

Fragrances & Moods: New Perspectives

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Like all growth-oriented industries, ours is a dynamic field, forever seeking to apply our expertise to new product areas in the hope of cultivating new markets. In order to lay out future directions for our involvement, we must carefully scrutinize the impact of fragrance upon various aspects of people's lives. One exciting and potentially fruitful area concerns the effect of fragrance upon a person's mood and sense of well being. We hope to ride the current wave of preoccupation with physical and emotional health, which is moving towards simpler treatment processes, and away from the complex drugs and medications which are sometimes as awful as the conditions they are supposed to cure. Our participation as perfumers in this endeavor will depend upon a marriage of convenience between our artistic creativity and the relevant scientific and medical findings.

Today we will look at two aspects of the impact of fragrance. The first concerns the effect of perfume in the social context. The second is more individual, covering perfumes and mood, stress level, and relaxation responses. A historical backdrop will be provided by a brief look at the work of the French and Italian schools of aromatherapy. Especially intriguing for us today is the work coming out of the neuroscience labs, unraveling the mysteries of the smelling processes. The data are full of incredible implications for our expanded role, if only we can understand them and translate them into new products.

The most familiar social use of fragrance is probably its much discussed enhancement of sexual attraction. This has clearly been a favorite subject of perfumers, our customers and most of all, their marketing people. However, I will resist the temptation to bore you with a re-

hashing of the now well-known pheromone controversy.

Beyond its application to excite another's senses, and entice a sex partner, perfume makes a statement about the self. It thus is part of our conscious effort to convey an appealing image. Besides creating an aura of beauty, the fragrance we choose is a clue to both our mood and the qualities we wish to project. Take the sexiness of "Tuxedo," conveyed by an accord of heavy amber, animal, resinous notes; or the romanticism of "White Linen," expressed in its floral delicacy. For the sporting outdoors people among us, we create fragrances such as "Aliage" and "Polo." The green herbals are designed to make us seem clean, scrubbed, refreshed or even exhilarated. Sometimes the label worn by a fragrance is as important as the perfume itself, providing an immediate sense of group membership.

We turn now to fragrance and emotions. Sadly, social scientists characterize modern life as stressful, depressing and anxiety-producing. Proof of this is found in our rapidly increasing consumption of tranquilizers and stimulants. Natural and harmless ways to alter mood and emotion are now sought. Included here are biofeedback techniques, meditation, jogging and yoga. The common denominator among these is that all elicit a relaxation response.

In *Seventeen* magazine's 1983 fragrance survey, 94% of the young women agreed that fragrance makes them "feel good." Similar links between smell and emotion are being explored by brain scientists. The data suggest a fascinating new arena for the perfumer. Application of our talents will require a great deal of imagination, curiosity and a spirit of adventure. We have little hard data as yet.

We draw historically from folk medicine and the European schools of aromatherapy. Leading physicians of antiquity advocated the use of aromatic herbs as calming and antispasmodic remedies for nervous tension and, on the other hand, as a stimulant to treat depressive states. Folk medicine is a rich source of clues about the psychoactive properties and physiological impact of familiar products and chemicals. For example, in cultures as far apart as China and North Africa, orange flower water has been used for centuries as a sedative. We don't know why.

Essential Oils in Aromatherapy

Systematic study of the use of essential oils in aromatherapy started in France and Italy before World War II. It was assumed that in appropriate doses, the inhalation of specific odors was a nontoxic and effective remedy, a therapeutic ac-

tion which could be measured by the length and intensity of its stimulating or sedative effect on the brain. Experiments were conducted by sniffing pads of cotton impregnated with solution and applied with masks to the mouth, or by spraying the atmosphere. The improvement and relief of symptoms documented was remarkable. For example, the Italian investigator, Gatti, found that anxiety was reduced by spraying mixtures of essential oils such as geranium and patchouli. Professor Benedicenti, a pharmacologist from Genoa, went a step further, identifying the various effects of different functional groups of products. The alcohol and ketone functions, such as geraniol and ionone were identified as nerve sedatives, while the aldehydes and phenols, including citral and eugenol, acted as nerve stimulants and excitants.

Imagine how popular our labs would be if this word were to get out! Though I would be hesitant to swear by the results reported in the aromatherapy literature, their findings are provocative and warrant rigorous experimental validation.

A product line launched last year reflects the spirit of these early studies. In the large cities, all of our senses are met with a barrage of noxious stimuli. There is a longing for the restoration of the restful cues of nature: smells of green forests, fresh sea air, pleasant gardens. In Japan, Professor Kamiyama studied the elements of forest air and their physiological effects. It was learned that alpha pinene, the main constituent in forest air, relaxed people. This led to the development of Kanebo's "Du Bon Air" line, the fragrance of which is based on the aroma chemicals found in forest air.

Looking to the future, IFF is currently compiling historical and recent aromatherapy findings from many disciplines. We hope to apply our modern scientific rigor to study these and their application to product development.

Let us turn now to some of the neurophysiological issues underlying the relationship between perfume and mood. A bit of background first.

In 1955, Hess and Alert found that by using electrical stimulation, they were able to produce emotions in their animal subjects. Sleepiness, anxiety and terror could be provoked at the flick of a switch and just as abruptly turned off. Their results depended on the exact location of a wire tap in the brain. Similarly, Olds and Milner (1954) identified "pleasure centers" in the brain, where electrical stimulation seemed to feel good. Other areas proved to be punishing sites. Brain physiologists have concluded that at least some emotions can be localized in brain tissue and can

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be directly manipulated by stimulation.

Studies like these raise complex questions for perfumers. Can we use our knowledge of olfaction and perfumery to influence mood, emotion or one's sense of well being? I think we can. Let me tell you why.

The reasons involve both the geography and neurophysiology of the brain. We know that when we smell something (or a message is sent from our nose to our brain), we not only recognize the odor, but also react to it either psychologically or physically. Imagine, if you will, that your current heart throb is usually enveloped in a cloud of musky fragrance. You approach, and your spirits are immediately lifted. The more passionate among us may experience quickening of heart rate, increased sweating or arousal. The fragrance drives you crazy. But no one knows for sure where the physiological reactions come from. Are they the result of the chemical impact of musk on our brain? Or do they stem from associations and images triggered by the musky aroma?

Odors Influence Mood

A closer look at the physiology of the smelling processes suggests how odors might influence mood. The olfactory system is located in that part of the brain known as the limbic system. Via neural signals, which travel from the limbic system to other parts of the brain, the olfactory system affects other brain functions, including heart rate, blood pressure, response to stress and emotional regulation. It is also linked to that brain region which controls hormonal activity. A striking example of the effect of smell on the hormones is the reported synchronization of the menstrual cycles of females living together, the so-called McClintock effect.

Recent advances in our understanding of information processing by the brain has critical implication for the perfumer who wants to affect mood via fragrances. At the core of everything we do, feel and think, are cells called neurons, designed to communicate electrochemically with one another. When an odor is perceived, neurons transmit the message from the nose to the limbic system. The odor molecules set off a chain of events in which neurons fire, sending an electrical impulse flowing through the cell path. Chemical messengers called neurotransmitters are released to leap the gap from one cell to the next. Walter (1981) noted that if odors could be shown to affect neurotransmitters, then we might be able to use inhaled fragrances to directly manipulate mood. He further stressed the importance of identifying the neurotransmitters re-

sponsible for odor signals.

In May 1983, the U.S. Fragrance Foundation announced its philanthropic fund's support of a five million dollar fund-raising drive to study the relationship between brain function and the senses of smell and taste. Research will be conducted at the Monell Center under the direction of Dr. Julius Axelrod, a Nobel Prize winner for his work on neurotransmitters. Two million dollars have already been pledged.

The value of research in this area may be demonstrated by looking at our responses to stress. It has been learned that emotional strain affects the concentration of certain neurotransmitters. It will be crucial that we couple this knowledge with a thorough understanding of the links between different odors and their emotional and behavioral consequences. This information in hand, might it not be possible to design fragrances the inhalation of which could produce predictable changes in mood, emotion or even behavior? The scenario might go as follows:

Let's travel momentarily to the year 2,000. En route to a crucial meeting, you find yourself stuck in a taxi at a gridlocked intersection. The moments tick by. What begins as a mild irritation rapidly mushrooms into extreme frustration and agitation. You try relieving the mounting tension by smoking or yelling at the driver. Nothing helps. Wary of the dangers of pot or tranquilizers, you reach for your inhaler or atomizer of relaxation-inducing fragrance (undoubtedly developed by IFF).

In fact, experimental work in this direction is already underway at IFF. Under the leadership of Hank Walter, we have begun designing and testing the effectiveness of such fragrances. To date, we have raised more questions than we have answered. For example, do we have an edge over ingested medication? Scientists have shown that if a chemical is inhaled rather than taken orally, ten to one hundred times less is required to produce the same effect. Second, does an inhaled chemical reach the brain faster than a psychoactive pill? Beyond the simple proximity between nose and brain, it may well prove advantageous to bypass metabolism of chemicals by the stomach, liver, and other organs. We will need to understand the effects of small quantities of regularly inhaled aroma chemicals on the brain as well as their physical and emotional consequences. The doses of fragrance ingredients we must study are considered minute by psychopharmacologists and toxicologists. As cautioned earlier, we must reserve judgment on these exciting hypotheses until more sound data are in hand. The line between "creator" and

"crackpot" can indeed be quite fine!

It is my hunch that in many instances, we as perfumers may have already been unknowingly or intuitively using aroma chemicals which physiologically influence mood. For example, take the monumental success of benzyl salicylate. This chemical is present in high concentrations in all the "L'Air du Temps"-type perfumes. I wonder if its acceptance might stem from properties other than its diffusion-effect of esthetic value. Some perfumers don't even smell it. My wild guess is that the appeal of these fragrances may, in part, stem from the aspirin-like effect of the salicylates on the brain.

The trend towards musk fragrances imposed upon the perfumers by the hippie generation of the sixties is a provocative phenomenon in our field. Let's face it. These were not the artist's choice. Yet we found ourselves creating fragrances containing up to 80% or 90% macrocyclic musks. Might these musks have an uncharted impact on "pleasure centers" in the brain?

Answers to the questions raised above would provide a terrific boost to our creativity. As the data unfolds, it might suggest novel applications of high levels of common fragrance ingredients. New products will surely follow as well. One can foresee the development of solid perfumes, containing up to 50% fragrance oils. Hung in lockets around the neck, these could create an aura around the wearer, influence his or her feeling state and, coincidentally, bypass RIFM restrictions on skin application.

As perfumers, one of our traditional tasks has been the marketing of illusions and promises. We not only sell sexiness and romance, but also enhance enjoyment of daily living by fragrancing products and environments. Our sphere of influence could be greatly enlarged if we could integrate our knowledge of perfumery with the scientific findings regarding the impact of odors on health and well being. Possible applications could be as varied as moods themselves, generating an explosion of highly specialized introductions on the market. In this way, perfumers could make yet another direct contribution to the quality of our emotional lives.

The spirit in which we must proceed is neatly summarized by Diana Vreeland, who said, "I believe in wit, and good nature, and laughter. They are all essential ingredients. All essential as fresh flowers."

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