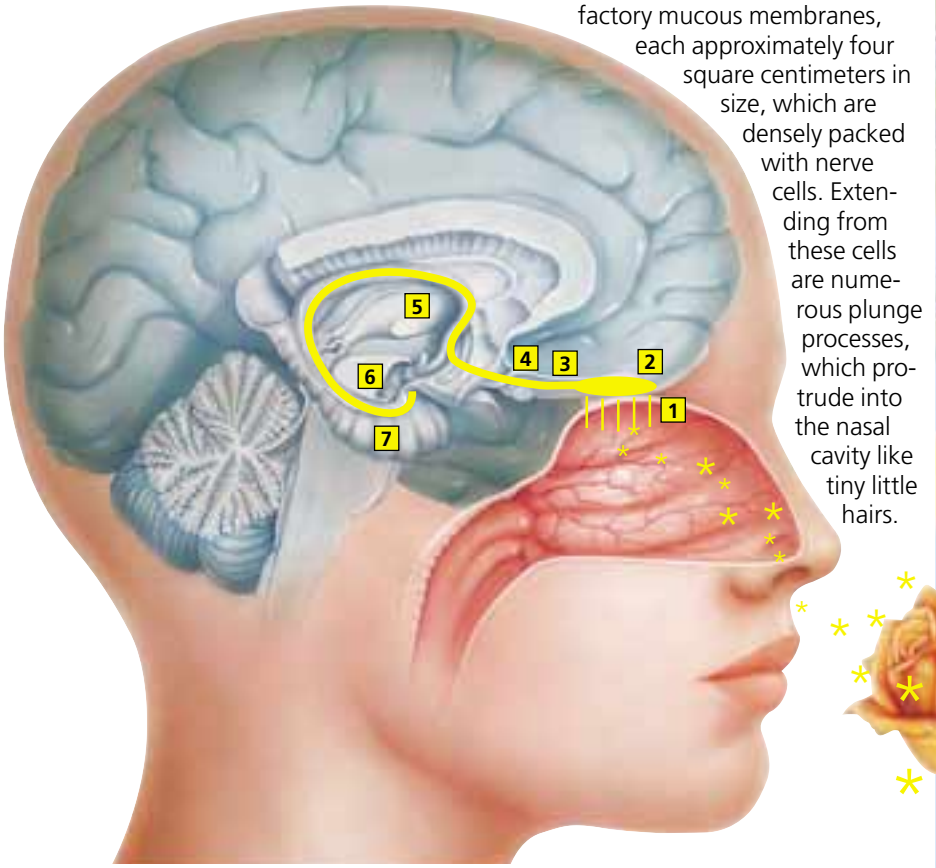
The Sense of Smell...

For a long time, science paid only little attention to this most mystical and emotional of our senses. In Greek philosophy, the sense of smell was disqualified as being imprecise and emotional. Only in recent decades has this sense been more thoroughly researched.

What do we know about it today?

First of all, it is only possible to smell what reaches the nose together with the air we breath – i.e. the substances have to be an a gaseous state. When we smell a fragrance strip, for example, we do not smell what is on it but what is no longer on it, i.e. what has evaporated and can be inhaled.

Located in the nose are two olfactory mucous membranes, each approximately four square centimeters in size, which are densely packed with nerve cells. Extending from these cells are numerous plunge processes, which protrude into the nasal cavity like tiny little hairs.



**The olfactory system with its primary and secondary paths to other regions of the brain:
1. Olfactory nerve cells in the nose, 2. Spoon-shaped olfactory bulb, 3. Olfactory tract, 4. Olfactory trigone, 5. Stalk leading to the thalamus, 6. Hypothalamic region, 7. Amygdala.**

Contained on these cilia are differently shaped receptors. When the air we inhale carries a molecule to the nasal mucous membrane, the molecule attaches to a matching receptor, like a peg in a hole. Both its geometric shape as well as its electrical charge, its polarity, play a role in this connection. When a molecule "docks" with a matching receptor, an electrical signal – a stimulus – is sent to the brain.

We smell with our brain

Extending from the multitude of nerve cells in the olfactory mucous membrane are numerous appendages – processes – that are bundled in the upper nasal cavity in the form of nerve fibers. These nerve fiber bundles extend through the ethmoid plate, a bone behind the root of the nose, and into a part of the brain that is called the olfactory bulb. If subjected to strong shear forces such as those caused by a heavy blow, for example, this bone can slice through the bundle of nerve fibers like a knife – resulting in a loss of the sense of smell. In the olfactory bulb, each of these hundreds of nerve fibers, which serve as a continuation of the nerve cells with their olfactory cilia, terminates in an olfactory brain cell.

Following preselection here, the stimuli are then advanced to portions of the midbrain and to the so-called olfactory brain.The olfactory brain was one of the earliest portions of the

Only his enormous olfactory memory enables this perfumer to translate a fuzzy sensory perception into a concrete fragrance.

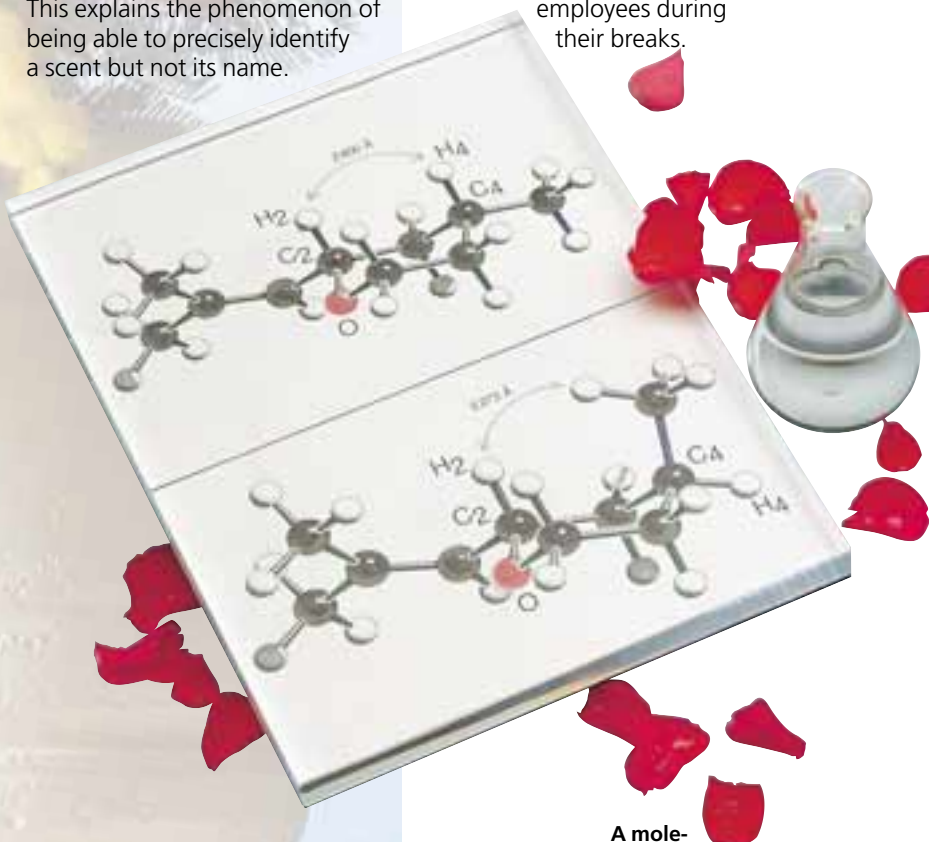
cerebrum to develop, which in turn is linked with the limbic system, the system that controls our feelings and emotions.

Interestingly enough, nerve impulses do not travel in only one direction – this area also contains nerve cells that work in the opposite direction. This means that there are a variety of ways in which a kind of feedback can modulate and modify the way a scent is perceived. Consequently, the expectations of the person who is smelling can exert a strong influence on the way a scent is experienced – yellow is associated with freshness, red with fruity sweetness. If this expectation is not fulfilled, the scent is frequently rejected, even though it is not really unpleasant. So a product's olfactory acceptance is also highly dependent upon the right kind of packaging!

The intensity of a scent, too, can influence its acceptance. This is because not every stimulus that is triggered by a molecule actually reaches the brain. The number of molecules that are necessary for this to happen (which is termed the olfactory threshold) depends upon the fragrance material in question. In highly concentrated form, fragrance materials are often perceived as pungent. In this case, the nose would appear to be overstimulated – molecules are also deposited on the "wrong" receptors, thus triggering olfactory confusion, a "blurry" smell. In diluted form, on the other hand, they seem delightfully floral or fruity! A floral fragrance would have to be diluted to 2 to 5% to equal the strength of its natural counterpart.

The sense of smell addresses both our emotions and our intellect. A scent's stimuli are advanced to the right half of the brain, where it is recognized, while intellectual activity or the ability to associate a name occurs in the left half. This explains the phenomenon of being able to precisely identify a scent but not its name.

Aromatherapy utilizes the emotional side of our sense of smell and employs essential oils to produce a calming effect, e.g. through vanilla extract, or to stimulate the mind, e.g. with citrus oils. Scents can also be used as a source of subconscious manipulation. In Japan, for example, it is not infrequent for essential oils to be distributed through the air conditioning system in order to relax employees during their breaks.



A molecule serves as the origin of a fragrance impression.