

along the air-ducts, and these sensations being carried to the brain (or what does duty for it) record the character of the plant or animal from which the messengers come.

Our own organ of smell does a score times more work than it gets credit for, and the taste-organ gets credit for an amount of labor considerably in excess of what it performs; this is due to our own physical inability to accurately discriminate in our own minds between what we taste and what we smell—there is a sort of deception practiced by these two senses upon the brain. These senses are not alone in this failure of identification. Eyesight and touch may be deceived with ease. Truly speaking, the greater number of the things we believe we are actually tasting, we are but smelling; for instance, the different flavors of honey. Our own comparatively coarse discriminating organ of smell can be easily rendered useless by cold; the taste-organ nearly always sympathizes with it, and we thus so often find a cold in the head deprive us of the temporary use of these senses. To be accurate, we can only taste acids, alkalis, sweets and bitters, these things recording themselves on taste-cells situated at the back part of the tongue, whereas the flavors of things rise, or are rapidly carried up, to the true smelling cells situated in the nostrils. Now, what about the honey-bee and its taste (!) organs? Are they not, must they not be, in some portion of the mouth as in most other animals, so that what passes down the oesophagus may be checked, and passed along as approved and suitable, or rejected? Is it not more reasonable to confine the true use of the taste-organ of the bee to the discrimination between acids, alkalis, sweets and bitters, to locate these tasting-cells in the mouth, as with us, than to mistake tasting for smelling, and lodge the organ in the antennae? When we observe a bee approach any substance with its head, do we not find the antennae passed over it and touching it before the tongue comes into play, smelling and touching before tasting? It becomes an interesting subject for thought how the smell of nectar, or anything else, is carried to the knowledge-centre of the honey-bee, for it seems to me that an act of inhalation is necessary in nearly all animals before the smell-organ can be brought into use, before they can taste (!) anything beyond sweet or bitter, alkaline or sour; this is in order that minute flavor-atoms may be borne along the current and strike the scent-cells en route. No air, current no inhalation is necessary to enable the bee to smell by its antennae; there can be no actual inspiration, bringing the flavored particles into contact with the extremely sensitive

smell-organ—seeing that the inhalation of air is believed to be only by means of the spiracles found on the abdomen and thorax. Every other animal (excepting insects) I can think of, that is attracted or repelled by odor, demands the mechanism for the inhalation of air-currents. With the bee, which we all know is violently attracted or repelled by agreeable or disagreeable odors, I believe the scent-atoms strike immediately on those telephone-receiver-like depressions on the antennae, which communicate the impression to the thought-centre precisely as do the scent-cells in our own nostrils. Whenever we notice bees under the influence of odor the antennae are somewhat raised forward, so that the scent-atoms borne about by the air may strike the drum-like disc and vibrate them on the nerve-tip, which we believe is the true organ of smell. Whenever we notice bees approach an odorous substance the antennae are first placed over it, for the reason just stated.

Returning for a moment to the agreeable or disgusting qualities of odor, let me impress upon you the fact that attraction or revulsion are almost always only questions of the intensity of the smell given off. Try most odors—musk, Hawthorn, orange, heather, clover, the smell of apples, pears, and many fruits, the scents of lillies, violets and most flowers—in intensity, and even on our notoriously coarse olfactory nerves there is an exceedingly objectionable effect produced. On the other hand, let us attenuate by spirit water or air nearly every objectionable smell, and the sensation becomes agreeable, so that the bee finds delicious what may annoy us, and is sometimes intensely annoyed at what we may deem agreeable odors. This is the case with many human beings who have more or less sensitive smell-organs. We find precisely the same thing with the essential active principles of plants; diluted they are potent medicines, whilst in intensity they are deadly poisons.

Again, we find insects which, in their larval state, feed on plants, are flavored throughout their whole body with the active principle of the plant, besides partaking of its color (falsely called mimicry). Both in color and taste they resemble the food they eat, and not this alone, but they have in many cases an apparatus for casting forth flower-perfumes for the same purposes as the nectar is used by flowers—aids to cross-fertilization or protection against undesirable mating. Some larval secretions of beetles smell of guano. Some larval secretions of moths smell of pineapple, fennel, pears.

Beetles.—A *Pterostichus* smells of smelling.