STATEMENTS BY AROMAS

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ABSTRACT

This paper is an exploration into the use of odours in art: performances, installations, and in relation to images.

Our perceptions of odours are affected by the concentration, the associative powers, and the sequencing of odours as well as by adaptation to odours. Humans use odours as communication, to create environments, and to denote identity. In my work, I use odours to make artistic "statements." I describe a variety of my work utilizing odours: small 'scent poems,' odour installations, and performances utilizing odours.

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For Donald and Victoria Larkin

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INTRODUCTION

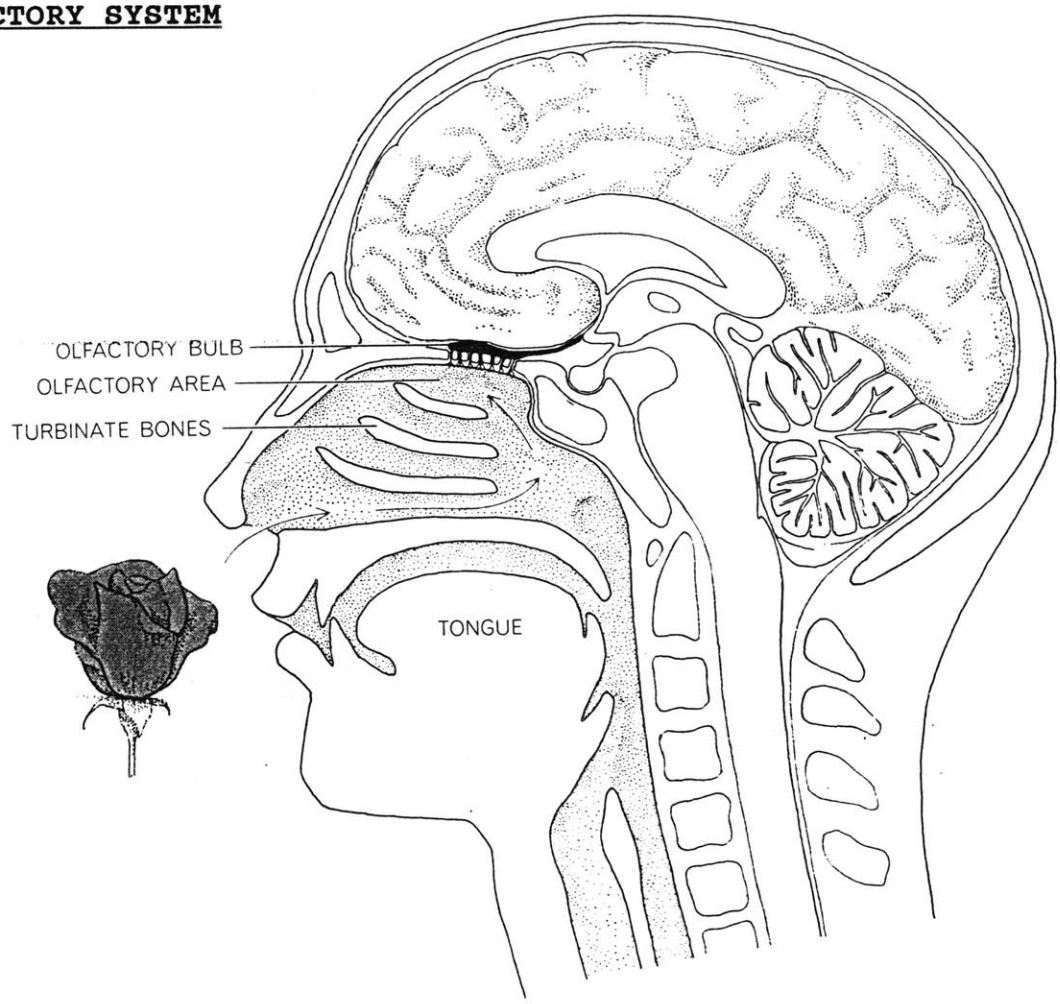
This paper explores the use of odour in art: performances, installations, and in relationship to images. The sections on the olfactory system and factors that affect the perception of odours provide a basic understanding of how we perceive odours, and how odours can be used to 'make statements.' A section discusses the 'American Unscented Aesthetic,' the conservatism of the American public, and the imposed limitation on the use of odours. There is accumulating evidence for human olfactory communication. I illustrate this by citing the more popular studies. The problems of classification and description of odours is discussed (a glossary defines some of the terminology of odours). The sections on human use of odour describes the communicative uses of odour: to create identity, environment, and security. A discussion of artists' work provides a background for what has been done with odour and to show the great potential for the use of odours. The next section describes my work. I have created a variety of works in order to explore a wider range of what can be done using

odours in the arts. In my work, I 'make statements' through invoking impressions and through coding messages in the form of odour sequences. The final section explains the personal notation system that I developed to help conceptualize this work.

Throughout this text I have chosen to use the spelling ODOUR because I feel it is a more neutral spelling than ODOR. ODOUR is the English spelling of the word. ODOR is the American spelling of the word which carries the negative connotation of malodor. This text is for use by a primarily American audience. The English spelling of this word lends distinction and flexibility, alleviating the negative view of the word. Properly defined, odour/odor means: any scent or smell, whether pleasant or offensive. It is a neutral word.

My point of view is that there are many types of language, e.g., verbal, visual, mathematical. Perfumery is as long-established and highly developed art form as language. This thesis is directed to the possibilities of cross-fertilization between these two art forms. The potential is exciting and immense.

OLFACTORY SYSTEM



(Figure 1) from "The Stereochemical Theory of Odour"[1]

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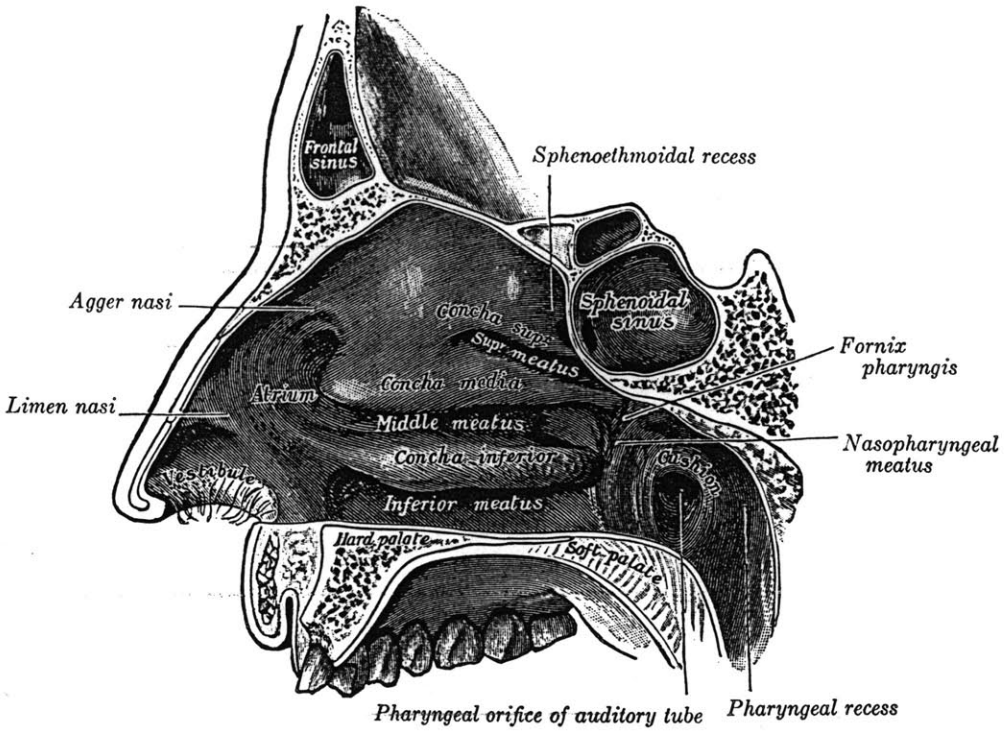
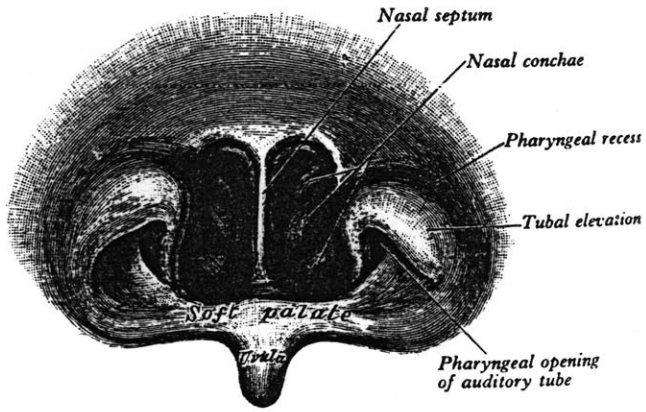
[1] John E. Amoore, James W. Johnson, Jr., and Martin Rubin. "The Stereochemical Theory of Odor", Scientific American, February 1964.

The olfactory system, starting with the nose and leading to the brain, is really two systems placed symmetrically next to one another and separated by the nasal septum, a thin bone and cartilage covered by flesh. An odour enters the olfactory system in two ways: through the nostrils and through the back of the nasal cavity. In the first way, through the nostrils, the air is filtered by hairs around the opening and mucus on the wall of the nasal cavity. Four folds of flesh covering the turbine bones, called the inferior concha, middle concha, superior concha, and the concha suprema, guide the air through the nasal cavity. Part of the air is directed above the concha suprema to the olfactory mucosa which holds the receptor cells.

The second way is through the back nasal cavity from the pharynx or throat. The air is guided out of the nasal cavity by the conchae, and part of the air is directed to the olfactory mucosa. The olfactory mucosa consists of two yellowish-brown patches of cells located at the top of the nasal cavity. These are divided by the nasal septum, and occupy an area of about one square inch. Both parts of the mucosa contain the yellowish-brown support cells that hold receptor cells; these receptor cells are nerve cells with hair-like endings and nerve fibers that lead to their respective olfactory bulbs. Figures 1-3 illustrate the anatomy of human olfaction.



(Figure 2) from Anatomy of the Human Body[2]



View from the pharynx into the back of the nasal cavity
(Figure 3) from Gray's Anatomy[3]

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[2] Henry Gray. Anatomy of the Human Body, Lea and Febiger, Philadelphia, 1973.

[3] Henry Gray. Gray's Anatomy: 36th Edition, edited By Peter L. Williams and Roger Warwick, Churchill Livingstone, Edinburgh, 1980.

Amoore's Stereochemical Theory[4] suggests that the olfactory mucosa differentiates the molecules that reach it by the shape of the molecule, by the vibration of the molecule, and by the area the molecule reaches on the olfactory mucosa. This theory is very close to a working model of how the mucosa functions. Its basis is that there are seven primary odours that in different combinations make up all smells. The seven primaries are: camphoraceous, musky, floral, pepperminty, ethereal, pungent, and putrid. Each primary odour has its own type of receptor that functions like a lock and key. Camphoraceous, musky, floral, pepperminty, and ethereal odours are detected when the shape of their molecules fit into a similarly shaped pore. Pungent and putrid are identified by the electric charge they carry. Pungent molecules carry a positive charge and putrid smelling molecules carry a negative charge. It is also suggested that the mucosa contains areas that detect each primary odour, and that the structure of the nose delivers the proper sized molecule to each area. When there is a high concentration of molecules in the nose, the areas to which the molecules are delivered are distorted, causing a change in the perception of the odorant.

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[4] John E. Amoore, James W. Johnson, Jr., and Martin Rubin. "The Stereochemical Theory of Odor," Scientific American, February 1964.

The olfactory bulb sorts and codes the information received from the receptor cells and sends it through the olfactory tract to the olfactory trigone where it splits into the lateral olfactory stria, the olfactory tubercle, and the medial olfactory stria. The lateral and medial olfactory stria deliver olfactory signals to different parts of the limbic system, including the thalamus, hypothalamus, and pituitary glands. The limbic system is a complex set of rings below the cerebral cortex. It evaluates input as either dangerous or innocuous and instantaneously directs the appropriate action. Because all of the brain is intricately tied to emotion, it is considered the seat of emotion. These direct pathways to the limbic system explain why odours are such powerful agents in triggering emotions. An area underneath the visual cortex at the bottom of the brain and an area on the under side of the frontal lobe both appear to be connected with olfaction. However, the information is first processed by the emotional part of the brain and has already caused a physical response before it is processed by the cerebral cortex, so the linguistic and logical responses are secondary.

A diagram of structures on the inferior aspect of the human brain in the area immediately surrounding the optic nerves, chiasma, optic tracts and interpeduncular fossa. Many of these structures are intimately related to the olfactory and limbic systems; they are coloured blue. The right temporal pole has been displaced laterally to expose underlying structures. In addition to the features which have been labelled fully, the abbreviations used have the following significance: OT—olfactory tubercle; APS—anterior perforated substance; DBB—diagonal band of Broca. The uncus hippocampi is divided into three areas; IG—the intralimbic gyrus; BG—the band of Giacomini; and UG—the uncinate gyrus. The lateral olfactory stria continues into the gyrus semilunaris (GS); this is bordered laterally by the gyrus ambiens (GA); whilst further laterally is the entorhinal area (EA) which is the rostral extension of the parahippocampal gyrus. Note the curved extensions of the prehippocampal rudiments, medial olfactory striae, and diagonal bands of Broca on to the medial aspect of the hemisphere. The triangular midline zone between the converging diagonal bands, and superior to the optic chiasma, is the lamina terminalis. The occasional intermediate olfactory stria which merges with the olfactory tubercle, is illustrated but unlabelled. (After Kuhlenbeck: redrawn and modified from: *The Hypothalamus*, with the permission of the authors W. J. H. Nauta and W. Haymaker, and the publishers Charles C. Thomas, Springfield, Illinois.)

(Figure 4) from Human Neuroanatomy[5]

[5] Malcolm B. Carpenter. Human Neuroanatomy, The William and Wilkins Company, Baltimore, 1976.

The olfactory system is a complex sensory tool that is too rarely appreciated. It is complicatedly intertwined with the brain and body. The olfactory system is a dual system from nostrils to brain. The left nostril sends olfactory information to the left side of the brain and the right nostril to the right side of the brain. The direction of the odour seems to be detected by the air flow in the nasal cavity and not by this dual system. However, there must be reasons for the existence of this dual system which should be explored. The conchae focus odours on the olfactory mucosa, playing an important part in the detection of odours. The manner by which the brain and olfactory system are linked makes verbal language superfluous to the utilization of olfactory information, and verbal communication of olfactory information is therefore difficult.

FACTORS THAT AFFECT THE PERCEPTION OF ODOURS

The concentration, duration, associative power, the sequence of odours, the physical effects, the weather, and the fact that odour is temporal, all determine the interpretation and presentation of an odour. All these factors are interdependent. Seeing the whole, understanding the components, and being able to control them are crucial to being able to make statements with odours.

The concentration of the aromatic chemical is one factor that determines the meaning of an odour. Odours are perceived differently at different concentrations. For example, cinnamaldehyde, the main component (approximately 75%) of Ceylon cinnamon bark oil, is the chemical recognized in a dilute concentration as cinnamon. Cinnamaldehyde becomes bitter and burning in stronger concentrations, and like the odour of vomit in very strong concentrations. On the other hand, androst, a pheromone produced in the testes of human males, smells urine-like or musky when dilute, and flowery at high concentrations. The perception of an odorant varies in different ways depending on the concentration of the chemical(s).

This perception can also be altered over time. Prolonged exposure to an odour can make the most pleasant

smell unbearable. Most people would agree that the smell of baked bread is pleasing, but over a prolonged period, especially without direct involvement with the product, it becomes an annoyance, an environmental pollutant. Part of this annoyance may lie in being unable to have the bread while having an expectation of it. However, it is the persistence of the smell and the inability to escape it that are the real annoyance.[1] Because any persistent smell can become intolerable, the body has developed mechanisms to prevent this. The nose or the olfactory system can undergo adaptation to an odour, losing the ability to perceive even a very strong smell due to fatigue or frequent repetition. This can become dangerous. The smell of rotten eggs, sulfur dioxide, is intolerable at two hundred parts per million[2] and will repel a person. However, after about five minutes exposure to sulfur dioxide, the smell becomes less noticeable and seems to be going away. After longer exposure it seems that the odour is gone entirely even though the concentration has remained the same. The way the senses block odour in this case is particularly dangerous

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[1] Steve Ellies, Arthur D. Little Inc., interview March 8, 1989.

[2] Wiliam O. Negherbon, Handbook of Toxicology: Volume III: Insecticides, (W. B. Saunders Company, Philadelphia, 1959)

because sulfur dioxide is highly toxic to human beings,[3] animals, and plants.

Most smell is associative. Infants only show arousal to a new odour, whereas adults are judgmental about odours.[4] There are some reactions to odours that seem to be genetically inherited or related to biological needs, such as an adverse reaction to odours that are harmful, or a craving for the smell of foods that the body needs; but for the most part people's reactions to smell are an acquired association. Strong memories and reactions are evoked by smell. This is due to the way odours affect the brain; the olfactory system is connected directly to the limbic system which controls emotional reactions and sends the response to the body. The first reaction to an odour is immediate and subconscious, while the conscious reaction is secondary. This makes one's association to odours very powerful. Marcel Proust used smell in his book Remembrance of Things Past to launch him into a world of memory.[5] Rudyard Kipling wrote, "Smells are surer than sounds or sights/To make your heart-

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[3] Dr. Alan M. Ducatman, Interview November 14, 1989.

[4] T. Engen, "The Acquisition of Odour Hedonics" in Perfumery; The Psychology and Biology of Fragrance, edited by Steve Van Toller and George H. Dodd (Chapman and Hall, London, 1988.)

[5] Marcel Proust, Remembrance of Things Past, translated by C. K. Scott Moncrieff, Terence Kilmartin, and Andreas Mayor. Random House, New York, 1981.

strings crack."[6] Boyd Gibbons starts his National Geographic article, "The Intimate Sense of Smell," by recounting how an old deerskin hunting vest evoked the memory of his grandfather.[7] When I mention that I am working with smells, most people cannot wait to tell me about how a smell evoked a deeply buried memory; how a smell propelled them into a vivid world, with strong vibrant images and detailed sound. It can be the smell of a small mountain flower associated with a grandmother's bed, or the smell of gasoline recalling a father mowing the lawn in the afternoon, or the smell of split pea soup bringing back the stench of the apartment house where a man grew up. The memories seem to be unavoidable when confronted with the right odour trigger.

These associations vary widely, but people from similar environments or 'cultures' have many shared associations--for example, rose water reminding people of their grandmother's house, or the smell of a fir tree at Christmas time, or stale beer from their first fraternity party. There are far more shared associations than differences. These commonly held associations provide a strong basic vocabulary for conveying emotional information.

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[6] Rudyard Kipling. The first line of a poem "Lichtenberg," The Five Nations, Charles Scribner & Sons, New York, 1920.

[7] Boyd Gibbons, "The Intimate Sense of Smell," National Geographic, September 1986.

The contextual setting of an odour changes its perception. The smell of boiled cabbage is not of itself pleasant, but it can be quite nice in the context of someone preparing dinner. The same smell in the context of a bathroom can be unbearable.[8] A woman may choose a lipstick because it smells pleasant to her, it marks a brand that she likes, or it tells her that the lipstick is of a high quality. And to a man, the smell may be sensual. But to find the same odour coming from a glass in a restaurant, meaning that the glass was not properly washed, may be extremely unpleasant. Its relationship to the other senses determines the meaning of the odour. The cultural context also determines the associations made to the odour. Engen provides a good example:

> The following is a true story about the affective response to odour. A newlywed couple had checked into an hotel the evening before. In the morning the smell of bacon drifted into the their room from the kitchen below. She had grown up in a kosher home and woke up feeling sick, but he who was from a different religious background woke up hungry, urging her 'let's go for breakfast.'[9]

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[8] Steven Ellies, ADL, March 8, 1989.

[9] Engen, "The Acquisition of Odour Hedonics." Perfumery: The Psychology and Biology of Fragrance, edited by Steven Van Toller and George Dodd. Chapman and Hall, London, 1988.

The perception of odour is controlled by what a person's other senses tell him/her and by what a person knows.

The sequence of odours, what comes before and after an odour, can also change its meaning. For example the smell of gasoline in association with a burning smell is very different from the smell of gasoline in the context of AA aldehyde--the smell of freshly cut grass.

Many aromatic chemicals elicit physical responses; for example, menthol opens up the nasal passages and formaldehyde desensitizes the olfactory mucosa. When released into the air, some odorants, such as oil of pepper or bergamot oil, become irritants. Some trigger the release of hormones in the body. Other physical reactions come from allergies or asthma. In utilizing odours one needs to be very sensitive to the physical reaction of the aromatic chemicals (see Appendix 1, SAFETY).

Weather, temperature, humidity, air pressure, and air movement all affect the way aromatic chemicals perform. The temperature is the most obvious example: the higher the temperature, the more volatile the chemical. High humidity can slow down the evaporation rate of the material, and low humidity will increase it. High air pressure slows down evaporation; low air pressure increases evaporation. Air movement increases vaporization; it also spreads out the molecules of the odorant, decreasing the concentration in a given area. It causes convection cells where pockets of

odour are and leaves other areas without odour. People tend to confuse air movement with the sense of smell. A blast of air is refreshing but is not a fresh smell.

Odour is temporal. It enters the air at certain rates and disperses itself at certain rates. Patience is required to appreciate some of the subtleties of odour.

The concentration, duration, associative power, sequence, physical effect, weather, and time all affect the perception of an odour. Understanding them and their interrelations is the key to understanding how to use smells.

THE AMERICAN AESTHETIC OF ODOUR

The sense of smell has been ostracized in American culture. As Edward T. Hall put it:

> In the use of the olfactory apparatus Americans are culturally underdeveloped. The extensive use of deodorants and the suppression of odour in public places results in a land of olfactory blandness and sameness that would be difficult to duplicate anywhere else in the world.[1]

J. Byrne-Quinn[2] addresses likes and dislikes in odoured products, showing the conservatism of the American public. The problem may be that Americans have become unaccustomed to using their sense of smell so they shy away from it. The notion that the sense of smell is a primitive and expendable sense, coupled with the notion that all odour is bad, has caused a disregard for olfaction.

This has led to the 'Unscented Aesthetic' in America. It is very difficult to make 'Unscented' products. In order to do this there must be enough fragrance added to neutralize the original odour of the product but not enough to make the fragrance detectable. 'Unscented' products are

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[1] Edward T. Hall, (1966) The Hidden Dimension, "Olfactory Space," pg 45-50

[2] J. Byrne-Quinn. "Perfume, People, Perceptions and Products,"Perfumery: The Psychology and Biology of Fragrance, Edited by Steven Van Toller and George H. Dodd, Chapman and Hall 1988. p.205-216.

more popular in America than products with a noticeable odour. The popular aesthetic is biased towards the removal of odour, and compared to other cultures, the creative range of odours is confined to a very small area.

Deodorization is achieved in several ways: by masking or counteracting odours, by deadening the olfactory sense, and by killing the bacteria or fungus that causes the odour. Masking is the most common method of odour modification. It is done by adding a dominant odour to the environment that covers up the malodor. Counteraction is a delicate balance of selecting an odour that improves the character of the malodor. Suppressing the olfactory sense is no longer done commercially. It is achieved by introducing chemicals, such as formaldehyde, that deaden the olfactory mucosa, effectively blocking the perception of any odour. The most common way of killing bacteria is by alcohol, although many essential oils have the same ability. The only real way to cleanse the air is by forcing it through an activated charcoal filter that traps the odourant.

STUDIES ON HUMAN OLFACTORY COMMUNICATION

There is mounting evidence that humans can and do communicate using odours, and use perfumes to enhance olfactory messages. D.M. Stoddart in his article "Human Odour Culture: a Zoological Perspective," and D.B. Grower, A. Nixon, & A.I. Mallet in their article, "The Significance of Odours: Steroids in Axillary Odours," present evidence that humans have more than enough sebaceous glands to generate odour messages.[1] Donald H. McBurney[2] and R.W. Moncrieff[3] both report that mercaptan can be detected in parts per trillion. Most odour thresholds are in parts per million, which indicates that humans are certainly able to detect olfactory messages. Michael Russell[4] demonstrated that humans can recognize their own odour, a male's odour, and a female's odour. He showed in another experiment that

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[1] Both from Perfumery: The Psychology and Biology of Fragrance.

[2] McBurney Donald H. "Taste and Olfaction: Sensory Description," Handbook of physiology - The nervous system III, Ch. 23

[3] Moncrieff R. W. (1967) The Chemical Senses pg. 214

[4] Russell, Michael J. (1964) "Human Olfactory Communication." Nature 260, pp. 520-522

infants can recognize the smell of their mothers' breast milk within a period of six weeks. And in yet another experiment, Russell[5] showed that women regularly exposed to each other's body odour develop synchronized menstrual cycles. Russell's work shows that, at least on a minimal level, people do send and receive olfactory messages.

The same factors that hamper the translation of visual information to verbal expression apply to olfaction. There are few words in common English that describe visual information or the methods through which visual information is conveyed. This leaves people with few ways to express what an image means to them. Combining this factor with the false assumption that "if meaning is not expressed verbally, then it does not exist" prevents people from acknowledging the reception of information. S. Van Toller shows through use of an electroencephalograph (EEG) that subjects will register an odour in the brain but may not be able to respond verbally that they have sensed an odour. Yet following the test, when presented with the same odour, they will easily identify it as an odour used in the test.[6] Other experimenters have noted the inability of their subjects to

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[5] Russell, M. J., Switz, G. M., Thompson, K. (1980) "Olfactory Influence on the Human Menstrual Cycle." Pharmacology, Biochemistry and Behavior vol. 13, pg.737-738

[6] Steven Van Toller. "Emotion and the Brain" Perfumery: The Psychology and Biology of Fragrance, Edited by Steven Van Toller And George H. Dodd. Chapman and Hill, New York, 1988. p.121-144.

respond to an odour in any other way than "I like it" or "I don't like it." In both vision and olfaction, the information gained from the senses is dealt with directly. Verbal processing is secondary and not necessary for the utilization of the information.

Isabel Briggs Myers has developed a theory of personality type. In applying this theory she has found that only 5% of people react to stimuli in an intuitive way such as considering information from different perspectives, extrapolating meaning from given information, or imagining outcomes. This result was obtained by verbal response. If this can be applied to olfaction it means that only 5% of the population will be able to consider different relationships to an odour, extrapolate meaning from odours, or imagine the use of an odour. This same reasoning also applies to imagery.[7]

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[7] Isabel Briggs Myers with Peter B. Myers. Gifts Differing, Consulting Psychologists Press, Inc., 1980.

CLASSIFICATION AND DESCRIPTION OF ODOURS

There are three basic ways to classify odours: by likes and dislikes, by associations, and by chemical structure. All of these have their limitations. What is needed to understand and overcome the limitations is avid smelling. Likes and dislikes are not specific because tastes differ. The use of associations becomes complicated because associations differ, and odourants possess differing qualities. Chemical classes or stuctures are an interesting way of classifying odours. They are grouped in families according to molecular structure, such as terpenes, aldehydes, alcohols, esters, ketones, and shift-base odours. This method is helpful because the odours in each group tend to have similar smells. Terpenes tend to smell like turpentine. Esters smell fruity. Ketones are animal-like, and shift-base odours present several odours all at once, like a bouquet of flowers. As a system, however, it becomes confusing to someone who lacks a background in organic chemistry. Avid smelling is needed to develop a clear understanding of odour. In addition, a set of standard odours is necessary for concise comparision.

Perfumers have developed a method of categorizing odours. Floral, citrus, woody, green, and fruity are examples of the categories used. Perfumes are grouped in a similar way. Examples of the families are single floral, floral bouquet, aldehydic floral, oriental, chypre, woody, green, citrus, fougere, canoe, musk, animal, herbal, leather, and spice. What is confusing about the categories of odours and perfumes is that odours and perfumes can fit into several seemingly contradictory categories. The contradiction in categorization is due only to language. Odour or perfume often fall into several apparently contradictory catagories.

HUMAN OLFACTORY COMMUNICATION

Human use of olfactory communication happens on both a conscious and an unconscious level. On the unconscious level the odours directly affect the limbic system, and is then processed consciously by the cerebral cortex.

The olfactory sense can pull memories to mind better than any other sense,[1] as "A whole vanished universe is preserved by an odour," from Betsy Warland's work Four Poems. This ability to evoke memories gives odours strong associative power. The associations create identity,[2] convey meaning, and function conceptually.

Smell marks people, things, and places. The smell of a lover, a child, or of a parent, is imprinted in the memory. Helen Keller could identify people by their smell alone.[3] The fictional character Jean-Baptiste Grenouille, in the story Perfume, by Patrick Suskind, could identify people by

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[1] Ruth Winters. The Smell Book, J. B. Lippincott Company, Philadelphia, 1976.

[2] J. Byrne-Quinn. "Perfume, People, Perception and Products", Perfumery: The psychology and Biology of Fragrance, edited by Steven Van Toller and George H. Dodd, Chapman and Hall, London, 1988.

[3] Ruth Winter. The Smell Book, J. B. Lippincott, Philadelphia, 1976.

their smell.[4] Russell's experiments with children show that a child learns to identify its mother by smell.

The use of odours to mark brands is prevalent in industry. Soap, cosmetics, cars, computers, tobacco, and food are all odoured to give identity and make the product more pleasant. There is much testing to give the product an odour that is both pleasing and tells the consumer that it is doing the job.[5]

In the case of plastic, aldehydes are used in the curing or hardening of a plastic and as lubricants in the releasing of the product from the molds. Aldehydes are a large and diverse chemical group of odorants. Choosing an aldehyde that is appealing and functional makes the product more agreeable to work with and insures that it does not ruin food with which it comes in contact.

Microencapsulated odours can also be added to plastic. When the plastic is rubbed or torn the odour escapes. Cherry Mary Muffin was a doll with microencapsulated fragrance in the plastic. When the doll's 'skin' was rubbed, the odour was released.[6] Some packages have an encapsulated fragrance

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[4] Patrick Suskind Perfume: the story of a Murderer, Pocket Books, New York, 1986.

[5] J. Byrne-Quinn. "Perfume, People, Perception and Products", Perfumery: The Psychology and Biology of Fragrance, Edited by Steven Van Toller and George H. Dodd, Chapman and Hall, London, 1988.

[6] Stanley Resincoff, Mattel Toys, interview.

in the plastic to cover the plastic smell; when a buyer tears open the package the odour is released.[7]

The use of odour to give identity adds security and makes the product more pleasant. A child continuously carries an over-loved stuffed doll, but after the doll has been washed the child no longer cares for it. The olfactory identity of the doll has been lost. The child no longer feels security from the doll, and the doll is not as pleasant. The paper industry uses large amounts of perfume--with good reason: if people are going to put their nose in a book for a long time, it must smell good. In this same way, the smell of a new product--a stereo, computer or car--gives the buyer security in the product and makes the product more pleasant. The odour identity is a signal that the product is new, that the car is fast or comfortable, that the stereo is of high quality, or that the computer will function well. People spend large amounts of money on these products and they want to feel secure that the product will do the job. Odour identity is a statement of what the product is like, and it provides a sense of security and makes the product more pleasant. Unfortunately this may be seen as manipulation of the buyer, because most consumers do not consciously recognize the olfactory message.

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[7] Charles Wiemer, flavorist, International Flavors and Fragrances, interview, January 27, 1989.

The use of odours to identify place is more important than we might think. Book stores smell differently than restaurants, and a dentist's office certainly has an anxiety-causing odour. Spaces are made by many means other than physical walls--one of them is olfaction. Grocery stores pump the air from the bakery or deli department to the front of the store, welcoming the customer and confirming that this is a place to get food. This not only defines the space, it give it identity and announces its function. One concern in creating a high quality restaurant is odour; if it has the smell of over cooked food, the smell of food ground into the carpet, or the smell of disinfectant, it is not a pleasant atmosphere and distracts from the pleasure of eating. The most interesting examples of olfactory space come from Islam. The mosque at Kara Amed and the mosque of Zobiade at Taris were built with musk mixed in the mortar. In both mosques the musk fragrance can still be detected by people with a trained nose. Musk is a particularly important perfume to the Muslims because of it ability to last for a long time. In the Garden of Paradise, the place after death, perfumes never fade.

The conceptual use of odours takes advantage of odour associations. The idea of an odour is sometimes more appealing than the odour itself. The most prevalent use of the 'concept of an odour' is in humor. Just the idea of a nose in Gogol's book <u>The Nose</u> is riotous. Think about Abott

and Costello being chased by a skunk, or Larry of the Three Stooges holding a skunk by the tail with a clothes pin on his nose. Whoopy cushions and sprany fart are common gags. In the comics there are numerous jokes involving farts. The actual odour of a skunk or a fart is not funny, but the idea is. The same is true for the appeal of a room full of the smell of roses, but the reality of the odour may be overbearing.

Synesthesia is the transference of representation from one sense to another. The word for a sensation of smell produced by nonolfactor stimulus is olfactism. Baudelair describes it in his sonnet 'Correspondences':

Correspondences

Nature is a temple where living pillars
Sometimes allow confused words to arise;
Man goes by through forests of symbols
Which observe him with familiar eyes.
Like long echoes which mingle far away
In a dark and unfathomable unity,
Vast as the night and as the light,
Perfumes, colors, and sounds answer one another.
Some perfumes are fresh as children's flesh,
Sweet as oboes, green as prairies,
And others, corrupt, rich, and triumphant,
Possessing the expansion of infinite things,
Like amber, musk, benzoin and incense,
Which sing the raptures of the mind and the senses.[8]

This poem says that nature is a system of perpetual analogies. One sense can represent another. "Perfumes, colors, and sounds answer one another." Odour can be used to convey other sensorium.

Unconscious information is odour that affects the limbic system directly. These are odours that are either pheromones or irritants. Pheromones are semichemicals that

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[8] The Norton Anthology of World Masterpieces, fourth edition, W.W. Norton and Company, New York, 1957

act between members of the same species, evoking a specific reaction or behavior. Pheromones are categorized as releaser pheromones or primer pheromones. Releaser pheromones evoke an immediate reaction, and primer pheromones effect long-term behavior. Pheromonal odours are very complex, and are a tender topic of discussion because of our aversion to admitting that humans are animals. Some people cannot smell pheromonal odours such as Andors.[9] This ability seems to be genetically linked. Pheromonal odours are connected with sexual drive, dominance, sexual arousal, and signaling moods (e.g. stress, anger, happiness).

Pheromonal odours are produced in the apocrine glands (sweat glands) located in different parts of the body, primarily in the arm pit, around the groin and anus, and most interestingly on the face.[10]

Irritants can also be associative, but I choose to talk about them in terms of unconscious communication because, in a large part, the recognition that an odorous material is dangerous happens in the limbic system, and a person's immediate reaction to it is involuntary. There are exceptions, such as mercaptan. Mercaptan is the odorant

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[9] Charles J. Wycoski and Gary K. Beauchamp. "The Ability to Smell Androstenone is Genetically Determined," Proc. Natl. Acad. Sci. USA, Vol. 81, August 1984, pp. 4899-4902.

[10] Ruth Winter, The Smell Book; Scent, Sex, and Society, J. B. Lippincott Company, Philadelphia, 1976.

added to natural gas which is an associated danger signal (there is an educational campaign teaching people how to react on perception of the odour). The choice of mercaptan and the amount placed in the natural gas is well thought out. At a low concentration it is unmistakably noticeable, but the concentration in gas gives the olceptor a chance to react calmly and rationally to the odour. At high concentrations it causes an immediate reaction of flight.

ARTISTS/BACKGROUNDS

TOM KOVACHEVICH AND BARRY SHARPLESS

The collaboration between Tom Kovachevich and Barry Sharpless at M.I.T.'s List Gallery (1988) was an event that was part of an installation. They released strong odours by holding bottles up to a fan. Some of the odours used were the smell of a basement, sweet and sour smells, also urine and flowery smells. The most interesting part of the odour-works was the placing of female moth odour on thin undulating strips of paper. Male moths were released and were attracted to the undulating paper.[1] This is an example of pheromonal response which is duplicated at the human level in subconscious reaction to odour.

KATHARINA FRITSCH

Katharina Fritsch, at the opening of her first one-person show, presented a work called "Parfum 1984," during which she filled a stairwell with perfume. The odour was so

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[1] Mrs. Kovachevich, telephone interview; and Barry Sharpless, interview.

strong that the caretaker opened all the windows.[2] This work was about the suppression of women. She used perfume as a symbol of femininity and placed it in the stairwell at such a strong concentration that it was oppressive. The things that are used to make women feminine are things that oppress women. This is a work that is beautiful in its clarity and simplicity. Fritsch uses two elements, the odour of the perfume and its concentration. She transforms the perfume into a symbol by our association to notions of romance and femininity. Then by the concentration of the perfume, she drives her point by making the perfume aroma an oppressive odour.

JOSEPH BEUYS

Joseph Beuys uses odours in two ways. He announces the work through a direct affront and creates a mystical sense through the pheromonal aspect of the odours. All of Beuys's elements, fat, felt, butter, honey, carried pheromones. In the animal fat, pheromones are present because they are a natural part of the animals' bodies and soluble in the fat. In the processing of the animal the pheromones stay with the fat. Beuys uses rough unwashed felt with a smell like 'Grey Flannel'--musk, oak moss, and earth. along with these odours, the felt retains the smell of horse sweat and the

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[2] Christoph Blase, "On Katharina Fritsch," Artscribe, March/April 1988, p. 52-55.

odourous pheromones in the sweat. In butterfat the pheromones are chemical signals to the young animal. Bees also use pheromones as chemical messages: go this way, stop, honey for food, nursery, queen bee. When the honey is extracted from the hives the pheromones are swept away and mixed with the honey. These same pheromones which are used by many animals, affect humans as well.

The least complex of Beuys's work utilizing odours is LAVENDER FILTER (1965). It consists of a cotton, cone-shaped filter supported by a bronze armature. Under the filter is a circular gauze pad. Lavender oil is filtered through the cone, and drips onto the gauze pad, and as the oil is absorbed it spreads across the pad. Lavender is an odour that calms the smeller.[3] The filtering of the lavender oil provides a large surface for evaporation and serves as a metaphor for the refining of the spiritual quality of calmness. The gauze pad is a visual metaphor for an absorbent bandage on a wound. The spreading lavender oil is the spreading of calmness over the wound. The circular gauze bandage represents wholeness or the earth. Beuys uses the physical affects of the odorant: the calming affect, in conjunction with the visual effect of the oil to make a

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[3] S. Tirri, H. Fukuda, H. Kanemoto, R. Miyahchi, Y. Hamauzu and M. Kawasaki. "Contingent Negative Variation (CNV) and the Psychological Effects of Odour," Perfumery: The Psychology and Biology of Fragrance, edited by Steve Van Toller and George H. Dodd. Chapman and Hall, London 1988.

statement about the spreading of calmness over the world and the healing of wounds.

COYOTE (1974) was an action done to evoke healing between Europeans and Native Americans. This work took place for a week in May 1974, at the Rene Block Gallery in New york. Beuys lived with a coyote for a week, gradually coming to terms with it and eventually building a dialogue with the animal. The zoo smell was an active ingredient of the piece--marking the place where it was, confronting the audience, and pointing to the entrapment of the participants (Bueys and the Coyote, standing for the Europeans and Native Americans.)

TALLOW (1977) was a sculpture meant to be a symbolic salve on the wounds of urban development. Bueys's aim was to question the underlying motives that produce urban concrete deserts. He found a deep wedge-shaped cut in the concrete underpass to an auditorium of the University at Munster. A mold was made of this wound and filled with the protective salve (twenty tons of beef and mutton fat). The salve was cut into five blocks, the largest of which was 2x2x3 meters, and displayed as sculpture in the courtyard of the Westfalisches Museum. The odour of the material has an oppressive presence which saturates the air. It also has an exuberant pheromonal effect. This polarity, an effect of the odour of tallow, creates the experience of the mourning of the wound and the energy to heal it. Odour has the ability

to make, simultaneously, contradictory statements without making the statements seem contradictory.

HONEY PUMP was installed at Document 6, in Fridericianum Museum, for 100 days. It was linked to seminars, discussions, lectures, films, and demonstrations of the Free International University. HONEY PUMP was the metaphoric heart of the Free International University. Bueys wrote;

> "With **Honey pump** I am expressing the principle of the Free International University working the bloodstream of society. Flowing in and out of the heart organ--the steel honey container--are the main arteries through which the honey is pumped out of the engine room with a pulsing sound, circulates round the Free University area, and returns to the heart. The whole thing is only complete with people in the space round which the honey artery flows and where the bee's head is to be found in the coiled loops of tubing with its two iron feelers."[4]

Honey was pumped through the 'veins' of the Museum, physically running through the building. The smell of honey was used in many ways. It marked the area where the art work was, it could be smelled throughout the building. It also generated awareness in a second way. Honey carries pheromones that arouse people, evoking a spiritual sense of excitement. This action is most impressive because it provided the machinery for social change, rather than simply

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[4]Caroline Tisdall, Joseph Beuys, The Solomon R. Guggenheim Museum, New York, 1979.

pointing out the need for it. Through the workshops. information was spread to aid in making social change.

Beuys uses the perception of odour on a conscious and unconscious level to reinforce the meaning of his work. The way he uses odour operates on an experiential (physical, real) as well as a mystical level, drawing a person's whole being into the meaning of the work. I have simplified Beuys' complex the work in order to demonstrate the use of one small element: odour.

CARLO CARRA

The first Futurist to declare that the sense of smell should be incorporated in futurist art was Carlo Carra in his manifesto "The Painting of Sound, Noise and smell 1913".[5] As the title suggests, the manifesto states that painting should evoke sound, and smell. Images which evoke the sensation of smell are described as olfactory-imagery. Olfactism is the term that appeals to the sensation of smell produced by a normal non-olfactory stimulus. McKellar describes in this way how mental imagery affects him.

> This olfactory imagery is rather a nuisance, as I now distrust my olfactory experiences unless others people experience them at the same time.' For example an interesting confusion occurred sometimes over the smell of a perfume. "If I am speaking to a man, I know it is an image, but if it is a woman I cannot tell whether

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[5] Umbro Apollonio, Futurist Manifestos, Viking Press, New York, 1973.

she is wearing it or whether I am experiencing an image."[6]

As mentioned above, Charles Baudelaire's poem, 'Correspondences,' first introduced this concept.

TAKAKO SAITO

Takako Saito did a work that bridged Marinetti's manifestos and Duchamps' love for chess. Marinetti wrote several manifestos proclaiming that Futurist performances must incorporate sound, weight, and smell. He did this with the most clarity in his "Manifesto of Dynamic And Synoptic Declamation" (1916)[7]. In 1965 Takako Saito combined the futurist proclamations and Duchamps' devotion to chess in 'SMELL CHESS,' 'SOUND CHESS,' and 'WEIGHT CHESS.' In each, the chess pieces were identified by either smell, sound, or weight. The pieces were sold through the Fluxus catalogue. SMELL CHESS was a wooden board with holes drilled partially through (instead of squares) that held bottles containing odours. SOUND CHESS was a grid of slats, for plastic boxes, that in concept held the sound. WEIGHT CHESS was also a grid of slats and square boxes with the boxes holding material of

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[6] R. Harper, E. C. Bate Smith, and D. G. Land. Odour Description an Odour Classification, American Elsevier Publishing Company, Inc., New York, 1968

[7] John F. Moffit, Occultism in Avant-Garde Art; The Case of Joseph Beuys, UMI Research Press, Ann Arbor, 1988.

different weight. SMELL CHESS was a conceptually based work, as is SOUND CHESS and WEIGHT CHESS. SOUND CHESS went to an extreme, with empty boxes supposedly holding sound. Saito made several editions between 1966 and 1977, for sale by catalogue, similar to SMELL CHESS, all entitled SPICE CHESS.

FLUXLABYRINTH and DIALOGUE OF THE SENSES

FLUXLABYRINTH and DIALOGUE OF THE SENSES were installations that where created by group efforts. The Fluxus group created FLUXLABYRINTH, and the Center for Advanced Visual Studies created DIALOGUE OF THE SENSES. Both groups created an installation whereby the visitor would have a total sensory experiences. The use of odours became an integral part of the environments. In the final version of FLUXLABYRINTH the odour component was 'elephant shit,' which utilizes the idea of a smell in a humorous as well as an experiential way. DIALOGUE OF THE SENSE was a show designed for the needs of the sensory impaired, particularly the blind. It stimulated all the senses in concert with one another in a way that heightened all sensual input. The olfactory component was contained in a forest of columns, some of them containing differing odours.

FLUXLABYRINTH, or FLUX-MAZE: Several versions of this work were made (and many proposals). All included an area for odour: smell chamber, smell box, and smell room, are

some of the names for this section. One of the proposed versions was:

> 'Enclosed is the final plan of labyrinth ... The third Watts Room will be with some smell, it should also have a roof. The smell could be either burning tar, or sulfur or hashish, we will think of something. it could be a different smell each day...'[8]

the proposal was sent by George Maciunas To Rene Block, Rene Block Gallery, New York (Summer 1976). Another proposed version was:

> Smell room needed: smells perhaps the entry door could be whoopee cushion or whoopee cushions somewhere on floor to make fart sound. Then we could have a sulfur smell. I will have an assistant locate a novelty and gag store to inquire. also : we could have unmarked aerosol cans with various smells so people could spray.[9]

This description was from a note from Larry Miller to George Maciunas concerning the Fluxlabyrinth, Berlin (August 1976). In the actual installation of the Fluxlabyrinth 'elephant shit' was used as a physical component as well as an olfactory component. The description of the executed version was:

FLUXLABYRINTH

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[8] Jon Hendricks. Fluxes Codex, Harry N. Abrams, Inc., Publishers, New York, 1988.

[9] Ibid.

at Berlin 26th Arts Festival, Sept. 1976
in the Art Academy
designed and installed by
George Maciunas & Larry Miller
with assistance from Joe Jones, Ayo, Bob Watts.

Entry
this door has knobs on each side: to open it, one has to turn them simultaneously. The door turns along its central vertical axis.
fog machine
Watts: spiderweb machine

Maciunas section this door releases a catch causing a beach ball to swing on a pendulum and hit the face of visitor.
this door swinging 270 degrees, must be open 270 degrees to permit anyone to enter. while opening it, the beach ball is lifted and set in a magnetic catch to be released by the next visitor.

foam steps
step made from foam rubber covered at top with thin plywood to prevent damage to foam
see saw

shoe steps
Various shoe steps: slipper type shoe rest made from leather attached to wood sole, oversized to fit largest shoe, held on top of wood post.
sloping sideways sloping upward sloping downward toward heel
rubber bridge or trampoline type bridge (canvas held by springs at perimeter)
see above
steps made up of 3 boxes filled with crumpled paper, styrofoam balls, tennis balls
slippery floor glass balls
door with knob at hinges
adhesive
N. J. Paik piano activates door One key on piano is electrically switched to activate an electrical door opener.
Ayo section starts with a forest of vertical rubber bands, rods, followed by mattress like foam bent into
U shape, soft enough to permit passage. To facilitate the foam should be covered with slippery vinyl film or cloth. followed by a forest of horizontal rubber bands, rods. Ayo
Joe Jones steel drum with bells attached walk inside drum up slight incline.

> The door has 20 knobs, but only one will open door;
> door is pivoted along a horizontal central axis.
> Larry Miller's section: Labyrinth within a labyrinth, vertical and horizontal passages. all in total darkness except on passing one portion a strobe flash is switched on.
> slit rubber gates containing a room full of balloons. this door has a small door in it. to open it one has to open the small door and find the door knob for the large door, which is contained in a box filled with elephant shit.
> EXIT

This plan (version C) for Fluxlabyrinth was completed in Berlin, september 1976.

DIALOGUE OF THE SENSES was an installation at the Wadsworth Athenaeum, Hartford, Connecticut, 1972, as part of a show designed by the Center for Advanced Visual Studies. This was the inaugural exhibition for the Wadsworth Athenaeum's new Tactile Gallery. Gyorgy Kepes (then Director of the Center) said this about the exhibition:

> It is of increasingly common knowledge that the individual human uses only a fragment of his potential. Vast ranges of our sensibilities are unexplored and unutilized. This exhibit is an attempt to bestow upon the visitors the opportunity to rediscover their interconnected resources of sensibilities. It is a small and, by purpose, unfinished design aiming to stimulate both the unsighted and the sighted to discover connections between sense modalities, and to learn to tap our almost inexhaustible inner resources.[10]

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[10] Miss Claire Burns, Wadsworth Athenaeum Press Release.

The description of the gallery is as follows:

> Upon entering the gallery, the visitor will receive a Braille map of the exhibition. He will then cross a sound floor consisting of 62 modular units. Of this total, 34 will produce an elemental musical sound when stepped on. Where are five independent instrumental timbres contained in the system: wind pipes, plucked strings, percussion, small bells and sampled electronic music. Each instrumental category occupies its own spaces within the floor system, which has been arranged according to classical chess moves, which the visitor can follow as he crosses the floor.
>
> After crossing the sound floor, the visitor will reach a forest of columns, which have appeal to many of the senses: olfactory, thermal, tactile. The interior wall of the gallery is a collage made up of a rich range of tactile material. The terminating area is a serpentine wall that offers an intimate space environment.[11]

Gyorgy Kepes formed the original plans for the exhibition. Micho Ihara took responsibility for coordination and construction of the exhibition, with the help of Paul Earls, Mauricio Bueno, and Lowry Burgess.

FLUXLABYRINTH and DIALOGUE OF THE SENSES were installations that were created by group effort to give the visitor total sensory experiences.

POLYESTER and THE SCENT OF MYSTERY

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[11]Ibid.

There are films that have employed odour. POLYESTER, a film in Odorama, came with a card that had ten pink numbered scratch-and-sniff circles on it. When a number was flashed on the screen during the course of the movie, the audience scratched the appropriate circle. The odour ranged from rose to body odour with a tendency toward malodors.[12]

In THE SCENT OF MYSTERY (at the Cinestage Theatre in Chicago, August 27, 1959), Michael Todd Jr. dubbed his technique used to synchronize odours with the film, Smell-O-Vision. Each seat in the house was equipped with a console type of machine controlled by a magnetic track on the film. The console could release up to forty different odours. The system was developed by a Swiss osmologist, Hans Luabe.[13]

The addition of odour to film makes the screening experiential. In making a movie, time is compressed in order to intensify the story. Odours occur in 'real time,' and therefore every time the viewers smell a new odour it pulls them back to reality. Movies that use odour either happen in 'real time' or cut between the 'compressed time' of the story and 'real time.' Both of these movies handled the this problem very well. In POLYESTER the story was broken by a flashing number on the screen, the number indicating the appropriate pink circle to scratch-and-sniff. In THE SCENT

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[12] John Waters, director, writer and producer, POLYESTER, released by New Line Cinema, 1981.

[13] New York Times Review August 19, 1959.

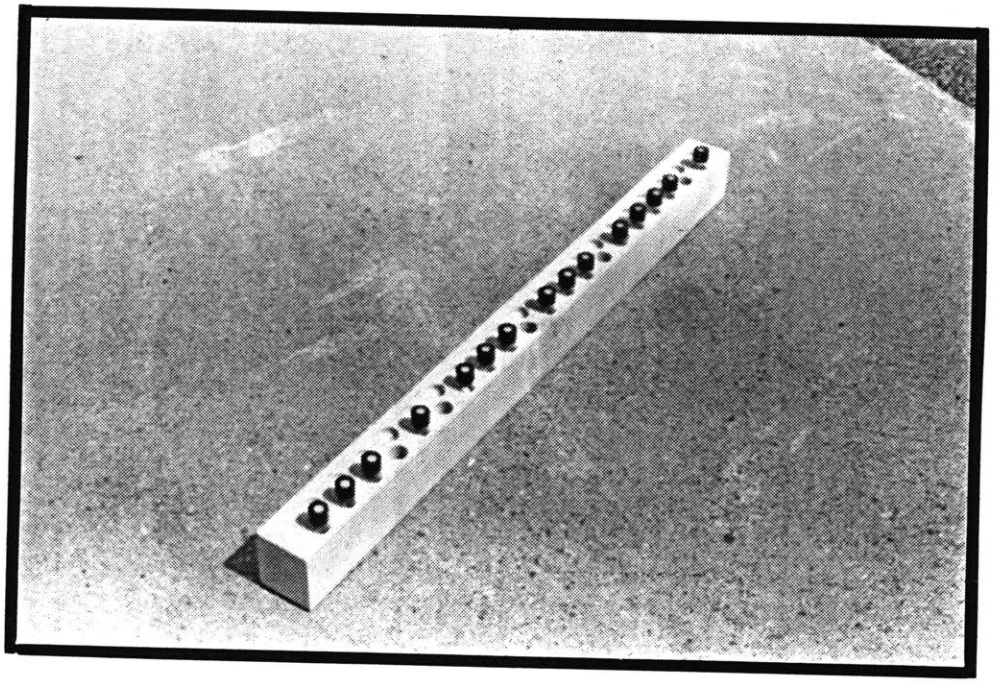
OF MYSTERY the movie was a panorama of Europe (very beautifully shot), with very little story. The whole movie occurred in real time, giving an environmental experience.

MY WORK

In my work with aromas, I have tried many ideas; each work has been an advancement in a learning sequence. Several works failed to produce the intended effect, but through each trial I have learned a little bit more. Much of the work has consisted in educating myself--learning the properties of odorous material and how powerful they can be. In this section I describe several works and three performances in this section that gave me an understanding of the expressive use of odours.

I started doing 'scent poems' in December 1987. The concept for making 'scent poems' came from what Elizabeth Goldring taught me about verbal poetry. I simply applied to the sense of smell what she taught me. Elizabeth uses words to evoke images, then uses those images she has created in your mind to pull emotional cords in you. Aromas have the ability to evoke powerful images and memories. Using a series of odours it is possible to evoke images-memories-associations that taken together can cause specific emotional sensations.

The objects that held the aromatic components of the scent poems were a series of two dram-bottles (a dram is an eighth of a fluid ounce) placed on a block of maple wood 1.5"x1.5" (however long the poem was) and drilled at intervals of one inch with holes to hold the bottles (see Figure 5).

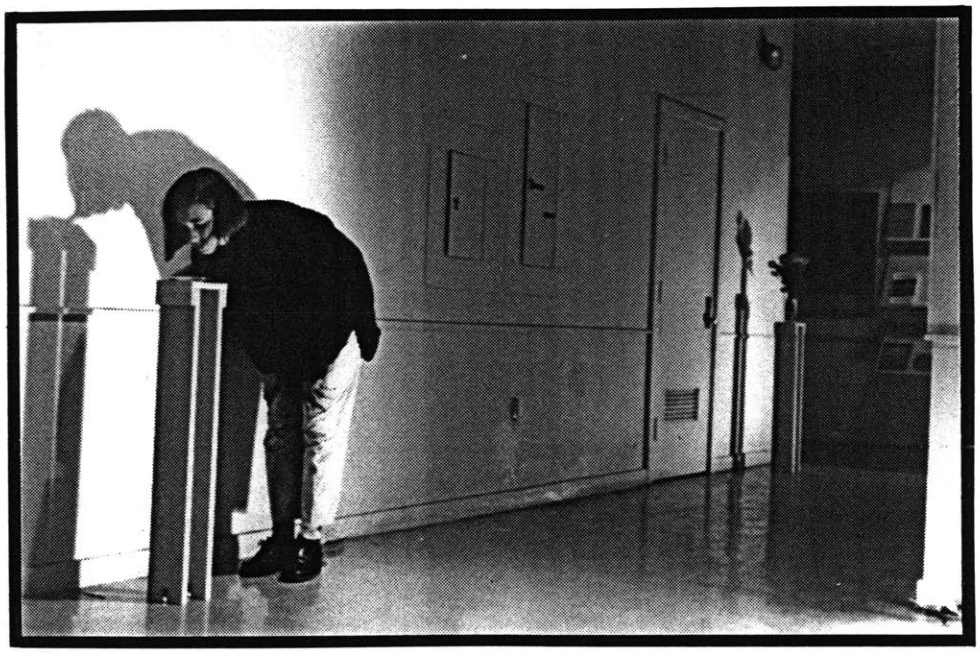


(Figure 5) Scent Poem, MAMA

The first poem, MAMA, incorporated the following sequence of odours: gardenia, carnation, hyacinth, space, rose, musk, hyacinth, space, gardenia, carnation, rose, musk, space, bay rum. To these fragrances was added a common base of Propylene Glycol which has a thick, sweet odour. This addition was useful, functioning as an unifying wash does in a painting to give all the aromas a common background smell. Unfortunately, however, it took some of the distinctiveness away from the fragrances.

The spaces in the block were intended as pauses between phrases of the poem. In showing the poems to people a ceremony evolved: the little caps were removed from the bottles, the poem was smelled and then handed to the next person, and then all little caps were replaced. People took part in the scent poem by smelling across the tops of the bottles. The experience was very much like playing a flute. I enjoyed these pieces because of the simplicity and intimacy of the work.

The ROSE also dates from December of 1987. This work consisted of two identical stands placed at each end of a corridor. One held a dozen unscented, pink roses, and the other held a dish of rose fragrance (Figure 6). Through cultivation, many roses have lost their fragrance--either sacrificed for other qualities or because the odour was considered an undesirable quality. The work was a displacement between the viewer perception and expectations.



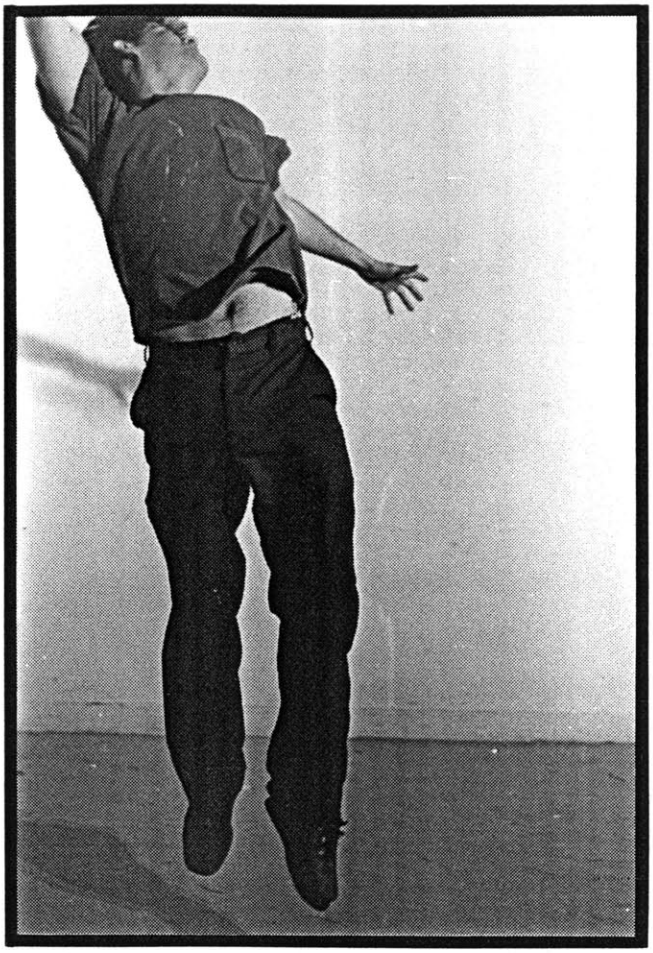
(Figure 6) Installation of ROSE

A type of work called 'scent balances' used the juxtapositioning of an image with two odours. These were done in November of 1988. One, called ANGELA, consisted of an image of Angela with two flasks on either side of the picture. The flasks contained aromas representing the extremes of how I felt about Angela. Cedarwood was in one aroma used, and a mixture of musk and hyacinth was the other. I could never understand Angela; the relationship was like biting into a santal, a delicious, refreshing fruit, but also a sour fruit. The combination of the hyacinth and musk was the delicious part; the cedar was a crisp slap in the face.

(Figure 7) Image of Angela used in the scent balance

ANGELA

A second work of scent balances was called JUMP--a picture of a man suspended in air, cropped so that his head was off the paper (Figure 8). This work took advantage of the ambiguity of the picture by setting it between two odours representing extremes of interpretation. One was Skin Bracer, a fresh but sickeningly sweet odour, and the other synthetic civet, the smell of a dead animal. JUMP comes from a dance piece I choreographed. It is about losing yourself in order to find yourself. It is about risk taking, trusting yourself, about that space where there is nothing to grab onto, and about trying something that is totally new to you. It is about this excitement, but also about the price of insecurity that you pay. The skin bracer is the sticky-sweet reality, and one leaps from and the civet as the peril of potential failure.



(Figure 8) Image used for the scent balance JUMP
photo by Kate Adams

A PASSAGE THROUGH THE NIGHT took place in December of 1988 at the M.I.T. Student Center. The work was installed in a darkened room. This was a series of four stands that were hybrids of a church kneeler and a mongoose scooter. Each stand had a pen light mounted at the base to illuminate it (Figure 9). The stands were arranged in a row imparting a specific sequence of odours, from left to right as you entered the room.

(Figure 9) Installation of A PASSAGE THROUGH THE NIGHT

Two small jars of fragrance were placed on each stand. On the first stand was lily and coconut. The second stand held musk in one jar, and coconut in the next. The third stand held patchouli and musk, and the fourth stand held lily in one jar and a mixture of coconut, patchouli, and musk in the other. The idea for this scent work comes from a long walk at two o'clock in the morning. There is a calmness to the city at that time. Boston, like any city, has a pulse, like a heartbeat. At that time of night one can still feel the heartbeat of the city; the soft breathing of people sleeping, the flicker of a halogen lamp distributing pink haze on glowing asphalt. These feelings were first realized in a 'scent poem' called A WALK BY THE WATER, with a sequence of Hyacinth, Coconut, Coco, Hyacinth, Musk, Coconut, Coconut, Coco. The poem was then developed further in MELODY OF A SUMMERS WALK and HARMONY OF A GRACEFUL WOMAN, two other scent poems. I wrote a poem to interpret what this 'scent work' was about.

2:00 am walking
when the light is black
yellow streaks in the sky
foot steps keep rhythm
with the pulses of the city
in slumber.

orange and deep purple waken the sky
soft forms of trees move
in the chill breathing wind
outside my body
in my chest warm air

passing quiet moments
unpronounced.
wrapped and held in non-time
sunset or sunrises
removed from the context
of time and location

The 'scent work,' MANDY, was an effort to match images of a person's body expressions with aromas in such a way that they would reinforce each other's meaning. The piece was inspired by pictures that Mandy had taken of herself, holding the camera at arm's length. It consisted of six black and white photographs that I took of Mandy (20"H x 24"L), hung on a 14'6" wall in a 6'9" wide corridor with 9'11" ceilings. Above the images was a box holding three Whisper 800 aquarium pumps and the six matching aromas. Whisper pumps have two air valves, a dial on the top that controls the air flow, and are quiet. Each pump had two Masons jars attached to it that held the odorants--from which air was pumped through plastic tubing to areas above the photos. The six aromas were pecan, honey-flavor-notes, rose oxide, baby soap, clover, and hyacinth.

This piece floundered for several reasons. The pictures were too close together, the flow of aroma was not strong enough, and there was an air current in the hall that produced pockets of smell in the wrong places.

MELODY OF THE FIELD was similar to PASSAGE THROUGH THE NIGHT. It was installed in a dark room with six stands of the same design as a PASSAGE THROUGH THE NIGHT. The stands were arranged in two rows facing one another: two stands in the first row, and four stands in the second row. The aromas used in the work were balsam of peru, myrrh, nerol, and hyacinth. Each stand held one aroma except for one which

held two, balsam of peru and hyacinth. The scent poem could be 'olfacterpreted' (my word meaning interpretation of a meaning inherent in the odour) in four ways. First, starting from the last odour in the second row. Because of the way the work was oriented this olfacterpretation was taken most frequently. The sequence balsam of peru, myrrh, nerol, balsam of peru, hyacinth, myrrh, nerol. The next most frequent way of olfacterpreting the scent poem was in the reverse order. The third way it was read was balsam of peru, hyacinth, nerol, myrrh, balsam of peru, nerol, myrrh. The fourth sequence was the most infrequent: myrrh, nerol, balsam of peru, myrrh, nerol, balsam of peru, hyacinth. The way that this scent poem is structured is very similar to the way Julio Cortazar structures or deconstructs his book Hopscotch.[1]

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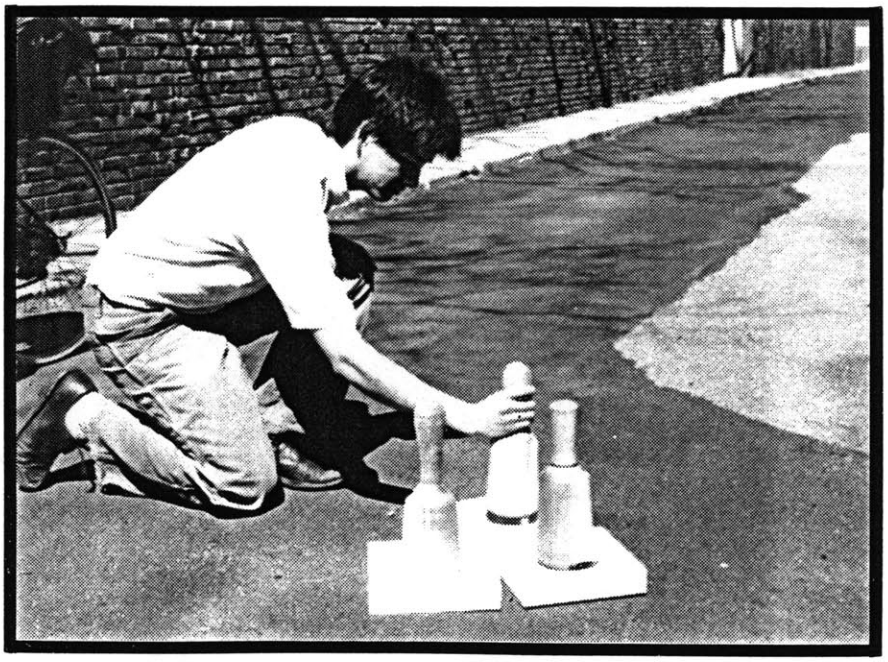
[1] Julio Cortazar does the same thing in literature, ordering segments of his book Hopscotch to give different meanings. There are two ways to read the book. One is the normal fashion, starting with the First Chapter and ending with Chapter 56. It can also be read starting with Chapter 73 and following the sequence marked at the end of each chapter. Each way of reading the book gives a different meaning to the book. Ordering information clearly changes the meaning of the information presented. Avon Books, New York, 1958.

THREE ACTION WORKS

Many performance artists have developed these concepts before me. The works were done in the same routine fashion that a night janitor mops the floor, done so that they were almost unnoticeable. All of these works are about suppression: a feeling of lost creative energy, suppression of the olfactory sense, and have something to express that one finds that they cannot express.

FOUL SEED, This piece was done to initiate a healing process. There are three mortars and pestles; a vial of sulfur or rotten egg smell; a vial of oak moss, the odour of a forest in the spring; a vial of civet, the odour of a dead animal. In FOUL SEEDS, each vial is crushed in its separate mortar releasing its odour slowly, about two minutes for the odour to reach its potential. The mortars are made of poplar, a wood that even after drying continues to move and twist (Figure 10). The act of crushing the odour-laden vials was performed coincidentally on the morning of a full moon.



(Figure 10) Crushing of a vail FOUL SEED
photo Seth Riskin

The vial of sulfur odour like the odour of bubbling sulfur pits; stands for scorched earth where nothing can grow. The oak moss, the odour of walking in the woods in the early spring is potential. The clinging odour of a dead animal is the presence of a suppressed creativity. this work was performed at the Center for Advanced Visual Studies, April 20,1989.

THE DEODORIZING OF AMERICA is about the fear of smell in American culture. The work consisted of myself dressed in a disposable cover-all, a carbon filter mask, and goggles. (Figure 11) I sprayed a selection of deodorants and air fresheners on the pavement in the alley between the Center for Advanced Visual Studies and the Chapel at M.I.T., April 27, 1989. The piece did not work because the original premise, that the compounding, or over-use of these products was destructive, was false. After doing the piece in the alley I noted an increase in the amount of people using the alley as a passage, and the audience who witnessed the 'action' enjoyed the odours. I repeated the piece two days later in order to photograph it, and noted the same increase in the use of the alley as a passageway. It was obvious that people enjoyed and were attracted to the new smell of the alley.

(Figure 11) Performance of DEODORIZING OF AMERICA
photo Annette Kasper

LOSS OF A CHILD is about my older sister losing a child in her sixth month of pregnancy. It consisted of hanging large poorly drawn images of infants and fetuses on the wall. The drawings were doused with the odour of baby soap to evoke the potential of a child. These were then taken down and iodine was poured over it in order to sterilize the wound and start the healing process. A text was handed out to be read during this performances;

THE LOSS OF A CHILD

Drawing, drawn with a numb energy

tacked to the wall

anointed with the promise of a child

i think

The loss of a child

everything seems so unimportant compared to the loss of a child.

school, thesis, art

compared to that promise that enormous potential.

everything seemed so unimportant

When Able died, we, the family, took it hard.

Things were just going well for him.

He was trapped in a gulley between two mountains.

When a flash flood drowned him and his companions.

Dan was upset, he crumbled at the loss.

Dan a warm strong and gentle man.

his first son

Dad took it hard, but could not find a way to show it.

He ran around trying, doing all the errands to keep his loss to himself.

His first grandson.

When Dad came to tell me I thought something was wrong, thought Aunt Ruth had died, Last year about the same time we found Aunt Ruth on the floor of her kitchen she had fallen and was not able to get up the ambulance attendant said she

must of laid there for two weeks. Her stepson calls her every week after the second week and usually some one visits her every week the system broke down. When her stepson could not contact her for the second week he got worried and came to check on her. He saw her through the window on the floor and called the ambulance.

Mom and Dad fought, they never fight In all my childhood i only remember Two times and then they were very short.

The stress was hard on them.

Mom you don't realizes all the sides of Mom growing up with her. The side that came out was how good a friend she is.

Celine had seen this side before. I had to but had not realized it till seeing this time.

Corina was in asia I tried to call her in Hong Kong Then In Taipei, then in Hong Kong

i am shaking like i am cold.

Mr. Tenny a jolly man.

you could see the pain shake out of him.

Mrs. Tenny looked so Fragile Like a china figurine on the edge of a table.

Celine still Feels the loss

She knew the child the best.

they bury the child on saturday

they buried him Jetulo

with Grammy so the child would not be alone.

Grammy was fond of Celine.

they made a blanket of white pansies

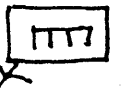
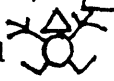
Poetic gesture to help in the healing.

This work is about wanting to speak but being unable to do so, about disappearing and not being able to speak. The work is finished by the taking down of the drawings and pouring Iodine over them symbolizing the start of the healing process.

These three actions were done in the most unnoticeable way possible. I was looking to make them as mundane as a night janitor moping the floor. I was curious to see 'what if' I did performances that were unspectacular.

The three performances, MANDY, and MELODY OF THE FIELD where the works that were done for my thesis.

MY NOTATIONAL SYSTEM

As my vocabulary of odours grew and I discovered odours that I could not describe or had no association to, I needed to find a quick method of notation. From my experience as a dancer with Laban notation, and my understanding of symbols and signs from earlier work, I created a personal notation system. One system I am particularly fond of, because I found it to have humor, is 'The Hobo Language' or 'Knights of the Road.'[1] I responded to the loose almost playful system of graphic symbol that can be seen around the world.  means 'a kind lady lives here,'  'vicious dog,'  'you can sleep in hayloft,' and  'be careful.' Since learning of this system, I have seen these or similar symbols carved into trees and soft brick, or left in the asphalt pavement of the Mid-West. This system offers a natural and direct way for me to create, this personal symbol system that translates odours into images.

My personal notation scheme is much more clumsy than 'The Hobo Language,' but it does not need to be as eloquent

---

[1] Henry Dreyfuss, Symbol SourceBook, McGraw-Hill Book Company, New York, 1972.

because I am not trying to communicate this information to other people. Its purpose is only to trigger in my memory the odor of a particular material,

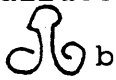
 stands for Alpha-Ionone; it was the first odour which I encountered that had volume. This is the form that Alpha-Ionone has for me, like an encompassing vessel. It is a chemical also called Alpha-Cyclocitylideneacetone. Alpha-Ionone, according to Fenaroli's Handbook of Flavor Ingredients, has a characteristic violet-like odour, but when you say the words Alpha-Ionone it sometimes make a face squirm up because it sometimes smells like rotten carrots. I cannot clearly explain this difference--it could be concentration, that the chemical has decayed, that it is not in a pure form, or other factors. I have experienced it as a very pleasant odour and as rotten carrots, both ways it retains that encompassing form.

Beta-Ionone is a richer odour, and I denote it in this way.  It is more fruity than Alpha-Ionone and it also holds a range from fruity to rancid.

 Rose oxide is a fresh smell, like running through the woods in early spring. It is a broken twig smell, the sparkling odour, that comes when one breaks open a rose hip. It is one of the four main chemical that make up rose essence, along with other trace chemicals which give the essence of its fullness and intricacy.

Geosin smells like fresh earth and come from the scent gland of moles so its symbol is  or  ; the first one being the image of the earth and the second the image of a mole. Geosin is a scare chemical which I was very fortunate to be allowed to smell. Professor Barry Sharpless had a student whose mother worked on a method for synthesizing Geosin, and this student had given Professor Sharpless a bottle that retained its smell.

Oak Moss is a essential oil with a green, moss-like odour, it send my mind to an oak forest on a wet fall day, with the soft earth giving way underneath my feet. I use this symbol  to stand for Oak Moss.

Five-Alpha-androst, or androstenone, is a steroid found in the largest quantities in boars. It is also found in the sweat, urine and saliva of male humans. Its smell is urine-like in low concentrations, and musky or floral in high concentrations; the difference in description of the odour is in concentration. It is urine like at low concentration, floral at high concentration. This is counter-intuitive and unusual, as most odours are more pleasant at low than at high concentrations. A good example of this is civet, which when undiluted smells like a three-day-old dead cat and lasts in your throat like horse-hoof prints for about three days, but in very dilute concentrations is alluring. I denoted Androst as  because it is a male pheromone. Pheromone is a term proposed by Karlson and Luscher in 1959

to group animal secretions under that animal use in order to send signals or leave signs for one another.

In fairness to a civit, a more accurate description is needed. Civet comes from the glandular secretions of both sexes of the civet cat. Most of the production comes from Ethiopia, where the animals are kept in cages and their glands drained about once a week. Civet is a yellowish viscous material that darkens on exposure to light. It is a very strong, putrid odour that becomes sweet when diluted. It contains trace amounts (about one percent) of indole and skatole. Both indole and skatole have a fecal odour which adds to the animal-like quality of civet. Civet is used in perfumes because it enriches floral odours, makes the fragrance of a perfume last longer, and for its sweet, animal-like odour in very dilute concentrations. I denote civet in this way  to remind me how powerful it is.

Jasmine I denote in two ways,  because it is floral, and in this more abstract form  because it makes it easier to remember its characteristic of being a warm rising smell that becomes tart. Jasmine in high concentration becomes like burnt electrical wiring. Its main components are cis-jasmone and methyl jasmonate.

Amyl Salicylate is noted as  because it is warm, up lifting, and sparkling.

Ambergris comes from the intestinal tract of a sperm whale. It is a soft rolling smell with a burst of freshness; so I denote ambergris as  .

Birch tar resin conjures a fire on a canoe trip in a birch tree forest, so I denote it as  .

One of the most enjoyable of odours is AA aldehyde. It is the smell of freshly cut grass; I use a little lawn mower with long grass underneath to symbolize it:  .


Grapefruit oil is obtained by pressing grapefruit skins. It is an essential oil that smells like grapefruit.


Bergamot oil is made primarily in Italy, from the peels of unripe citrus fruit. It has a tart, fresh odour.


Rosemary reminds me of Vick's Vapor Rub. The botanical name for the plant it comes from is Rosmarinus Officinalis Labiatae.

A scent poem that I am currently developing is notated in this way:

Explanation

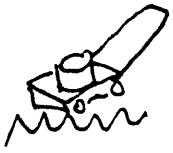
Title, coming from the legend of the Turtle people who believe that they live on the back of a turtle that lives on the back of a turtle.

That sharp smell of a just broken twig.

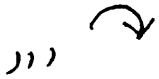
Moss in a forest.

Pine needles brushing against your face.

The feel of a fire, by a clear stream in a birch forest.



The smell of a freshly cut lawn.



The number and direction of step between each odour.

GLOSSARY

Adaptation: Change in the sensitivity of the olfactory receptors due to the continuous or frequently repeated stimulus and leading to fatigue.

Animal Secretions tend to have good persistence, the most common being Ambergris, Castoreum, Musk, and Civet.

Allomone: A compound or mixture acting between different species adaptively favoring the emitting species, as in a defensive secretion or a floral scent attracting pollinating insects.

Aroma: The distinctive fragrance exhale from a species.

Aromatherapy: A branch of holistic health that uses essential oils.

Asnosmia: Inability to detect odours. Smell-blindness/ deafness.

Body: Implied fullness or richness, in the sense of a sufficiency of color or overtones. A perfume that lacks body is thin.

Bouquet: The odour exhaled by wine or perfume. The term is also used to denote a blend of odours, as in a floral bouquet.

Conchae: The folds of flesh in the nasal cavity that direct air through the nose. Singular: concha.

Counteraction: The reduction of an odour intensity by selective modification.

Essential Oil: An extract of odours substances from plant materials.

Fixation: The property of a perfume that determines the persistence of its odour and--in a wider sense--insures odour continuity. Fixatives are products which enhance fixation.

Flavor: A distinctive taste, or savor. Flavor is affected by all senses, particularly taste.

Fragrances: Sweetness of smell.

Kairomone: A compound or mixture acting between different species, adaptively favoring the receiving Species, as in chemical cues by which a predator recognizes or locates its prey, or by which an insect is attracted to its food plant.

Gustation: The sense of taste or act of tasting.

Masking: The superimposition onto a malodor of a dominant odour without reducing the malodors level of intensity

Malodor: An unpleasant odour.

Modification: The action of changing a malodor to a more pleasant character and/or acceptable intensity.

Mucosa: The mucous membrane that lines the roof of the nasal cavity and contains the olfactory cells and their supporting cells.

Odoriphore: Osmophore, odour-producing chemical group.

Odorivector: Odorant, an odorous substance.

Odour, Odor: Any scent or smell, whether pleasant or offensive. 'Odour' is the British spelling; 'odor' is the American, and has taken on the meaning of a malodor. 'Odour' was chosen for this text because of its neutrality.

Olfaction: The perception of odour.

Olfatism: A sensation of smell produced by a sensory stimulus which is not normally olfactory.

Olfactor: He who or that which smells.

Olfactory: Of or pertaining to the sense of smell; connected or concerned with smelling.

Olfactology: The science concerned with the sense of smell

Organoleptic: Relating to the senses, especially of taste and smell.

Parosmia: Partial anosmia; an abnormality in the sense of smell.

Persistence: The staying ability of an odour.

Pheromone: Substance acting between members of the same species. A compound or mixture which is secreted or excreted to the environment by one animal and which evokes a specific

reaction or sequence of reactions, behavioral and/or physiological, in a receiving member of the same species.

Primer Pheromone: A pheromone, the effect of which is primarily longer term, involves physiological changes in the receiving animal.

Releaser Pheromone: A pheromone which evokes a response which is primarily immediate and behavioral. The appropriateness of this name, which was derived from insect studies, to the field of mammalian pheromones has been questioned by Bronson.

Scent: An odour left by an animal, generally perfumes and odorants used by humans are considered scent, but there is debate.

Semichemical: A general term for compounds or mixtures carrying information between organisms in the natural environment. Sub-divided into Releaser Pheromone, Primer Pheromone, Allomone, and Kairomone.

Senteur: A French term, applied to the scents or odours(agreeable or disagreeable) of things(solid or liquid): object, interiors, spaces.

Smell: To have perception of an odour.

Stereochemistry: A branch of chemistry which explores the structure of a molecule.

Tincture: A dilution in alcohol or water.

Threshold: The minimum stimulus level or concentration which will register sensation or a difference in sensation. The threshold of perception of an odour is usually lower than its threshold of recognition.

BIBLIOGRAPHY

Albone, Eric. "Ecology of Mammals - a new focus for Chemical Research"

Apollonio, Umbro. Futurist Manifestos, The Viking Press, New York, 1973.

Ball, Hugo. Flight Out of Time: A Dada Dairy, The Viking Press, New York, 1979.

Bauer, Kurt and Garbe, Dorothea. Common Fragrance and Flavor Materials: Preparation, Properties and Uses, VCH Verlagsgesellschaft, Weinheim, Federal Republic of Germany, 1985.

Baudelaire, Charles. Selected Writings On Art and Artists, Translated by P.E. Charvet, Cambridge University Press, London, 1972.

Berger, Rene and Eby Lloyd. Art And Technology, Paragon House Publishers, New York, 1986.

Blase, Christoph. "On Katharina Fritsch", Artscribe International, March/April 1988.

Blumenthal, Arthur R., Theater Art of the Medici, University Press of New England, Hanover, 1980.

Billot, Marcel and Wells F.V., Perfumery Technology, Art: Science: Industry Ellis Horwood Limited, Chichester, Sussex, England, 1975.

Brower, K.R. and Schafer, Rollie. "The Recognition of Chemical Types by Odor: The Effect of Steric Hindrance at the Functional Group," Journal of Chemical Education, vol. 52 no. 8, August 1975. pp. 538-540.

Bruni, Claudio and Gambillo, Maria Drudi. After Boccioni, Wittenborn and Company, New York, 1961.

Burton, Robert. The Language of Smell, Routledge and Kegan Paul London, 1976.

Carterette, Edward C. and Friedman, Morton P., Handbook of Perception, Volume III, "Biology of Perceptual Systems," Academic Press, New York, 1973.

Carpenter, Malcolm B., Human Neuroanatomy, The Williams and Wilkins Company, Baltimore.

Charalambous, George and Inglett, George E., Flavor of Food and Beverages: Chemistry and Technology, Academic Press, New York, 1978.

Cook, David A., A History of Narrative Film, W. W. Norton and Company, New York, 1981.

Corbin, Alain. The Foul and The Fragrant; Odor and the French Social Imagination, Harvard University Press, Cambridge, 1986.

Cortazar, Julio. Hopscoth, Avon Books, New York, 1958.

Davis, Douglas. Art and the Future: A History/Prophecy of the Collaboration Between science, Technology and Art, Praeger Publishers, New York, 1973.

Dia Foundation, New York. Joseph Beuys, 1979.

Donato, Giuseppe and Seefried, Monique. The Fragrant Past; of Cleopatra and Julius Caesar, Emory University Museum of Art and Archaeology, Atlanta, 1989.

Dorries, Kathleen M., Schmidt, Hilary J., Beauchamp, Gary K. and Wysoki Charles J. "Changes in the Sensitivity to Odor of Androstenone During Adolescence," Monell Chemical Sense Center, Philadelphia, 1989.

Dreyfuss, Henry. Symbol Sourcebook, McGraw-Hill Book Company, New York, 1972.

Duchamp, Marcel. The Bride Stripped Bare By Her Bachelors, Even, Jaap Rietman Inc., Art Books, New York, 1976.

Dyer, Frank Lewis, Martin, Thomas Commerford and Meadowcroft, William Henry. Edison: His Life and Inventions, Harper and Brothers Publishers, New York, 1929.

Eastman, Max. "Poetic People," ChemTech, April 1988.

Eisner, Thomas and Wilson, Edward O. The Insects, readings from Scientific American, W.H. Freeman and Company, San Francisco, 1977.

Encyclopedia of Chemical Technology; third edition, volume 16, John Wiley and Sons, New York, 1981.

Federal Register National Archives And Records Administration. Code Of Federal Regulations, Food and Drug 21 parts 170 to 199, U.S. Government Printing Office, Washington D.C., 1988.

Bibliography (continued)

Fenaroli, Giovanni. Fenaroli's Handbook of Flavor Ingredients, translated Thomas E. Furia and Nicolo Bellanca. Chemical Rubber Company, Cleveland, Ohio, 1971.

Fluxus Etc.; The Gilbert and Lilai Collection. Cranbrook Academy of Art Museum, 1981.

Fluxus etc./Addenda 1; The Gilbert and Silverman Collection, Ink and New York, New York, 1978.

Fluxus etc./Addenda II; The Gilbert and Silverman Collection. Baxter Art Gallery California Institute Of Technology, 1983.

Gauguin, Paul. Noa Noa, translated by O.F. Theis. The Noonday Press, New York, 1957.

Genders, Roy. Perfume Through the Ages, G.P. Putnam & Sons, New York, 1972

Gibbons, Boyd. "The Intimate Sense of Smell", National Geographic, September 1986.

Goldberg, Rosellee. Performance: Living Art 1909 To The Present, Harry N. Abrams, Inc., Publishers, New York, 1979.

Goldstein, Bruce E. Sensation and Perception, second edition, Wadsworth Publishing Company, Belmont, California, 1984.

Gogol. "The Nose," in Diary of a Madman and Other Stories, translated, Ronald Wilks, Penguin Books Ltd, Harmondsworth, Middlesex, England, 1985.

Jaynes, Julian. The Origin Of Consciousness in The Breakdown of the Bicameral Mind, Houghton Mifflin Company, Boston, 1976.

Gregory, Richard L. and Zangwill O.L. The Oxford Companion To The Mind, Oxford University Press, Oxford, 1987.

Harper R., Smith E.C. Bate and Land D.G. Odour Description and Odour Classification, American Elsevier Publishing Company, Inc., New York, 1968.

Hayashi, T. Olfaction and Taste II, Pergamon Press, Oxford, 1967.

Bibliography (continued)

Heath, Henry B. Flavor Technology: Profiles, Products, Applications, AVI Publishing Company, Inc., Westport, Connecticut, 1978.

Heath, Henry B. Source Book of Flavors, The AVI Publishing Company, Inc., Westport, Connecticut, 1981.

Held, Richard and Richards, Whitman. Perception: Mechanisms and Models, readings from Scientific American, W. H. Freeman and Company, San Francisco, 1971.

Hendricks, Jon. Fluxus Codex, Harry N. Abrams, Inc., Publishers, New York, 1988

Henri, Adrian. Total Art; Environments, Happenings, and Performance, Praeger Publishers, New York, 1974.

Homer. The Odyssey, Anchor Books, 1963.

Kennett, Frances. History of Perfume. Harrap, London, 1975

Kilmartin, Terence. A Reader's Guide To Remembrance of Things Past, Random House, New York, 1983.

Kirby, E.T. Total Theatre: a Critical Anthology, E. P. Dutton and Company, New York 1969.

Kirby, Michael. The New Theatre: Performance Documentation, The Drama Review Series, New York University Press, New York, 1974.

McClintock, Martha K. "Menstrual Synchrony and Suppression," Nature, vol. 229, January 22 1971.

Margalith, Pinhas Z. Flavor Microbiology, Charles C. Thomas Publisher, Springfield, Illinois, 1981.

Merory, Joseph. Food Flavorings: Composition, Manufacture, and Use, Second Edition, The AVI Publishing Company, Inc., 1968.

Moffitt, John F. Occultism in Avant-Garde Art: The Case Of Joseph Beuys, UMI Research Press, London, 1988.

Moncrieff, R. W. The Chemical Senses third edition, Chemical Rubber Company, Cleveland, Ohio, 1967.

Bibliography (continued)

Negherbon, William O. Handbook of Toxicology, W. B. Saunders Company, Philadelphia, 1959.

The Norton Anthology of the World Masterpieces, fourth edition. W. W. Norton and Company, New York, 1957.

Ohloff, G. and Thomas A.F. Gustation and Olfaction, Academic Press, London, 1971.

Pfaffmann, Carl. Olfaction and Taste, Rockefeller University Press, New York, 1969.

Proust, Marcel. Remembrances of Things Past, Translated by C.K. Scott Moncrieff, Terence Kilmartin, and Andreas Mayor, Random House, New York. 1981.

Robbins, Tom. JitterBug Perfume, Bantam Books, Toronto, 1984.

Runchiman, F. John. "Noises, Smells and Colours," The Musical Quarterly, vol.1, no.2, April, 1915.

Schiffman, Harvey Richard. Sensation and Perception: An Integrated Approach, John Wiley and Son, Inc. New York, 1976.

Sittig, Marshall. Hazardous and Toxic Effects of Industrial Chemicals, Noyes Data Corporation, Park Ridge, New Jersey, U.S.A., 1979.

Suskind, Patrick. Perfume:The Story of a Murderer, Simon and Schuster, Inc., New York, 1986.

Tisdall, Caroline. Joseph Beuys, The Solomon R. Guggenheim Museum, New York, 1979.

Valnet, Jean. The Practice of Aromatherapy, Destiny Books, Rochester, Vermont, 1980.

Van Toller, Steve and Dodd George H. Perfumery, The Psychology and Biology of Fragrance, Chapman, Hall, London, 1988.

Verkauf, Willy. Dada; Monograph of a Movement, Visual Communication Books Hastings-House, New York

Waters, John. Polyester, New Line Cinema, 1981.

Bibliography (continued)

Winter, Ruth. The Smell Book; Scent, Sex and Society, J.B. Lippincott Company, 1976.

Wolstenholme, G.E.W. and Knight, Julie. Taste and Smell in Vertebrates, J. and A. Churchill, London, 1970.

Wysocki, Charles J. and Gilbert Avery N. "Nation Geographic Smell Survey: Effect of Age are Heterogeneous", Monell Chemical Sense Center, Philadelphia.

INTERVIEWS

Ducatman, Alan M., Director Environmental Medical Services, November 14, 1989.

Glendering, Susan, from the Exploatorium telephone April 21, 1989.

Hawn, Regina D., International Flavors and Fragrances, January 27 1989, and subsequent telephone interviews.

Marcos, Karel, Chemical Engineer, Yale University.

Norwich, James, MIT.

Rabin, Michael, International Flavors and Fragrances, January 27, 1989.

Resincoff, Stanley, Mattel Toys.

Sharpless Barry, MIT

Warren, Creg, International Flavors and Fragrances, January 27, 1989.

Warrenburg, Stephen, International Flavors and Fragrances, Psychologist, January 27, 1989 and subsequent telephone interviews.

Wiener, Charlie, International Flavors and Fragrances, Flavorist, January 27, 1989 and subsequent telephone interviews.

Appendix 1

SAFETY

Safety is a factor that can not be ignored. The International Fragrance Association or IFRA publishes guidelines for safety in the Flavor and Fragrances Industry. The Research Institute for Fragrance Materials or RIFM publishes its findings in a periodical "Food and Cosmetics Toxicology". All flavor and fragrance materials are regulated by the Food and Drug Administration, FDA under codes 170-199 title 21. Mike McCann at the Center for Safety in the Arts, New York City is a good source for safety in doing performances and installations. Dr. Alan M. Ducatman, Director of Environmental Medical Services, M.I.T. is an expert in Toxicology.

Addresses for safety information:

International Fragrance Association
8 rue Charles-Humbert
CH-1205 Geneva, Switzerland

Phone: 22 213548
Contact: F. Grundschober, Gen. Sec.
Languages: English, French, German

Research Institute of Fragrance Materials
375 Sylvan Ave.
Englewood Cliffs, NJ 07632

Superintendent of Documents
U.S. Government Printing Office
Washington D.C. 20402

To order: Code of Federal Regulations
Food and Drug
title 21, parts 170-199

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Guidelines for Safety

* Check all materials.

* Test them before exposing an audience.

* Cross check them to see if they will react with one another.

* Check for adequate ventilation.

* Make entrance to the piece of art voluntary.

* Avoid long exposure times.

* Clean spills immediately with solvent.