

THE SENSE OF SMELL IN THE BEES

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Any one who has observed bees has seen that they are guided very largely in their movements by the sense of smell. Bees have been known to fly a mile or more over water to reach flowers on an opposite bank, toward which they could be guided only by the scent.

The celebrated naturalist Huber first discovered that the organs of smell in the bee are located in the antennae, and he performed some interesting experiments by cutting off the antennae, and thus depriving the bees of their power of detecting odors. I have recently repeated some of his experiments on workers, drones and queens, with some modifications, and all my results confirm his position.

Concerning the queen, Huber says: "When one of her antennae is cut off, no change takes place in the behavior of the queen. If you cut off both antennae, near the head, this mother, formerly held in such high consideration by her people, loses all her influence, and even the maternal instinct disappears. Instead of laying her eggs in the cells, she drops them here and there." As is well known a young virgin queen is normally accepted without any difficulty by any colony, which had been queenless long enough to know its queenless condition. In experimenting along this line I cut the antennae from a virgin queen about three hours old, and put her on the comb of an observatory hive, and she was at once balled. This was repeated with another hive. She was rescued from the workers and confined in the hive in an introducing-cage, contain-

ing candy, but in a short time died, probably of starvation, for I am sure she was not stung by the bees in the ball, for she was taken out at once, and I never lost sight of her. Although there was candy in her cage, she evidently did not recognize it as food, since she was not attracted to it by smell, and on account of the loss of her antennae she was not fed through the meshes of the wire cloth.

When the workers are deprived of their antennae they remain inactive in the hive, and soon desert it since they are attracted only by light. I cut the antennae from several workers, and marked them on the thorax, to make it more easy to follow their actions, and then put them in an observatory hive from which they had been taken. The other bees at once recognized that there was something wrong with them, and gathered round them much as they surround the queen, and repeatedly tried to feed them; but the injured workers could not guide their tongues, and consequently did not take food readily. One worker with its antennae off, was put on the alighting board of its own hive, but was at once repelled and carried away by one of its own hive-mates.

Drones act in a very similar manner, but are frequently rejected by the workers as soon as they are put in the hive. Huber reports that, as soon as the light was excluded from his observatory hive, although it was late in the afternoon and no drones were flying out, the drones from which the antennae had been cut, deserted the hive, since light was the only thing that attracted them.

From these observations it seems clear bees recognize each other very largely by scent, but also by touch. The workers and drones operated on were returned to their own hive, and we would suppose that they retained the odor of that hive; but since they were not able to extend their antennae to other bees,