

On the mantelshelf of our sitting-room my wife has the habit of keeping fresh flowers. A vase stands at each end, and near the middle a small tumbler, usually filled with violets.

Sometime ago I noticed a file of very small red ants on the wall above the left-hand vase, passing upward and downward between the mantelshelf and a small hole near the ceiling, at a point where a picture-nail had been driven. The ants, when first observed, were not very numerous, but gradually increased in number, until on some days the little creatures formed an almost unbroken procession, issuing from the hole at the nail, descending the wall, climbing the vase directly below the nail, satisfying their desire for water or perfume, and then returning. The other vase and tumbler were not visited at that time.

As I was just then recovering from a long illness it happened that I was confined to the house, and spent my days in the room where the operations of these insects attracted my attention.

Their presence caused me some annoyance, but I knew of no effective means of getting rid of them. For several days in succession I frequently brushed the ants in great numbers from the wall down to the floor; but as they were not killed the result was that they soon formed a colony in the wall at the base of the mantel, ascending thence to the shelf, so that before long the vase was attacked from above and below.

One day I observed a number of ants, perhaps thirty or forty, on the shelf at the foot of the vase. Thinking to kill them I struck them lightly with the end of my finger, killing some and disabling the rest. The effect of this was immediate and unexpected. As soon as those ants that were approaching arrived near to where their fellows lay dead and suffering, they turned and fled with all possible haste. In half an hour the wall above the mantelshelf was cleared of ants.

During the space of an hour or two the colony from below continued to ascend, until reaching the lower beveled edge of the shelf, at which point the more timid individuals, although unable to see the vase, somehow became aware of trouble and turned about without further investigation; while the more daring advanced hesitatingly just to the upper edge of the shelf, where, extending their antennæ and stretching their necks, they seemed to peep cautiously over the edge until beholding their suffering companions, when they too turned and followed the others, expressing by their behaviour great excitement and terror. An hour or two later the path or trail leading from the lower colony to the vase was almost entirely free from ants.

I killed one or two ants on their path, striking them with my finger, but leaving no visible trace. The effect of this was that as soon as an ant ascending towards the shelf, reached the spot where one had been killed, it gave signs immediately of great disturbance, and returned directly at the highest speed possible.

A curious and invariable feature of their behaviour was that when such an ant, returning in fright, met another approaching, the two would always communicate, but each would pursue its own way; the second ant continuing its journey to the spot where the first had turned about and then following that example.

For several days after this there were no ants visible on the wall, either above or below the shelf. Then a few ants from the lower colony began to re-appear, but instead of visiting the vase which had been the scene of the disaster, they avoided it altogether, and following the lower front edge of the shelf to the tumbler standing near the middle, made their attack upon that. I repeated the same experiment here with precisely the same result. Killing or maiming a few of the ants and leaving their bodies about the base of the tumbler, the others on approaching, and even before arriving at the upper surface of the shelf where their mutilated companions were visible, gave signs of intense emotion, some running away immediately and others advancing to where they could survey the field, and then hastening away precipitately.

Occasionally an ant would advance towards the tumbler until it found itself among the dead and dying, then it seemed to lose all self-possession, running hither and thither, making wide circuits about the scene of the trouble, stopping at times and elevating the antennæ with a movement suggestive of wringing them in despair, and finally taking flight.

After this another interval of several days passed during which no ants appeared. Now, three months later, the lower colony has been entirely abandoned. Occasionally however, especially when fresh and fragrant violets have been placed on the shelf, a few "prospectors" descend from the upper nail hole, rarely,

almost never, approaching the vase from which they were first driven away, but seeking to satisfy their desire at the tumbler. To turn back these stragglers and keep them out of sight for a number of days, sometimes for a fortnight, it is sufficient to kill one or two ants on the trail which they follow descending the wall. This I have recently done as high up as I can reach—three or four feet above the mantel. The moment this spot is reached an ant turns abruptly and makes for home; and in a little while there is not an ant visible on the wall.

JAMES D. HAGUE

San Francisco, California, Feb. 26, 1873

#### *Perception in Butterflies*

THE interesting discussion on this subject in your columns has hitherto been almost entirely confined to facts of extraordinary "perception" with mammalia. But in other classes of the animal kingdom there occur instances perhaps even more astonishing still, showing a power of perception which we needs must attribute to smell, unless we are inclined to talk about natural forces hitherto unknown, to which I should prefer saying that we do not yet understand the matter at all.

In the valuable monthly, "Der Zoologische Garten," v. X. (1869) p. 254, there is a paper on the sense of smell in butterflies, recording, among other cases, the following one.

A well-known collector, the late M. Riese of Frankfort, bred a crippled female of *Lasiocampa pruni*, a species very rare here. M. Riese dwelt in a narrow and densely-peopled lane near the centre of this city. He put the said moth before the window with his other boxes, and soon had the pleasure to find it surrounded by some males, which became the collector's welcome prey. Here, as the writer fitly remarks, the performance of the male in finding out the female was the more surprising, by the latter being confined in the middle of the town as well as by the rarity of the species in general.

If, as the writer adds, there can be any doubt of the males being guided in these cases by smell, what is more to be wondered at, the acuteness of the males (supposed to be located in the large comb-shaped antennæ) or the enormous divisibility of the odour emitted by the females?

I may add that similar and even more striking cases (the females being confined within a room, and the males appearing outside at the windows) have been recorded by that most reliable observer, the late Dr. von Heyden.

Though I am not prepared to follow the whole length of Mr. Darwin's ideas on "Pangenesi," yet I cannot avoid observing how much such facts as these seem to support the fundamental assumption of that "provisional hypothesis," namely that organised matter is capable of a degree of divisibility scarcely conceivable by us, yet retaining in those most minute particles, infinitely smaller than any which can be revealed by our microscopes, all its specific distinctness,—the "gemmae" issuing from the female of a particular species reaching and affecting the distant male, and thereby testing their particular, specific nature.

J. D. WETTERHAN

Frankfort-on-the-Maine, April 5

#### *Perception in Fowls*

SEEING in NATURE many letters on the instinct of animals I am tempted to send you an incident which fell under my notice and which would seem to denote in domestic fowls a greater amount of reasoning power and of intercommunication than the lower animals are usually credited with.

Three years ago I was staying at a house in Ireland where a good deal of poultry was kept, and a young white duck just feathered being the only one left of a brood was allowed to roost with a hen and a young brood of chickens under the furnace in the back kitchen, to keep it from the rats which infested the out-houses. One evening our attention was called by the servants to a great commotion between the hen and the duck, which had always before been excellent friends, and upon close examination it was discovered that the duck was not the hen's usual companion, but although closely resembling it in age and colour, was a perfect stranger, not even belonging to the premises at all, whilst the proper duck was found quietly resting with the other ducks in the duck-house. The intruder having been ejected, and the ordinary bed-fellow restored to the hen, peace again reigned between the feathered companions; but the singular part of the affair is, how the duck could have