

SCENTS AND SENSIBILITY



Maria McElroy traveled to Asia to discover the world. Instead, she found her nose.

The New York painter witnessed an incense ceremony in Japan where sticks of scented wood were burned. “My brain was just mesmerized by the smell,” McElroy told *Current Science*. She returned home determined to make a similar impact with her art.

Alexis Karl made the same transition. Like McElroy, she began her career as a painter, and she was known for her wild canvases and thick brush strokes of bright yellow, pink, and purple. She has

Some artists have found a new medium of expression: perfume.

since set aside the brushes and traded her oil paints for rose oil, jasmine oil, and *citrus oil* (oil derived from citrus fruits—oranges, lemons, limes, and grapefruit).

Today, McElroy and Karl are two of the country’s leading perfumers. “Creating perfume,” says Karl, “is

just a step away from painting. ... I used to draw the body on paper or canvas. Now the body is my paper. The skin is my canvas.”

McElroy says perfume has offered her artistic opportunities not available in traditional mediums. “I think perfume is the next great chapter in art,” she says. “Scent is incredibly powerful. It can be sweet. It can be sassy. Scent can evoke memories in ways visual media simply can’t.”

Both women have their own fragrance lines. McElroy’s is called *aroma M*; Karl’s is *Scent by Alexis*. Recently, the women partnered to create *Cherry Bomb Killer Perfumes*, a line for teens.

SYMPHONY OF NOTES

Like every other substance that has an odor, a perfume is *volatile*—some of it evaporates into a gas. When the evaporated molecules, called *odorants*, reach sensitive cells in the nose, a biochemical reaction takes place, and the sniffer senses an odor.

A perfume, Karl elaborates, is a blend of different oils, in the same way that a song is a mix of different sounds. Both have *notes*.

The notes in a perfume are the individual scents. The first one, says Karl, is the *top note*. It makes an immediate impression. The molecules in citrus oils make ideal top notes because they are small, light, and extremely volatile, prone to evaporating rapidly from a liquid to a gas. “Lemon, lime, orange oil—you recognize them right away,” she says.

When the top note fades, the nose recognizes the *heart note*. Floral oils, such as rose, jasmine, lilac, and ylang-ylang, make the best heart notes, says McElroy. They are heavier and less volatile than top notes, so they stay in liquid form longer. Their smell lingers for hours.

When the heart note finally fades, the *base note* asserts itself. “Base notes are made of the heavier oils (amber, sandalwood, musk)”—the least volatile ones, says McElroy. “They become the lasting memory of the perfume, substances that will linger into the next day.”

SCIENTIFIC CHANGE

The science of perfume preparation has changed tremendously in recent years, says Virginia Bonofiglio, a professor of cosmetics and fragrances at the Fashion Institute of Technology in New York City. At one time, perfumers had to collect the oils themselves, extracting them from citrus plants and flowers using a technique called *enfleurage*. The perfumer pressed the specimen, such as a rose petal, into purified animal fat. The rose then sat for hours, infusing the fat with its *aroma*. The perfumer then used a

solvent (a liquid that dissolves other substances) to release the aromatic molecules from the fat.

Today, many of the key materials are readily available. Perfumers can simply order large quantities of floral and citrus oils. Still, says Bonofiglio, a good perfumer needs an in-depth knowledge of the chemistry of perfume.

“You need to be able to control the chemicals,” she says. “In a fragrance you might have 100 ingredients: *organic* materials [compounds derived from living things] and *synthetic* materials [artificially constructed compounds]. If you don’t know how they mix, you’ll end up with a mess.”

INFECTIOUS ENTHUSIASM

Since Karl became interested in perfume, it has become “a family passion,” she says. When Karl’s younger cousin, Fariza Badrieva, first came to the United States from her native Uzbekistan at age 13, she didn’t speak any English. “Alexis needed someone to test out her perfumes—to provide feedback,” says Badrieva, now 18. “We couldn’t really communicate in words, so perfume kind of became our language.”

With Karl and McElroy working on their new youth-oriented perfume, Badrieva is once again helping out, giving her assessments and collecting additional feedback from friends. She keeps a sample of the new perfume, *Truth or Dare*, in a small locket attached to her jeans.



Why You Smell

The human nose contains about 10 million nerve cells called *olfactory receptors*. (Some dog breeds have as many as 250 million.) When molecules of a fragrant or a smelly substance evaporate and drift into the nose, they react with some of the receptors. Specific receptors react to specific odors. That reaction depends on the shape of the odor molecule, which fits into the receptor like a key into a lock. When the key fits, a signal travels from the receptor to an area in the brain called the *olfactory bulb*. At that point, the odor is registered.

Some molecules are almost identical in shape—for example, those of cut grass and rotten eggs. Why do they smell different? Molecules vibrate at different frequencies. In some cases a molecule’s vibrations, not its shape, may be what stimulates olfactory receptors in the nose.

“I’ve always liked perfume, and being here, seeing my cousin work, I’ve gotten to appreciate it even more,” says Badrieva. “With all the oils, mixing them just right, you get to see how making perfume is both an art and a science.” **CS**



Left: Perfumers Maria McElroy and Alexis Karl. Right: Karl and her cousin Fariza Badrieva