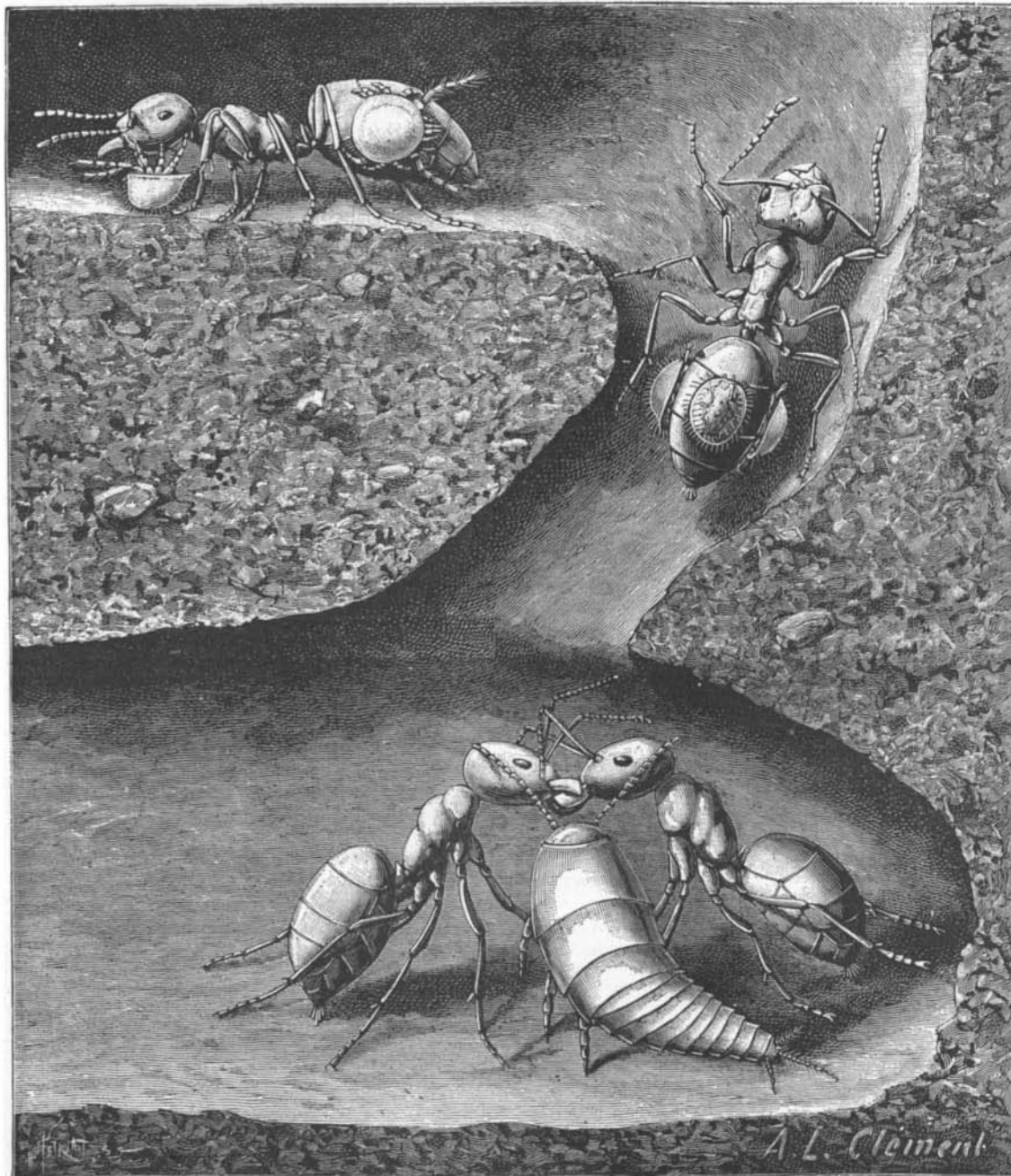


Fig. 1.—SECTION OF A FORMICARY, WITH ITS INHABITANTS, HIGHLY MAGNIFIED.

quently discovered upon ants. It is found in very small number in the galleries, but in very large numbers upon the larvæ of the males and queens, and especially upon the abdomens of the adult workers. When a *discopoma* is placed upon the floor of a gallery of the formicary, it moves about thereon with the antenniform legs directed forward. When an ant passes in the vicinity it rises upon its hind legs, and, if it can reach the insect, creeps upon it. Although the ant endeavors to free itself from the parasite, its efforts are in vain, because the acarid applies the edges of its carapax so closely to the body of its victim that the legs of the latter slide without getting any purchase.

to that in females in Massachusetts. The rate in 1851 was 1,451 females to 1,000 males; in 1890, 1,055 females to 1,000 males; and last year only 974 females to 1,000 males. Last year was the first in the history of the State in which the number of deaths from phthisis in females was smaller than that in males. The fact that a uniform reduction in the rate of female deaths began some five years ago, about the time women began to ride the bicycle extensively, Dr. Abbott considers significant, and he is inclined to attribute the decrease in the death rate to the great increase in open air exercise among women which has been inaugurated by the use of the bicycle.—*British Medical and Surgical Journal*.