

Art in the Mouth

a critical evaluation of the chemical senses in contemporary art

Submitted by

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Declaration of Original Authorship

I hereby declare that this dissertation is entirely my own work and that it has not been submitted as an exercise for a diploma or degree in any other college or university.

I agree that the Oxford Brookes University library may lend or copy the thesis upon request from the date of deposit of the thesis.

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A handwritten signature in black ink, appearing to read 'Frederick Ryan Bromley', written in a cursive style.

Frederick Ryan Bromley

September 26, 2016

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Abstract

Can the experiences that we have when we eat and smell make a meaningful contribution to art? Often referred to as 'the bodily senses' or 'the lower senses', the chemical senses of taste, olfaction and chemesthesis have been determined as unsuitable for inclusion in art in classical philosophical literature. This research challenges that exclusion by exploring the classical judgements and asking if these senses have anything to contribute to contemporary art. If so, what are the contributions of these senses and their limitations?

This is new research within art theory that draws upon multidisciplinary research findings within the fields of life sciences, cognitive studies, anthropology, sociology, philosophy, food studies and flavour and fragrance chemistry. The contributions of this research are: assertions derived from data and expert opinions from within these fields; curated events which provide examples and discourse for critical consideration; and the proposal of a new paradigm that is the result of the syntheses of the research findings.

My research strategy began with a survey of related literature and industry practice within art. A series of interviews with leading scientists contributed a contemporary understanding of these senses in life sciences. Case studies were developed, with insights from cognitive sciences, which investigated the conceptual potential of contemporary gastronomy. Finally, discourse was introduced through curated events and artistic actions that made relevant assertions concerning the suitability of these senses in art.

Art is an expression of human experiences which are mediated by all of our senses.

The implication of this research is a fresh starting place for critical discourse

concerning the inclusion of the chemical senses in art that is founded upon current scientific knowledge. Broader implications of this research include a paradigm that could be applied to a possible new field of study, Critical Studies in Contemporary Gastronomy.

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Online Portfolio

This written thesis is one of two elements of my PhD submission, the other being an online portfolio which documents my research activities. As this research is fifty percent theory and fifty percent practice based, the online portfolio forms an important dimension of my research and contributes practical details which are not possible to express in this written theoretical work. Where this written work details the theoretical aspects of my research questions, the online portfolio illustrates this work through records of interviews, art performances, curatorial events, images, videos and descriptive details.

A cd containing the online portfolio portion of this thesis has been attached to the front cover of this publication.

List of Research Actions and Curated Events

(in chronological order)

European Congress of Culture, Wrocław, Poland

Artistic collaboration with Oskar Dawicki – *Treatise on the Anatomy of Bad Taste*

(8-11.09.2011)

Royal College of Art, London, United Kingdom

Lecture and Publication - *Art per Os: a place for taste in art* (19.11.2011)

Khoj International Artists Association, Delhi, India

Critic in Residence - International Residency - In Context: Public. Art. Ecology –Food

Edition I (5.03-15.04.2012)

Public Lecture – *History of Food in Art* (20.03.2011)

Direktorenhaus, Berlin, Germany

Public Lecture - *Can Art be Tasted?* (08.06.2012)

Monell Chemical Senses Center, Philadelphia, United States of America

Visiting Scholar - investigations into the physiology of the chemical senses (19.09-

03.10.2012)

Public Lecture - *Taste in Art*

Max Planck Institute for Psycholinguistics, Nijmegen, the Netherlands

Visiting Scholar - cognition and the chemical senses & case study development (19-

29.03.2013)

Public Lecture - *Taste in Art: as symbolism of flavours*

University of Gastronomic Sciences, Pollenzo, Italy

Conference Lecture – Food, Art & Philosophy, *Flavour Unbound: in pursuit of a*

rational tongue (04.04.2013)

Nordic Food Lab, Copenhagen, Denmark

Case Study Investigation – *Concepts and Cultural Identity* (24-31.10.2013)

Food Organisation of Denmark, Kasper Fogh Hansen (29.10.2013)

Basque Culinary Center, San Sebastian, Spain

Case Study Investigation – *Abstract Concepts and the Chemical Senses* (31.10-11.11.2013)

Arzak Restaurant (02.11.2013)

Akelare Restaurant (06.11.2013)

Basque Culinary Center (07.11.2013)

Mugaritz Restaurant (08.11.2013)

Oxford Brookes University, Oxford, United Kingdom

Research Presentation - *In the Space Between Art, Science & Gastronomy: connecting industries and disciplines through 50/50 research* (18.11.2013)

Kuchnia+ Food Film Festival 5, Warsaw, Poland

Public Conversation – Experts' Panel on *Design and Gastronomy* (24.11.2013)

Museum of Modern Art, Warsaw, Poland

Public Event, organiser/curator/speaker/workshop – *Polish Gastronomy: inside the global avant garde* (30.11.2013)

Givaudan, Naarden, the Netherlands

Study Visit and Lecture – *Flavour as Cultural Material* (11.12.2013)

Raqs Media Collective, Delhi, India

Public Event, Organiser & Speaker – *In Conversation with Shuddhabrata Sengupta: Curating Conceptual Gastronomomy*, Khoj International Artists Association (26.03.2014)

Givaudan, Zurich, Switzerland

Sponsor Visit – on site orientation of sponsor facilities (9-11.04.2014)

Nowy Teatr, Warsaw, Poland

Public Lecture - *Symbolism and Meaning in Historical Banquets*, Political Kitchen

exhibition (28.06.2014)

Publications

Bromley, R. F. (2012) 'Art per Os: a place for taste in art'. In F. Schmidt & N Hoogslag (Eds.), *The Edge of Our Thinking*. London: Royal College of Art, pp. 100-105.

Bromley, R. F. (2012) 'Paradox in the Birthplace of Zero'. Khoj.com, Critic Note for, *In Context: Public, Art, Ecology - Food Edition I*, Delhi: Khoj International Artists Association artists' residency. April 2012

Bromley, R. F. (2014) 'Flavour Unbound: a way forward for gastronomy in art', in, Perullo, N. (Ed.), *Cibo, estetica e arte: Convergenze tra filosofia, semiotica e storia*. Pisa: Edizioni ETS, pp. 83-92.

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Glossary

Chemical Senses: three distinctive senses with separate chemical and neural pathways: olfaction, taste and chemesthesis. While olfaction is responsible for the perception of odour, it also provides us with the perception of flavour. Taste is the perception of sweet, salty, sour, bitter and umami. Chemesthesis is commonly referred to as 'mouthfeel' and registers the chemical reactions of touch, pain (spicy), temperature, texture, menthol and carbonation in the mouth.

Documenta Kassel: Founded in 1955 as part of the *Bundesgartenschau* horticultural show, *Documenta* is a very influential exhibition of modern and contemporary art that takes place in Kassel, Germany. *Documenta* occurs every five years and lasts for 100 days. *Documenta 14* will be the next edition which takes place in 2017.

Ferran Adria: Spanish Chef and early pioneer of molecular gastronomy. Ferran's restaurant, *El Bulli*, in Roses, Spain, became one of the most influential restaurants of its generation for its innovation and explorations at the intersection of design, science and gastronomy.

Gestalt: 'An organized whole that is perceived as more than the sum of its parts.'

(Source: Google)

Hedonic Response: The reaction to perceptual stimuli where the response is either pleasure, or displeasure.

Heston Blumenthal: British Chef and pioneer of early molecular gastronomy. Most famous for his restaurant The Fat Duck in Berkshire, UK, which combines chemistry, gastronomy and imagination to open new avenues of exploration in multisensory dining.

Molecular Gastronomy: A sub-discipline of gastronomy that combines the scientific investigations of the laboratory with the chemical processes of the kitchen. Molecular Gastronomy seeks to understand the chemical processes at work in cooking in order to better manipulate and transform culinary ingredients beyond the limits of traditional cooking techniques. Very often specialised tools and equipment are employed to this end. Molecular gastronomy has also transformed the organisation of the contemporary professional kitchen, diverging from the classical hierarchical French brigade towards a more horizontal laboratory structure. Hervé This is commonly recognised as the 'Father of Molecular Gastronomy'.

Occam's Razor: a problem-solving principle which favours the simplest hypothesis with the fewest number of assumptions. In the context of this thesis, I am referring to a notion where the concept with the simplest, most elegant construct which has the greatest explanatory potential is more ideal.

Percept: an object of perception. In philosophy, it is a mental concept that is formed through the act of perceiving.

Selective Breeding: The practice of breeding animals and plants in order to develop specific desired traits. In animals, the result is referred to as a 'crossbreed' while in plants it is referred to as a 'hybrid'.

Tasting Menu: A style of food service often found in high-end restaurants where many small dishes are served in succession over the course of the meal. The dishes are composed by the restaurant in such a way as to convey a concept, theme or to complement ingredients; each dish is usually highly designed. Tasting menus are often employed in contemporary dining but find traditional roots in culinary forms such as Japanese Kaiseki dining and Spanish Tapas.

Early Motivations

My motivation for this research arose out of a sense of frustration at the absence of gastronomy in the 'public and cultural diplomacy' programming during my family's diplomatic post in London, 2006. My wife was the Deputy Director of the Polish Cultural Institute in London and I was working as a chef with a top event catering company, creating designed food for exclusive London clientele in prestigious venues across the city. My frustration grew from the tension between the work that I was doing and the exclusion of gastronomy, not only from my wife's programming, but from public cultural programming at large. In the other cultural expressions of literature, architecture, music, theatre, design and visual arts, dynamic and inspiring content was in great abundance; however, the contribution of food in the cultural sector was limited to canape receptions and dinners in support of these other programmes. Gastronomy did not seem to me to be an accepted expression within the canon of culture. At that time, the international media's obsession with food and cooking was in full force. Cookbooks, celebrity chefs and farmers' markets were rife – however, as I had already cooked, served and studied food for a few decades, my appetite was for conceptual expressions of food that would lead to more mature conversations in and around gastronomy.

At that time, Bompas & Parr were exploring the relationship between jelly and architecture, Ferran Adria's and Heston Blumenthal's molecular gastronomy kitchens were stretching the boundaries of the relationship between form and food, and Dark Dining experiences, where diners ate meals in complete darkness, were all tickling the surface of what was possible. What struck me in each of these, and other similar 'conversations' was the absence of a relevant critical theory – although 'creatives' were exploring possibilities for the material of food in this exciting new

milieu, there was little work being done to explain the significance of most of the conceptual expressions of food in the context of culture and art. As a result, these rather interesting conceptual directions fell under the broad label of 'playing with food', missing an opportunity to open up an entirely new landscape in cultural programming¹. Perhaps the loftiest example of this missed opportunity was Ferran Adria's participation in *Documenta 12*. Roger M. Buergel, Artistic Director for *Documenta 12* stated in a press release that:

I have invited Ferran Adrià because he has succeeded in generating his own aesthetic which has become something very influential within the international scene. This is what I am interested in and not whether people consider it to be art or not.

It is important to say that artistic intelligence doesn't manifest itself in a particular medium, that art doesn't have to be identified simply with photography, sculpture and painting etc., or with cooking in general; however, under certain conditions, it can become art (*Documenta Kassel, 2006*).

Rather than working to frame an exciting and challenging artistic conversation, Buergel dismissed a much publicised part of the *Documenta 12* programme by officially declaring that 'it doesn't matter if Adria's work is considered as art or not'. The result was that arts' encounter with Adria's work was largely panned by art critics as an enjoyable but irrelevant aesthetic experience², while the conversation concerning the inclusion/exclusion of the chemical senses in art, those senses

¹ Coincidentally, this sentiment was also the gist of an informal conversation that I had with Chris Dercon, Director of Tate Modern, during a chance encounter in New Delhi in 2014; that being the idea that the lack of a contemporary theory that explains arts' engagement with the chemical senses and food is necessary for serious curatorial and exhibition practice. The absence of such theory was an obstacle for food's inclusion in the programming of art institutions.

² A representative example: 'The inclusion of the star Spanish chef Ferran Adrià in *Documenta 12* is not conducive to Borja-Villel's critical vision. With all respect to Adrià, whom I consider to be an absolutely brilliant cook, I believe that he is responding to a certain dilettante extravagance of the artistic director [Roger M. Buergel], who, in my view, conceives of the political space as something merely festive and communal' (Allen, 2006).

responsible for the perception of food and fragrances, was stunted at best and entrenched at worse.

This research is intended to address the absence of a contemporary critical framework within which questions concerning the relationship between the chemical senses and art can be discussed. While my frustration arose from the lack of a coherent and mature practice-based gastronomic discourse within cultural programming, the core obstacle that needed to be addressed in order to open the way for such discourse was the exclusion of the chemical senses from art; more specifically, does the classical exclusion of these senses from art still make sense in the context of contemporary practice in both art and gastronomy? An additional, though peripheral benefit of this research is that a theory that supports the inclusion of the chemical senses in art is also a starting place for a Critical Studies in Gastronomy, a largely absent though increasingly necessary field of study. My aim is that this work might contribute a much needed paradigm that recognises the new opportunities for gastronomy in culture given the new possibilities for the manipulation of its materials, as well as facilitating artistic discourse pertaining to the social³, political⁴ and ecological⁵ factors surrounding food in relationship to the current and future food crisis⁶.

³ By this I mean the global phenomena of popular food engagement and its use as a vehicle to investigate historical national culture, as well as to communicate cultural identity within a globalised food conversation.

⁴ By this I mean to acknowledge the importance of Food Policy studies and the critical analysis of food as a tool of politics and of power. The book, *Food Policy: Integrating Health, Environment & Society* (Lang, et al., 2009), is an important primer on the subject.

⁵ The ecological responsibility for how we manage to feed ourselves as a global population in both the present and future is of utmost concern to the longevity of the planet and the health of our ecosystems. It is interesting to note that much of the impetus for transitioning to a more ecologically responsible food system has been championed by counter-culture movements that are closely associated with art. Consider the 'Diggers Movement' in the 60's and 70's in the USA which also spawned an important ecological art movement.

⁶ 'The world needs to produce at least 50% more food to feed 9 billion people by 2050, however, climate change could decrease crop yields by more than 25%. The land, biodiversity, oceans, forests, and other forms of natural capital are being depleted at

Research Methodology

The research questions addressed in this thesis are, Can the chemical senses contribute to contemporary art? If so, what do they contribute? On what terms do they contribute? And what are their limitations?

In order to address these research questions, I began with a multidisciplinary survey of classical and current literature, as well as an orientation in contemporary art practice. My orientation came in the form of an involvement as Critic in Residence in an international art residency in Khoj Artists' Association in Delhi, India. The residency, *In Context: Public. Art. Ecology.*, had the curatorial theme of 'Food' and included artists from Italy, Spain, Indonesia and India.

With a better understanding of the context of the chemical senses in art I determined that this research needed to be positioned on a scientific footing, rooting further investigations in contemporary scientific knowledge of these senses. My rationale for the need for a scientific foundation is my conviction that theoretical contributions to art should begin with current knowledge and a sound understanding of the world as it is, rather than as we have come to accept it. During my survey of the classical judgements levied against the chemical senses in art I determined that these were occasionally founded upon a scientific model of these senses that no longer holds true (p. 21). My scientific footing came in the form of a research visit to Monell Chemical Senses Center in Philadelphia, as well as the Max Planck Institute for Psycholinguistics/Radboud University, department of Cognitive Studies, Nijmegen, the Netherlands.

unprecedented rates. Unless we change how we grow our food and manage our natural capital, food security, especially for the world's poorest, will be at risk (The World Bank, 2016).'

Synthesising the knowledge and insights derived from these research visits, case studies were developed which were designed to investigate the capacity for the communication of complex concepts by way of the chemical senses. These case studies were facilitated by the Nordic Food Lab in Copenhagen, Denmark, as well as by the Basque Culinary Centre in San Sebastian, Spain. In Spain, case study research involved the internationally acclaimed restaurants of Arzak, Akelare and Mugaritz. These case studies contributed much needed examples for discussions concerning concepts and food.

In order to explore additional dimensions of my research questions I programmed curatorial actions, each with a specific purpose relevant to my research aims. These included a public event with the Museum of Modern Art in Warsaw, a public discussion with artist-curator Mr. Shuddhabrata Sengupta in India, an art performance with Oskar Dawicki at the Congress of Culture in Poland, participation as a lecturer at the University of Gastronomic Sciences in Pollenzo, Italy, as well as other lectures and actions. The public discussion with Shuddhabrata Sengupta was my final research activity and it served to contribute the voice of an internationally respected curator and theorist within contemporary art on the subject of my research question; a verdict from within international industry practice.

In addition to these research activities, I also published articles which served to position my research question within relevant contemporary discourse.

Historical and Current Context

Identifying a Starting Place

At the outset of this research, I conducted a thorough investigation of the historical context of the 'sense of taste' in art. An account of that research cannot be expressed in any brevity and to do so would detract from the more relevant findings of my applied research, however, the bibliography reflects a portion of this work. A scholarly overview of the 'sense of taste' in aesthetic philosophy can be found in Carolyn Korsmeyer's fine book, *Making Sense of Taste: Food and Philosophy* (1999); however, the account stops short of contextualisation within modern and contemporary art.

A focus on how the chemical senses contribute to art by way of their aesthetic qualities has formed the majority of the scholarly literature on the subject. The reason for this is that much of the consideration of these senses concerning their importance for art has not come from within artistic disciplines, but instead from philosophical, anthropological or cognitive branches of study. Although Korsmeyer's work is perhaps the most popular of these examples, other contemporary papers trod similar ground, such as Frank Sibley's paper, *Taste, Smells and Aesthetics* (2001). The relocation of the discourse concerning the suitability for the chemical senses in art, primarily into the disciplines of aesthetic philosophy and gastronomy, has played an important, if not distracting role in the contemporary discourse. I will explain the importance of this contextualisation later in this thesis (p. 61).

Of equal significance was my review of the historical development of scientific knowledge concerning the chemical senses. I identified the importance of contemporary scientific knowledge concerning the chemical senses at a very early point in my research, largely owing to the misconceptions concerning these senses

in the classical philosophical literature, and the erroneous a priori judgements against their inclusion in art that resulted from these misconceptions. As such, Dr. Ryan Pink was invited to join my supervisory team in order to have a sounding board for relevant scientific knowledge. Again, I will not review the scientific history of the senses for reasons of brevity, however, a statement in Francois Quiviger's book, *The Sensory World of Italian Renaissance Art*, summarised the issue rather well:

During the period ranging from the later Middle Ages to the end of the seventeenth century Europeans believed that their heads contained three ventricles. In these, they were told, their faculties processed, circulated and stored the sensory data by means of which they could apprehend and understand the outside world. Aristotelian philosophy served as the operating system of this hybrid construction, Galenic anatomy as the hardware and the Hippocratic theory of blood spirits and humours as the data transmitter. This system attributed a central place to images in thought processes and consequently had a considerable impact on the visual arts. The active life of this early modern account of the mind spans the period from the thirteenth to the seventeenth century. It coincides with a rise in the status and importance of image and image makers unprecedented in any other society (2010, p. 15).

After the seventeenth century there were significant scientific discoveries that had an impact on the importance of the chemical senses in society, however, no finding has been as transformative as Linda Buck and Richard Axel's discoveries of 'odorant receptors and the organization of the olfactory system' (The Nobel Assembly, 2004), for which they were jointly awarded a Nobel Prize in Physiology or Medicine in 2004⁷. Because of the importance of this discovery as well as the absence of art theory

⁷ That is not to say that here are not other important theories that explain how olfactory receptors function. One such theory is that championed by scientific maverick Luca Turin, who proposes that the functional mechanism for olfactory receptors is in-fact electron vibrations functioning within the receptor binding site, rather than the commonly-accepted 'lock and key' model which accommodates molecular size and shape. Originally proposed by Malcolm Dyson (1928), the vibration theory remains controversial and has yet to be either proven or disproven. The book *Emperor of Scent* provides an accessible account of Turin's life and theory (Burr, 2004).

pertaining to the chemical senses since that discovery, I will use this paradigm shift as the starting place for the scientific logic of this research.

The Chemical Senses in Classical Philosophy

After reviewing the arguments and judgments levied against the chemical senses in art⁸ I was absorbed with the conviction that the discourse of the past held very little significance for the realities of the present. Perhaps the most outstanding issue is that the chemical senses were being excluded from art for reasons of aesthetic appropriateness, failing to acknowledge that a principle virtue of contemporary art is its concepts. Logic for exclusion, such as 'food is functional and therefore self-interested' as asserted by Kant (1914)⁹, no longer hold merit in the conceptual world of art; predicated by Hegel's shift to an understanding of art which finds beauty in spiritual ideas and truths, the 'absolute spirit' (1975, p. 94), rather than the natural beauty of aesthetics. Other arguments pertaining to the collectability/impermanence of artwork considered by way of the mouth (i.e. food is destroyed in the act of consumption), can certainly no longer be valid if Allan Kaprow's Happenings (2003, p. 15) or performance art are to be considered valid expressions of art. Given that there have been anti-aesthetic movements in art, such as that of the Dadaists, if we strip away the criteria of aesthetic suitability from the chemical senses¹⁰ the only valid question to ask is, 'Do the chemical senses

⁸ A brief account of the development of these arguments can be found in my published paper, *Art Per Os: a place for taste in art* (Bromley, 2012).

⁹ This citation is from an online source without page numbers. The reference is to the subsection, '13.: The pure judgement of taste is independent of charm and emotion', where Kant states, 'Every interest spoils the judgement of taste and takes from its impartiality, especially if the purposiveness is not, as with the interest of Reason, placed before the feeling of pleasure but grounded on it.'

¹⁰ This is not to say that food and fragrance do not possess aesthetic sensibilities.

contribute to the conceptual discourse in contemporary art?' If so, how? And within which parameters?

If the conceptual contribution of the chemical senses to art is of principle concern, then we find ourselves very quickly exhausted of formal literature; within art theory there simply hasn't yet been much written on the subject. While Hegel may have been a starting place for the principle of concepts in art, I would contend that it is not realistic to have considered the chemical senses from a conceptual dimension prior to the emergence of a functional models in biology (such as Buck's and Axel's explanation of olfactory receptors,) and cognitive studies for sensory perception, which have only begun to emerge in the 20th century. How can we determine the conceptual virtue of these senses if we don't know how they work? Within cognitive sciences, semantics and psycholinguistics, we are only just beginning to understand the mechanisms and contributions of the chemical senses to cognition. Within philosophy, there still remains an open debate as to how concepts are formed and the role of language and experience in cognition (Prinz, 2012). In biochemistry, physiology and genetics, the chemical senses are a dynamic area of scientific discovery owing largely to the fact that they have been under-prioritised until recently, and remain a secondary area of research if measured by state funding¹¹. Within all of these fields, there remain more questions than answers; however, there is now sufficient knowledge to make some assertions about how the chemical senses can engage with, and contribute to contemporary art.

¹¹ See the interview with Dr Beauchamp (p. 20) as well as in the online portfolio.

Testing the Waters for the Chemical Senses in Contemporary Art

Practice

My first undertaking in this research was to determine for myself the potency of the chemical senses in art. I achieved this by working with Polish performance artist Oskar Dawicki to create artwork that employed these senses as the primary vehicle for the communication of the works' artistic concept. My introduction to Dawicki came through a mutual friend and curator at the Warsaw Museum of Modern Art, Łukasz Ronduda. Ronduda explained that Dawicki was looking for someone who could help him to develop a performance piece for the European Congress of Culture which was to take place in Wrocław in 2011 and would be attended by cultural professionals from across Europe. Dawicki was to have a mainstage performance and had decided to present a piece that would demonstrate his contempt for the commercialisation and in-group exclusivity of the European art market. He wanted to achieve this by serving off-putting food to the guests.

Prior to starting my work with Dawicki I had recently read works by Korsmeyer (2011) and Paul Rozin (1997) on the biological-cultural emotion of disgust. The logic in their writing proposes that the emotion of disgust is culturally specific (i.e. what disgusts people in one culture is not the same as in another), where 'core disgust' occurs as we approach the boundary between the cultured human and our primitive bestial nature. Distaste is also a biological way of determining food which is good for us from that which may be dangerous to our bodies. This project seemed like a perfect opportunity to apply this theory within artwork. I conceived and developed a menu of canapes which were aesthetically pleasing, yet which were subtly distasteful. An example was a truffle made of 100% chocolate, which is bitter and cloying, with finely diced pith from a grapefruit rolled within the chocolate. Each menu item

compounded the sensation of distaste, so if the participant was to try to replace the bitter-cloying flavour of the chocolate truffle, they would find it instead heightened by a salty panna cotta with mildly fermented berries (another of the menu items).

The black stage cast a spotlight on the white banquet table which presented the beautiful canapes. After Dawicki toasted the audience with a vodka martini made from infused meat, the formally dressed servers began to pass the canapes throughout the full auditorium. The outcome that I had hoped for began to materialise; which was that, rather than following their biological signals to reject the distasteful food the audience began instead to celebrate the violation of this chemical safeguard. Culture trumped physiology as a cultured audience celebrated the violation of their bodies and descended together towards the boundary between their cultured and bestial natures. For me, this was a success as it illustrated how the chemical senses can form the core element of a conceptual work of art while also relocating the sense of sight to the periphery of the concept. The collaborative aspect of this project also worked well. Dawicki's conceptual aims differed from my own, however, we were both able to achieve our priorities without compromise, providing additional layers to the conceptual element of the artwork. The performance was embraced by art critics and popular media (Zeilińska, 2011).

Food and Art in the Field

After a period of desk-based research on the historical and current context of food in art, I re-engaged with art practice as a 'Critic in Residence' at Khoj International Artists' Association, New Delhi; arguably South Asia's most influential contemporary art organisation. Khoj was hosting the international residency, *In Context: Public. Art. Ecology – Food Edition I*, and I was invited to work with the artists to develop their

projects and to present theoretical considerations. I presented a public lecture on the history of food in art, documented the developing artwork of the artists in residence, and published a critical review once the residency was completed. The seven artists in residence all took different approaches to their work as they investigated the intersection of food and art, not only in terms of media but also in terms of conceptual priorities. With regard to the chemical senses, none of the works of art delivered their concepts by way of flavour, with perhaps the exception of Indian artist, Shweta Bhattad. Bhattad explored the subject of food waste and starvation/hunger, beginning by spending time fasting among Delhi's homeless. For her exhibition work, Bhattad presented *'Four Course Meal and a Dessert of Vomit'*, an inedible meal that included hyper-realistic dishes of food made from wax sculpture. Participants were first dabbed on their wrists with a perfume that smelled of steamed rice before entering the exhibition space. White sculpted hands emerged from the walls begging for grains of rice, each grain endowed with miniature poetry. Bhattad laid inside a coffin of her own making, submerged in a vomit-like substance that represented food waste. Bhattad remained in the coffin as viewers considered the wax meal laid out before them. The rice fragrance served to stimulate hunger in her audience, which was a provocation given the inedibility of the meal. The concept was evident: *'Water, water every where, Nor any drop to drink.'* (Coleridge, 1798)

My work with Khoj served to inform my research concerning art practice where food was set as the conceptual focus. The work of the resident artists demonstrated examples of artistic process and industry practice which contributed practical knowledge to my theoretical work. This research investigation was also interesting for the fact that it was located in India, outside of the prejudices of the European judgements against the inclusion of food in art.

Mishaps in Taste

Shortly after my time with Khoj, I travelled to Berlin to participate in a 'Taste Festival' curated by the *en vogue* artistic space, Direktorenhaus. I was curious about the festival because it was one of the first artistic events that I had discovered that was focussed on the 'sense of taste'¹². What I discovered was the embodiment of the sentiments of Chris Dercon (p. 16), a programme where expressions loosely approaching engagement with the 'sense of taste' were presented together; however, I noted the absence of the lack of a theoretical framework that would position the contributions within artistic discourse. As was the case with *Documenta 12*, there was a notable absence of a structured curatorial logic that could guide participants into critical discourse that engaged with the role of the chemical senses.

¹² The term taste was used erroneously to describe the experience of gustation, including olfaction.

Science as a Foundation for Art

The Mechanics of Perceptions and the Problem of 'Taste'

One critical finding of this research has been the overarching misuse of the word 'Taste'. This misuse came to my attention during my research visit to the Monell Chemical Senses Center and has resulted in a critical paradigm shift in my research. I came to discover that the chemical senses are three separate senses, each with their own sensory pathways, of which one is the sense of taste. When an object is placed into the mouth the separate senses of taste, olfaction and chemesthesis begin to process the sensory material. In most of the classical and contemporary literature, the term 'the sense of taste' is used to refer to the whole of the perception of things placed in the mouth. While this distinction may seem to be rhetorical, it is actually a critical detail. It is the sense of olfaction (smell) that is responsible for our perception of flavour, which means that one cannot consider a theory for food in art without also considering fragrance. This correction in wording is evident in the titles of my publications, where two titles refer to 'taste in art' before I shifted the wording of the research to reflect my new understanding of these senses.¹³

Chemesthesis are chemical reactions that happen on the skin of the mouth – menthol, pungency (spicy), carbonation, touch, temperature, tear induction (onions) and 'mouthfeel' are examples. Chemesthesis sends signals to the brain by way of the trigeminal nerves.

Taste perception occurs on the tongue and includes the perception of sweet, savoury, salty, bitter and umami. Substances placed in the mouth chemically react

¹³ I discovered that the misuse of this term reaches far back in the classical literature. The Bible writes, 'Taste and see that the Lord is good (Psalm 34:8)', while the enlightenment philosophers created the metaphor for the aesthetic sensibility of 'taste'; meanwhile, Carolyn Korsmeyer's contemporary work on the subject is entitled, '*Making Sense of Taste*'.

with taste receptors and are each processed in a distinctive manner. Although the majority of taste perception occurs on the tongue, there are taste receptors throughout the body.

Olfaction (smell) is responsible for the perception of flavour. Volatile molecules are released from objects placed in the mouth which travel through the nasopharynx to olfactory receptors positioned towards the back of the nasal cavity. Although taste is limited to five primary reactions, the possibilities for flavour perception are unbounded.

The 'gut' plays a role in processing gustatory information and might also play a larger role in determining our emotional constitution. The gastrointestinal tract possesses an incredibly complex nervous system, where up to 90% of vagus nervous fibres carry information from the gut to the brain (rather than from the brain to the gut). Additionally, '95% of the body's serotonin [a neurotransmitter that contributes to feelings of happiness and well-being] is found in the bowels' (Hadhazy, 2010). The enteric nervous system is so complex that it is commonly referred to as our 'second brain'.

What is truly remarkable is that these separate sensory systems arrive in the brain to form a gestalt sensory experience. It is because of our bio-chemical efficiency that we have incorrectly labelled this combined perception as the sense of 'taste'. The fact that the sense of taste and that of smell are considered as separate senses in classical literature, from the Greek 'hierarchy of the senses', through Enlightenment philosophy, to the present day demonstrates the lack of utility in considering classical arguments concerning the suitability of 'taste in art'; both the understanding of the physiology of the chemical senses as well as their role in cognition was simply incorrect.

The Role of the Chemical Senses

In order to better understand the chemical senses and their suitability for contemporary art I arranged to be a visiting scholar at the Monell Chemical Senses Center in Philadelphia, USA, one of the world's leading research facilities for these senses. I conducted a series of interviews that included the following discussions which explore the relationship between nature and culture, which seek to contribute to the discourse surrounding the chemical senses and art.

Dr Leslie Stein

Before we were humans, we were chemically-sensing creatures

I asked Dr Leslie Stein about the importance of the chemical senses in contemporary society, as they seem to no longer be required for survival. Stein elegantly expanded on the idea that the construct of humankind is rooted in the chemical senses. Stein clearly stated that the chemical senses transcend food and fragrance, explaining that they are about communication at all levels; between cells, organisms, materials and our environment. She explained that the processes that the chemical senses originally facilitated - such as procreation, locating nutritious food, and danger avoidance - are all richly connected to chemical-emotional responses, which is why these senses are so intrinsically attached to the emotion life of modern humans. These senses are responsible for providing our bodies with information, however, the question of what the most important information is for our bodies is still being explored and negotiated.

The understanding presented by Dr Stein, that the chemical senses are the oldest and most integral of the human senses, should be the starting-place for discussions about the suitability of these senses for deployment in contemporary art. At the core of the human emotions of love, fear, desire, disgust and hatred are chemicals which are mediated by these senses. In fact, humans are chemical creatures interacting in a chemical world, a reality which is certainly pertinent to contemporary art and philosophical discourse. (2012)

Dr Danielle Reed

Cultural choice can influence genetic physiology

Dr Danielle Reed is an internationally respected geneticist with a focus on genetic factors of the chemical senses. Dr Reed explained how the classical understanding of genetic reproduction is the Darwinian model, in which organisms that possess DNA traits that are not suited to their environments often do not survive. A new, though much less understood model explains that the chemical interactions that we have with our environments, that is the inter-cellular communication that happens as a result of the olfaction and taste receptors throughout our body, can alter the way in which DNA functions. This is referred to as 'epigenetics'. What this means is that the environment that we create for human habitation can affect our genetic expression and eventual evolution by means including olfaction and flavour perception.

One expression of this is through food choice, where we often select diets owing to considerations of cultural status rather than flavour preference. Dr Reed cites the example of wine, where we are rarely able to perceive differences between a \$10 bottle of wine and a \$100 bottle of wine based upon taste alone; in fact, many people

struggle to even recognise the difference between red and white wine based solely upon flavour (Spence, et al., 2014). Reed explained ways in which we shape nature and create man-made solutions to satisfy our flavour preferences. Perhaps the most potent tool in the human toolbox for this is selective breeding: breeding in/out genetic qualities in order to produce a more desirable food product. Michael Pollan explores the relationship between nature and culture in his book, *Botany of Desire*, citing the examples of apples and maize, both of which have been transformed by human hybridisation and, in turn, have reshaped our natural and cultural habitats (2001). Relative to the more recent practices of gene splicing and synthetic biology, such as man-made sweeteners, Reed believes that hybridisation has been one of the most potent methods by which we have transformed nature to appease human desires. When I asked about cultural alteration of nature in order to suit our taste/flavour preferences, Reed simply answered, 'but we are nature; that's our nature'. (2012)

Dr Johan Lundstrom

The plasticity of the chemical senses

Dr Johan Lundstrom is a biologist and a psychologist whose research examines how these two disciplines interact by examining sensory perception by the chemical senses. In Lundstrom's words, 'I want to know where the reciprocal connection is and how that interacts and forms the final percept.' One of the main themes that emerged during our discussion was the plasticity of the mind as well as that of the sense of olfaction; this plasticity is in contradiction to traditional views on mental

processes that understood the mind as more rigid and linear in its operations¹⁴. By way of example he states that if you smell something in the morning, then again at mid-day and in the evening, it will be perceived differently each time. He also explained that, 'By pairing odour stimulus with a shock, then we can make the odour 'negative', just as a result of the pairing. In this way we can make a subject up to 20% more sensitive to that odour. In terms of vision, we cannot make people 20% better at seeing by pairing it with additional stimulus.'

Lundstrom explained how with vision we determine very specific details, yet with olfaction we get large amounts of broad information. When I asked him if this was a result of the prioritisation of vision in our society and early education he conceded that we are taught at an early age to connect words with the things that we see, yet we rarely do this with the chemical senses. However, Lundstrom continued to explain that our brains are not wired to pay attention to such details through our chemical senses as they are wired to our brains differently than the other senses. The signalling in all of our other senses travel from our receptors to our thalamus, the centre for processing rational thought; however, with the chemical senses signals arrive at the olfactory bulb and then are proceed along separate pathways to the pyriform cortex, or the amygdala, or the hypothalamus, or hippocampus before, perhaps, arriving at the thalamus. Lundstrom cited a dictum in neuroscience that states, 'Unless something crosses the thalamus then it doesn't reach into consciousness.'

¹⁴ The landscape of neuronal research is now changing. Neuronal plasticity has become a large field of scientific research since discovering that neurons replicate in the hippocampus (Spalding, et al., 2013).

Flavours must be associated with objects

In the literature pertaining to sensory perception, references are made to the recognition of olfactory percepts as 'flavour images' (Shepherd, 2012, p. 12); I asked Lundstrom about this idea because, if it were true then it lays the groundwork for a strong argument that all sensory perception ultimately becomes an image, confirming the predominance of the visual sense in humans. Lundstrom made an important correction to this, stating that all percepts eventually become recognised and stored in the mind as mental 'objects'; that is, in order to grasp a flavour then it must be linked to an object. He continued, asserting that some people believe that there cannot be a functioning memory for odours unless there is an object linked conceptually to that odour.

Subjectivity and the senses

I wanted to better understand the nature of the subjectivity of these senses, as the argument of the subjectivity of gustatory perception has been used in aesthetic art to exclude the chemical senses (as with Kant's critique against self-interest, p. 22). I asked if a universal stimulant (for example, an artificial odour which has been manufactured and reproduced with identical specifications) would be perceived in the same way by different people. Lundstrom explained that, because the network of the mind is different in every person, and because in each person an odour percept will travel along a different pathway through the brain, then odour percepts would be perceived differently by different people. As this is true of olfaction, the subjectivity of perception is also true to varying degrees with all of the senses, including visual perception of colour; however, as the non-chemical senses are directed to a more narrowly defined region in the brain then this subjectivity results in a lesser amount of variation.

New frontiers in volatile compounds

One rather exciting frontier of knowledge pertaining to olfaction that we discussed was how odour quality is encoded in the molecular properties of volatiles. In most cases, a single molecule is unable to represent a familiar flavour as flavours are made up of complex compounds where each of the 'ingredients' form only part of the 'recipe'; however, in some cases, single molecules can indicate the odour properties of its compound. For instance, the single molecule phenylethyl alcohol would be described as 'rose-like' by most test subjects, while the actual fragrance of a rose is comprised of hundreds of individual molecules (where most of them smell nothing like a rose). Lundstrom explains, 'We are waiting for single-molecular compounds, but for the time being we need to wait. This area remains a big unknown.'

The irrelevance of the Hierarchy of the Senses

I discussed with Lundstrom the idea of the hierarchy of the senses, as expressed in classical aesthetic literature. Lundstrom explained that most of the research that he is conducting now is multisensory; the reason for this is that in daily life it is almost impossible that we perceive with our senses in isolation. He explained that responses to stimuli resulting from tests where the senses have been isolated produce very different results than those where the stimuli are multisensory. Lundstrom's emphasis in the interconnectivity and interdependence of the human sensory system made discussions pertaining to hierarchy irrelevant.

Changing perception through suggestion

At the end of our conversation, I asked Lundstrom how we might best manipulate subjects to alter their perception of flavour. He suggested that the greatest manipulation is simply that of suggestion, where an odour described to the same

test subject as 'cheesy' or 'stinky feet' would elicit ratings on opposite ends of the pleasantness spectrum for most people. (2012)

Dr Graeme Lowe

The sensory coding of the brain

Graeme Lowe's research investigates the seemingly magical transformation of odour molecules into electrical impulses between the olfactory receptors and the olfactory lobe, as well as the coding strategies of the brain for olfactory information. As Dr Lowe explains, the determination of the coding mechanism of the brain is the 'Holy Grail' in this area of olfactory research. During our discussion, I made an analogy that the olfactory receptor-lobe system seemed not unlike a stereo amplifier; Lowe added that, similar to a stereo amplifier, there are feedback loops in olfaction perception that amplify the signal in order to make the brain more responsive, or sensitive for the purpose of detection. These feedback loops are also a part of a filtration system that allows for the organisation of sensory data into 'code' so that it can be transferred to the next stage in the mental process. Beyond advancing our knowledge of these systems, a direct application of this knowledge is in the creation of 'artificial noses', technology that would allow for the creation of devices that simulate human olfaction through technology. This technology has practical applications for the detection of explosives, quality control for food products and early disease detection, however, this technology is still embryonic when compared to other technological counterparts, such as camera lenses (vision) and microphones (sound).

Addressing Principles of order

An area that has become a recent focus of study in the discipline of food science has been flavour pairing based upon the idea of compatible volatile molecules (Ahn, et al., 2011), where volatiles with similar structures may have complimentary flavours. In the context of Frank Sibley's critique that the chemical senses lacked principles of order (2001, p. 226), the notion of pairing compatible flavour volatiles offers a principle of order based upon flavour's fundamental chemical properties. This, when considered alongside hedonic principles such as pleasantness and disgust, which establish polar opposites, sketch an outline for principles of order. Similar to the proposed principles of order found in visual and sonic art, these determinations are a hybrid of cultural and scientific qualities that are as much imposed as they are innate. For example, the principles of harmony and dissonance existed as philosophical-metaphysical concepts with written discourse arising with Plato's *Republic* and continuing through aesthetic literature long before science and mathematics were able to determine the scientific qualities of harmony.

Lowe explained that the pairing of volatile compounds is still in its infancy and while there is a lot of data on perceptual responses to pure/single odour stimuli, much remains to be learned about blending odour ingredients. For instance, the blending of two different colours results in a third new colour, where the individual characteristics of the composites disappear within the new colour; however, with flavour the component qualities of the blended compound may still be detected depending upon an individual's experience and familiarity with those ingredients. This is not to say that principles of order are lacking in the aesthetics of flavour and fragrance, flavourists and perfumers group compounds into families such as floral, fruity, musky, etc.

Another obstacle to the pairing of volatiles is that, unlike a 'middle C' in sound (for example), flavour preference has strong associations with individual experiences which seems to undermine a universal order; where even if molecular compounds may be structurally compatible, the harmony would be lost owing to an individual's negative hedonic response to a particular volatile. Another factor is that our acuity for odours can be sensitised or desensitised, which would seem to prevent the capacity for an ideal acuity, such as 20/20 vision.

On positioning flavour in art

Lowe highlighted that, if you look at the way in which our visual and auditory senses are wired to our brains then we find that those sensory signals are being relayed to our higher senses, making them more suited to intellectual messages. Alternatively, signalling through the chemical senses travels more directly into the emotional centres of the brain or the brain stem, producing a 'gut feeling' (p. 28)¹⁵. We are not very good at dividing our focus between sensory and rational tasks; when we are engaged in an evocative political conversation then it is unlikely that we will fully enjoy the flavours of an ice cream Sundae, and vice versa.

Cognition through memory and emotional evocation

On a final note, Dr Lowe reemphasised the association between olfaction and memory, explaining that olfaction is the sense most directly connected to memory and associated emotions. Although a scent may not immediately offer cognitive considerations, the memories that form along with scents and the emotions that those experiences evoke do present cognitive material that can be accessed and manipulated through olfaction. (2012)

¹⁵ Luca Turin refers to perfume as 'chemical poems' (2007, p. 36).

Dr Gary Beauchamp

Dr Beauchamp is an expert who explores the functioning of salty taste; he was also the Director of the Monell Center during the time of my visit. I utilised my conversation with Dr Beauchamp to better understand industry perspectives, rather than technical aspects of the chemical senses. This discussion was an important one as it helps to explain the chemical senses in a larger social-political context.

In defence of the chemical senses

Dr Beauchamp was quick to point out that, although a fully-functioning model for the chemical senses is yet to be determined, research into these senses possess the potential to have a positive impact on serious public health issues. Diseases associated with obesity are a plague of the developed world, while those of malnutrition effect the planet. And while coronary heart disease, diabetes and thyroid illnesses may not seem like the sort of fodder for art - public health concerns, as well as their associated environmental issues, represent some of the greatest challenges facing humanity in our present time. Research into the chemical senses can influence what we eat and the way that we perceive food, both of which might contribute solutions to public health priorities. These global problems, and the possible solutions that can be found in a deeper understanding of the chemical senses, should form at least a branch of discourse addressed through contemporary art.

Dr Beauchamp and I discussed the disproportionate amount of research and funding invested in the sense of vision when compared to our other senses. The unspoken rationale upon which this budget unbalance is founded is the logic that if we were to lose these 'lesser senses' (the chemical senses) then life would still be

manageable, whereas, if we were to lose our sense of sight then life would become much more unbearable. This sort of logic is erroneous because it is difficult to measure the qualitative differences between the losses of the senses. Also, the benefits of the senses have become unbalanced towards vision because of the neglect of the other senses. For example, the loss of tactility owing to a severed limb has resulted in the development of robotic limbs that are wired directly to the mind (Katyal, et al., 2014). This research not only has an impact on amputees but also on any field that robotic tactility can benefit (manufacturing, scientific research, warfare, etc.) The imbalance in the deficit of attention given to senses other than vision and audition has resulted in a perception of their lesser importance. I made the point that this zero-sum thinking is also utilised in ecological arguments, where people contend that it seems unimportant to save the lives of insects and creatures in the rainforest due to clear-cutting because land and lumber is more important to us in this time than unknown bugs. Like the undiscovered insect that may provide a future cure for cancer, the knowledge yet to be discovered about our chemical senses may prove to be indispensable in a future understanding of society.

The merging of three senses

Dr Beauchamp and I discussed the misuse of the term 'taste' to describe the combined experience of the chemical senses. While this distinction may seem arbitrary, the problem realises itself in practical ways. The example that Dr Beauchamp presents is that of salt. In the food industry, some manufacturers have suggested that reductions in salt (for health) could be masked by increasing flavourful ingredients; however, this doesn't work because these are two completely different sensory systems. Beyond this, while salt makes percepts saltier it also makes them 'better', and does so in a way that nobody completely understands.

Saltiness also contributes to feelings of fullness and thickness, perceptions that olfactory components cannot provide. (2012)

Relevant Scientific Findings Applied to Contemporary Art

By way of summary, the chemical senses are the best means of triggering memory and associated emotions in humans. If we would like contemporary art to be enriched by the memories and emotions of arts' participants, then the chemical sense should be engaged and used as an avenue of provocation and elicitation. This is true because humans evolved as chemical organisms interacting in a chemical world. Our chemical senses enabled our survival as a species; as such, they are also fundamentally important for core human emotions such as love, anger, fear, desire, disgust and hatred. While the chemical senses provide us with large amounts of information, that information is less specific than that of vision and sound. As information perceived by the chemical senses is connected to the experiences that we have had in the context of specific stimuli, people may interpret sensory stimuli differently from each other. Flavour and fragrance must also be associated with an object in order for our minds to make sense of it, although the object of association may be arbitrary or even fictional. Very often the interpretation of specific olfactory and gustatory stimulus is culturally specific.

Humans are multisensory creatures and our senses are both interconnected and interdependent. As such, a hierarchy of the senses is both arbitrary and superficial. Additionally, as with the other senses, principles of order do exist with flavour and olfaction. As harmony is different from symmetry, the organising principles of the chemical senses also differ but are no less credible. Finally, the general understanding within society pertaining to how the chemical senses function is

largely incorrect and ill-defined. A very good starting place for arts' engagement with the chemical senses would be a paradigm shift towards a more accurate model of how these senses function and how they affect us.

Cognition, Concepts & Flavours

Bridging Physiology and Concepts

The conclusion that resulted from my initial research survey in art, that the communication of concepts is the necessary prerequisite for the inclusion of the senses in contemporary art, led me to pursue current scientific knowledge concerning the chemical senses. Armed with a better understanding of how these senses work, it became important for me to explore the potential for the communication of concepts by way of these senses, as well as the means through which these senses can be manipulated. This avenue of inquiry led me to investigate cognitive studies.

In order to understand the possibility for the chemical senses to communicate in concepts, I planned a series of case study investigation with support from Max Planck Institute for Psycholinguistics, NL, under the guidance of Professor Asifa Madjid. The case studies explored the fine gastronomy of some of the world's most acclaimed restaurants and considered their abilities to communicate specific concepts. The rationale for my investigation into gastronomy was that these restaurants had demonstrated a mastery of the material of food, the principle material associated with flavour, and that in the work of these restaurants perhaps I could find evidence of conceptual communication that depended upon the flavour/olfactory aspects of this material.

The time that I spent at Max Planck was a frustrating experience for me as I was constantly overwhelmed with the feeling that I was out of my depth. Without even a tertiary knowledge of cognitive science, I felt that I was academically unprepared to wade into the complexity of issues that I encountered at the Max Planck Institute. I gleaned as much as I was able to from my exposure to these disciplines but I had to

remind myself that the work that I was doing was that of curatorial studies in art and that perhaps it was enough to identify possible areas of future inquiry, more so than to determine answers.

The Sensory Turn

What I did discover is that cognitive investigations into the chemical senses have been relatively recent; for many of the same reasons that these senses have been largely ignored in physiology they have also been neglected within the other disciplines. The 'Sensory Turn' (Howes, 2013), a paradigm shift which embraces the importance of sensory perception in our multisensory world, is rather more of a return than a turn. A shift took place during the middle of the 18th century away from the qualitative science of sensory observation towards the pursuit of quantitative science, through which the world could be described objectively and with exactness. This transition did not arrive without contest, with examples including Denis Diderot, William Blake and Gabriel-Francois Venel rejecting the Spartan distance of a mathematical account of the world in lieu of a disciplined harnessing of the senses (Roberts, 2005, p. 107).

This transition towards rationalism separated artists, sensual explorers of the world and the imagination, from scientists, whose interests lay in codifying, systematising and transmitting exact knowledge about the world. The French Revolution was a turning point in this transition towards exactness, empowering Antoine Laurent Lavoisier to realise his modern vision of calculative science. As Lissa Roberts summarises, 'Chemistry's literary, social, and material instruments joined with chemists' own bodies to direct their attention along a productive path in which the claims of individual sense no longer gave rise to scientific consensus' (2005, p. 108). In this new view of the world, taste and smell all but disappeared from modern

laboratory techniques. This rejection of the sensual dimension of nature towards calculation and taxonomy by seventeenth and eighteenth century Enlightenment scientists and philosophers was part of the reason for the embrace of the sensual metaphysics by nineteenth century Symbolist artists. Constance Classen reminds us of John Keats words on the subject in his poem 'Lamia' in her book, *The Color of Angels* (1998, p. 109):

Philosophy will clip an Angel's wings,
Conquer all mysteries by rule and line,
Empty the haunted air and gnomèd mine -
Unweave a rainbow (1820).

This contention between the scientific and artistic approaches to life have been echoed through the voices of others such as Edgar Allan Poe and Johan Wolfgang von Goethe, however, in the twentieth century it was C.P. Snow who most famously articulated this dichotomy in his essay, *The Two Cultures* (1959).

The Sensory Turn, a paradigm formalised in the 1980s within the Humanities, had precursory twentieth century roots in the sociology of Claude Lévi-Strauss, Margaret Mead (and others) and the historical approach of Johan Huizinka and Lucien Febvre (Howes, 2013). The Sensory Turn has since been empowered by the development of scientific knowledge concerning the senses which has resulted from new understandings in human physiology and cognitive sciences. At present, there is a renaissance of investigations into the senses, however, unlike the rigid taxonomical approach of the past which sought to investigate the senses in isolation from each other, current investigations are very much multi-sensory, exploring the

interconnectivity of these senses in cognitive processes. The work of Charles Spence is one example of this approach which has informed this research¹⁶.

More Questions than Answers

The waters of sensory scholarship remain rather muddied by the congregation of academic disciplines, and while there has been a steady flow of discovery and innovation pertaining to a functioning multisensory model, there is less consensus. Grand questions in perceptual cognition inspire current investigation such as: How are concepts formed? How does the co-dependant relationship between language and perception function? How does environment, emotion and experience influence perception? And, what is the interaction between memory and sensory data?¹⁷

Searching for Proof of Concepts

I arranged to undertake research at two locations which I felt offered different possibilities for conceptual conversations in gastronomy; the Nordic Food Lab in Copenhagen, Denmark, and the Basque Culinary Centre in San Sebastian, Spain.

Cultural Identity and the Nordic Food Movement

In Copenhagen, the New Nordic Food Movement is a government supported initiative which aims to communicate Nordic values by way of food. The idea of

¹⁶ Examples include: *A Touch of Gastronomy* (Spence, et al., 2013), *MultiSensory Integration* (Spence & Squire, 2003) and *Does Food Color Influence Taste and Flavor Perception in Humans?* (Spence, et al., 2010).

¹⁷ I was particularly inspired by the work of Jesse Prinz, who addresses some of these questions from the perspective of philosophy. For an interesting discussion between Prinz and Edouard Machery, see the online video, 'Theories of Concepts' (2013).

embodying values of cultural identity within food seemed to be suitably conceptual for my research and the restaurant *Noma* in Copenhagen was a very good choice, as it has been rated as the 'World's Best Restaurant' over several years; famous for a scientific approach to their manifestations of creativity with dishes that prioritise expressions of local ingredients. The Nordic Food Lab is a non-profit organ of *Noma* that cultivates research which informs *Noma's* dishes. Directed by Dr Michael Bom Frøst, Associate Professor at the University of Copenhagen, Department of Food Studies, who has a focus on sensory analysis of food, the Nordic Food Lab agreed to host my visit and to make themselves available for a series of interviews.

One of the stated aims of the Nordic Food Movement is to promote the Nordic region and to contribute to its cultural identity by defining and elaborating on its food and flavours (Hermansen, 2012). In Elizabeth Rozin's book, *Ethnic Cuisine: the Flavor-Principle Cookbook*, she discusses the notion of 'flavour principles' - combinations of ingredients that are commonly found in a region's cuisine which, when served together, are representative of a people's culinary distinctiveness (1973). Where Rozin focused on three pivotal ingredients in each region's cuisine, I intended to extend the model to include distinctive methods of culinary preparation that bear influence upon flavour. Preparation methods such as tandoor and open pit roasting, curing, pickling, smoking, sun drying, and preparations of raw meat may produce specific flavour profiles, allowing for a more accurate representation of the 'flavour principle' for a specific locale. To apply a linguistic concept to cuisine, such 'preparation profiles' may resemble culinary 'dialects' within a larger flavour family. The reality of the research took a different, though valuable turn. Two important realisations occurred very quickly into my research. The first was that Danish cuisine could only be identified by people who had previous experiences with Danish cuisine

in the past; and the second, that it would be very difficult to differentiate Danish cuisine from other countries in the region that shared similar ingredients and cooking techniques. The realisation that previous experience with a concept is a prerequisite for correct identification of that concept in artwork may seem like an obvious discovery, but I had not yet considered the importance of this for art in general, let alone for food. We take for granted the conceptual language of symbols present in visual art without realising that these too are culturally educated. The idea that a dove represents peace arises from within the Judeo-Christian tradition, an association that seems obvious to a person from a western culture but may be lost on a person from another cultural tradition. Where black is the colour of death in the European tradition, white is the colour of death in Asian cultures. The realisation was that, although concepts can be transmitted by way of the chemical senses, these concepts need to be learned, and there is not a lot of motivation for most people to learn a conceptual language of flavours. Professor Paul Rozin's study, *The flavour of Vegemite as a Marker of National Identity* (2003) was a useful reference point for this idea, yet my conclusion was simple – flavour concepts can be learned but it is an uphill battle that is unlikely to be functional in the broader concept of contemporary art. The second point, that Danish cuisine may not differ significantly from other similar culinary traditions, was an obstacle for this case study on the communicability of national flavours but not a game changer for the notion of flavour concepts at large. As I am both a Polish and Canadian national, many of the ingredients and food preparations that I experienced in Denmark could very well have come from either of those countries. In some cases, the food of Japan might also find common culinary reference points. In the end, I concluded that I would be unable to find a clear example of the communication of Nordic/Danish culinary traditions by way of the

chemical senses. To add strength to my conclusion, experts who I interviewed suggested similar notions in their own ways¹⁸.

Nordic Food Lab case study conclusions

It is very often the case that when looking for one thing you find something else, and this was the case with my research in Copenhagen. What I found instead of the embodiment of 'Danishness' in flavour were other valuable realisations. During one interview, I was able to articulate a notion that I believe represents a truth about the contribution of the chemical senses in art. This articulation arrived during a conversation with Josh Evans, Lead Researcher at the Nordic Food Lab, while he was explaining how Noma restaurant 'is very good at serving you a dish that reminds you of a memory that you do not have.' (2013) This very curious point on 'phantom culinary déjà vu' led me to express that,

One of the challenges to all of this work with concepts and flavours is that I'm trying to attach words to something that words don't explain. For example, the reason that the 'language' of visual art is so effective is because words weren't – it does something that words can't. It creates an emotional trigger that allows you to experience something different. And I think that the conceptual elements of cuisine are like that as well. It triggers something inside of you that is really very difficult to 'package', or to explain, but it somehow affects us as cultural, physical human creatures (2013).

This recognition of the conceptual transcendence of language by flavour was as important to me as if I were to have determined concrete evidence of the embodiment of Danish national identity within their cuisine.

¹⁸ While Kasper Fogh Hansen was straightforward in his criticism of the notion of a Danish national cuisine (2013), Josh Evans relocated the idea of Danish culinary values into the philosophical arena, away from flavour markers (2013).

An additional realisation that I had was during a conversation with Director Michael Bom Frøst, who expressed the value that Noma strives towards the principle of Occam's Razor, or the Law of Parsimony; which in culinary terms means that, a dish must find the simplest, most direct way of communicating its idea in order for it to be considered as beautiful or ideal (2013). This was interesting for me because I had often used the notion of Occam's Razor to express an ideal value in conceptual art, that the communication of the concept should be graceful, sharp and free of all unnecessary clutter. My impression that Occam's Razor seemed to be a value in science, conceptual art and gastronomy seemed to confirm (to me) that all three disciplines shared the same ideal, which may have something to do with the conceptual nature of the work.

On a final note, Dr Bom Frøst shared a construct from his research concerning the elements of an 'ideal meal'. He explained that there were three levels of gratification required to achieve an exceptional meal: sensory, functionality, and cognitive. In the sensory level, 'deliciousness' is an imperative. Functionally, the meal must be nutritionally sound. Cognitively, the meal must be perceived to embody ethical/moral values. For me, this idea also represents a limiting factor for gastronomy¹⁹ in art, as the priority of 'deliciousness' must sometimes be violated in sacrifice for the concept (Dawicki, p. 24; also Mugaritz, p. 51). For cuisine and food to participate in conceptual art it may require a departure from the values esteemed in gastronomy. Additionally, gastronomy does not 'ascend' to art through the perfection of form or gastronomic ideals, but may participate in art by way of conceptual communication.

¹⁹ Not to be confused with the potential role for flavour and food in contemporary art. By Gastronomy I mean the discipline of culinary preparation and its service for the culinary consideration of its diners.

Abstract Concepts and the Basque Culinary Center

In contrast to the more sombre and reverent approach of Nordic cuisine, I was excited to explore the playful mastery of the Basque culinary scene. Northern Spain, and the Basque country in particular, is a sort of culinary Shangri-La. Famous for the creative abstraction of their fine cuisine, gastronomy in Spain lays somewhere at the intersection of prayer and art. Ferran Adria's restaurant, El Bulli (Catalonia, Spain), attracted international attention for its designed approach to cuisine, however, it is one of a handful of Spanish restaurants which blur the lines between art, design, gastronomy and poetry. The Basque Culinary Center is not only famous for their stunning multidisciplinary facilities that educate their students in the Spanish school of gastronomy, it is also a scholarly rallying point for mature discourse at the intersection of food and other disciplines. The Basque Center organised research visits to three of the world's most acclaimed restaurants – Arzak, Akelare and Mugaritz. A fourth visit to El Celler de can Roca became non-viable at the last minute as they had been awarded the title of 'World's Best Restaurant'²⁰ only a week prior to my arrival. This is unfortunate as their distinctive approach to cuisine and the multidisciplinary work that they have produced with leading artistic talents are certainly deserving of scholarly investigation.

As I considered the delineating principles that separate gastronomy from art, the notion of 'intentionality' in art (Levinson, 1989) became an important part of my criteria. What I mean by intentionality is that, in order for an object to be considered

²⁰ As rated by The World's 50 Best, a collaborative industry rating that rivals Michelin for its influence.

as a work of art then it must be intended to be considered as a work of art²¹. I would assert that the conceptual nature of contemporary art likens it to a philosophical conversation, where and artistic concept is a critical point that is made. When Marcel Duchamp presented his 'Ready Made' art, *Fountain* (1917), a point was made that art is what the artist presents to be considered as art. If art is to be considered as a philosophical discourse of conceptual statements, then the contribution made by each concept to that discourse should be intentional. As such, the repetition of critical points in conceptual art also detracts from its worth; most often there is little value in repeating the same point in any discourse.

As the aim of my case study research was to investigate evidence of the communication of abstract concepts within the discipline of gastronomy, there were a few distinct elements that I was hoping to find. The first was intentionality: chefs needed to make the claim that they intended a certain concept to be communicated through their creations. The second was complexity: the concept needed to be suitably complex in order to be able to participate in the discourse of contemporary art. Although a concept such as 'seasonality' may be communicated through a dish, this contribution would not hold much value in contemporary art discourse, which is host to very mature and complex critical discourse. Finally, the primary vehicle of the artistic conversation should be communicated by way of the chemical senses; that is to say that, if the concepts was communicated visually, and the edibility of the dish was simply a convenient pleasure then the chemical senses would not be necessary within the work of art.

²¹ There is an additional debate of Intentionality that refers to the idea that a work of art should be considered as the artist intended it to be considered when they created it. In this argument, I would take a more pluralist approach to the interpretation of art.

Arzak

Arzak's research and development chef, Xabier Gutierrez, was my host at the restaurant and guided me through the ideas within their cuisine. Arzak's cuisine exhibited mastery in the control of their materials while simultaneously exuding a playfulness that was both original and distinctly Spanish. Although there were certainly some conceptual elements to the cuisine of Arzak there was a distinctive distance between the space where Arzak was creating and that of contemporary art. The first was Arzak's primary focus on the aesthetic elements of their dishes, more so than their conceptual importance. An indication of this focus could be identified in Arzak's prioritisation of the gastronomic virtue of 'deliciousness'. Although cuisine that communicates artistic concepts may also be delicious, if the ideal of deliciousness is sacrosanct then it is usually an indication that conceptual communication is of secondary importance. An additional element that was missing was the absence of intentionality – that is, the culinary creations of Arzak were intended to be interpreted as works of gastronomy rather than works of art. In gastronomic terms, Arzak certainly is deserving of its accolades; I was not under the impression that Arzak was intending to present anything other than genius works of gastronomy and I was impressed by their professional honesty. My conviction upon leaving was that, although Arzak possessed the mastery of material and conceptual insight to create culinary works of art, they simply have not applied themselves in this direction. Their dishes are rather a kiss on the lips of contemporary art rather than the embodiment of it.

Akalare

Akalare presented immaculate dishes akin to classical artworks; however, they rarely entered into the conceptual realm. Although a few attempts were made to venture

into the playful domain of Arzak, these excursions lacked the maturity of Arzak's dishes. Having said that, Akalere's great strength is its classical compositions, which are presented in an exquisitely modern way and which serve as a reference point for the modern Basque culinary dialogue. Without having understood Akalere's cuisine I would have missed a critical dimension that forms the foundation for all of the mature Basque culinary endeavours.

Mugaritz

Mugaritz was different. I've decided to devote more space to the consideration of the work of Mugaritz because of the importance that I feel it holds for this research.

Considerations for the Role of Gastronomy in Art

Mugaritz

I was not acquainted with Mugaritz before I arrived in San Sebastian. I had researched their work in anticipation of my arrival and held their work in an open mind, uncertain of what I would learn when I arrived.

I have been in many kitchens throughout the course of my career but none have been like that of Mugaritz. It was not the elegance of the space that impressed me (although it was impressive), it was the sensation that I was in a workshop, more so than a kitchen; a reality which was reflected both in the layout of the space as well as the body language of those who worked in it. Additionally, 'totems' referring to the philosophy behind the conceptual nature of their work were embedded throughout the various rooms; iconic focal points for both the employees and the visitors to the restaurant.

During my time at Mugaritz I was hosted by Ramon Perisé Moré, Research and Development Chef. I was taken aback when very early into our conversation he declared without any leading, 'Andoni always says, 'I don't care if it's bad'. If the dish has sense, then we don't care if it's bad because we want to transmit an idea. If it's not good – tasty enough – we don't care (2013)'. Moré was referring to the culinary experience of the dish, an amazing statement to make for any gastronome. What I discovered is that Andoni Kuis Aduriz, Executive Chef of Mugaritz, is as much artist as chef, and Mugaritz is as much gallery as restaurant. As Moré explained, 'We try to go beyond the food and find something in the world of ideas. This is the beginning of everything here. ...For us, the worst thing is indifference. If you come here and at the end you are very tired, and bored, and angry, and disgusted – we are very sorry

but we pushed you, moved something inside you, we provoke your emotions – and for us, that idea is very, very interesting. I've seen many people crying here. I've also seen people here very angry.' Throughout my years in the restaurant industry I had never once heard these words spoken in a restaurant; I had found the realisation of my conceptual vision for food. What remained was to identify evidence of this conceptual communication through the dishes.

Evidence of Conceptual Communication by way of Gastronomy

Moré then proceeded to show me dish after dish which communicated conceptual ideas. These were not trivial ideas, but mature conceptual conversations. In the dish *Suspicious*, Moré explained that the dish concerned the changing relationship between humans and nature. In the past, baby fish were never kept by fisherman because it would harm the development of fish stocks; in many places, it was even illegal to do so. However, Mugaritz was surprised when they went to their fish supplier and were offered baby turbot. The supplier explained that, because of new farming practices baby fish could be provided in the volume that customers might desire. The dish is presented on a stone with an edible skeleton of a baby turbot served on top. The dish can be enjoyed from a culinary perspective but it is prickly and hazardous to the mouth. It is a comment on both the potency that humans wield over nature through technology as well as a moral provocation concerning the method of its use. The dish challenges hybridisation, genetic modification, big agriculture and ecological stewardship. The statement is clear – approach our emerging techno-cultural potency over nature with caution.



Figure 1- 'Suspicious', Mugaritz, San Sebastian, Spain

Another dish that Moré introduced me to was called *The Tower of Sins*. The dish involved collaboration with a designer to construct a structure that formed a co-dependant relationship between material design and cuisine; the design's form is essential for the communication of the concept of the dish, and without the cuisine the form makes no sense. The design of the dish makes reference to the piles of stones that sometimes mark paths on walking trails, where each layer of the dish represents one of the seven deadly sins. For example, 'vanity' was placed inside a mirrored box. At the centre of the box was a gold plated chocolate *petit for*. When placing the chocolate into the mouth the diner discovers that it is only a shell of chocolate, hollow throughout. The message is that vanity is a self-indulgence that is ultimately empty. The layers of sins continue: 'Lust' is a thick, sticky-sweet filling of strawberry syrup and white chocolate served with a spoon; it can drip from the spoon, coat your mouth, run down your lips, but is an oversweet indulgence. 'Avarice' is very simple – you open the box and it's empty. 'Sloth' is the last element in the Mugaritz 'tasting menu'. 'It's pear soaked in a syrup and it's very sweet and very difficult to eat; it's almost disgusting (2013)'.



Figure 2- 'Tower of Sins', Mugaritz, San Sebastian, Spain

A Model for a New Type of Performative Space in Contemporary Art

The conceptual elements of Mugaritz do not only exist in their food, the 'restaurant' is a new type of exhibition space that wanders far off the beaten track of gastronomy. Across the entirety of the ceiling in the front-of-house, running in contrast to the symmetry of the building, is a gentle line of light. The building structure of Mugaritz sits exactly on an old political border in the Danostia region; to demarcate this original border and to recognise the idea of borders – political, culinary, conceptual, emotional – this line was illuminated. Before each service, burning embers of wood are wafted throughout the front-of-house to create the calming environment of campfires in nature. The tables have been stripped of the classical culinary elements of place-settings, presenting only white tablecloth 'canvases' with sculptures of deconstructed plates at their centre point – symbolic references to the upcoming experience that guests will soon have. As guests approach their tables an overhead spotlight fades on to light the 'stage'. The experience then proceeds in a fixed twenty-two course tasting menu, although the order of the dishes may change from night to night, or from table to table. The coordination of the timing of the dishes is very complex and, as such, some tables receive different dishes at different times. Because the front-of-house is open, with no music to cover the conversations of the guests, visitors usually dine in hushed, reverent tones so as not to disturb the other diners. One dish that arrives at the same time to every table is a broth which guests must prepare themselves. Toasted spices arrive in cast-iron censers, filling the room with the aroma of spices as they are carried to the tables. As each guest grinds the spices for themselves with metal pestles, the music of the many chiming bowls breaks the silence of the front-of-house. Connected by the shared multisensory experience of sound, flavour,

fragrance, texture and vision, from that point onwards the front-of-house becomes a socially-unified space.



Figure 3 - Mugaritz Front of House, San Sebastian, Spain



Figure 4 - Multi-sensory soup - Mugaritz, San Sebastian, Spain

I believe that what Mugaritz has realised is a new vision for a performative gallery space, or at the very least a functional realisation of how gastronomy can participate in contemporary art. Each element of the space and the meal has been thoroughly researched and deftly executed. As it was with Igor Stravinsky's *Rite of Spring*, or the pioneering theatre of Jerzy Gradowski, the Mugaritz experience is very often misunderstood and even resented for its deviation from orthodoxy.

Need for a New Model of Food Critic

Diners who review the food of Mugaritz consider the culinary aspects of their meals but very often are oblivious to the conceptual elements which form the core of Mugaritz' work. A dish like *Suspicious* is reviewed as,

The second course is another Fingerfood. The “Fishbones’ with nuances of Lemon, garlic and cayenne pepper” are Baby Turbots. The look of the little fish is a bit irritating (the eating animals discussion in one bite...), whereas the taste is a wonderful combination of crunchy fish notes with acid of lemon and a sharp ending (*Frankfurterkueche, 2012*).

While the multi-sensory soup is reviewed as:

Sopa de mortero con especias, semillas, caldo de pescados y hierbas frescas. This broth epitomized Mugaritz for me. It was certainly some crunchy soup. Interactive dishes are tricky—how long should I pound this stuff before we move on to the next step? Sesames in your teeth, blasts of pink peppercorn, slightly bitter herbs so prominent, I barely even noticed the fish broth after it was poured. Flavor and texture (*Goodies First, 2011*).

In both cases, the critical conceptual elements of the dishes are overlooked. The current critical model being used in gastronomy is most similar to the art critic of the Enlightenment period, where critics act upon hedonic responses, judgements on ‘taste’, to cast personal verdicts for or against culinary creations. Because some

critics have very powerful pens, these judgements can severely damage the business and reputations of chefs and restaurants, absent of ethical safeguards and accountability.

The food critic for our times should not be a judicator who evaluates a dish's worth but rather an educator who facilitates growth and discourse. Such a critic should actively support the creative and technical development of both chefs and restaurants, recognising that all of the organs of the restaurant should participate in the multi-sensory 'performance' of gastronomy. Critics of gastronomy should bridge the divide between the creators of cuisine and its diners by facilitating the exchange of intelligent ideas and constructive discourse. The contemporary food critic should document new directions in gastronomy, producing an accessible body of knowledge that places these directions into the context of historical movements, contemporary issues and future considerations. The critic of gastronomy should seek to understand the motivating factors of chefs, empowering them with tools and perspectives in order that they might realise and/or sharpen their aims. And, a critic of gastronomy should work at a structural level within the catering industry for the betterment of dining practice; considering global food systems, social-cultural practices, public health and our natural ecosystem. It is my intention that a critical theory for the chemical senses in art can be a starting place for the development of such a food critic.

Food, Art & Philosophy at the Pollenzo Convergence

I was invited to present a lecture for a conference entitled, *Convergence Pollenzo: Food, Art and Philosophy*, at the University of Gastronomic Sciences in Pollenzo, Italy. The University of Gastronomic Sciences is an important institution as it is also

home to the Slow Food Movement, which has spanned the globe with its influence and continues to champion artisan local food production and small-scale agriculture. I had been referred to the organisers of the conference by Chris Dercon (p. 16) as a person who could represent the interests of contemporary art in the context of gastronomy and philosophy. Lecturers at the conference included influential individuals in both disciplines of gastronomy as well as aesthetic philosophy, including Richard Shusterman, Herald Lemke, Massimo Bottura and Andrea Petrini.

The conference was a rare opportunity to explore questions concerning the suitability of food in art and was notable in that it was being presented by an iconic institution. To me, this positioning of issue and venue inferred that it was the ambition of gastronomes to have cuisine to be considered as art. This inference was framed in a rather bold way in the programme, asking 'Is art inherent in food and cuisine?'. My immediate impression after the first morning of presentations was that the term 'Art' was being used as a catch-all concept which included craft, antique collectables and purely aesthetic works of art; there seemed to be an absence of understanding as to what art is in contemporary practice and, from what I perceived, this absence seemed not to matter to the presenters. The second term that was used very generally was 'food'. Was food to mean the material of food, cuisine or a very specific type of *haute* gastronomy? Without consensus as to what the term 'art' meant in the context of these discussions the presenters were free to make assertions concerning art without accountability to art professionals. A trend that I have discovered since attending this conference is that there seems to be a growing association between the disciplines of aesthetic philosophy and

gastronomy in order to make a case for cuisine as an expression of art²². My main concern with this aesthetic-gastronomic line of discourse is that it tends not to include representation from contemporary art practice and curatorial studies, discussing instead an understanding of art derived from the discipline of aesthetic philosophy. Aesthetic considerations of art were an important part of arts' development and remain relevant as cognitive studies unlock new windows into the mechanics of sensory perception; however, it is important to recognise modern and contemporary art practice as authoritative and distinctive from aesthetic philosophy. While I greatly appreciate the attention given to the subject by both aesthetic philosophers and gastronomes, I don't believe that this discourse will prove constructive until it positions itself within, and subordinate to contemporary art theory and practice.

²² An additional example was the 2016 conference, *Perspectives on Food Aesthetics*, Department of Culture Studies, University of Wrocław, Poland. The call for papers stated that, 'This conference will explore the ways in which the art world meets gastronomic culture; it will analyze the objectives of food centered artistic practices and the aesthetic discourse on the question of the artistic validity of food and cooking.'

In Consideration of Flavour & Fragrance

The potency of natural imitation in art

I have been privileged to have been supported in my research by Givaudan, the world's leading manufacturers of flavours and fragrances. As part of my research, I was invited to visit Givaudan facilities in both the Netherlands as well as in Switzerland. Flavour manufacturing is a relatively new industry within which flavours take three forms: natural extracts, nature identical and synthetic. Natural extracts are flavours drawn directly from the source of their flavours within nature. Nature identical flavours are copies of natural extracts produced to recreate flavours without the necessity of their natural ingredients. Synthetic flavours are man-made creations that do not copy nature.

In visual art, painting was transformed when the pigments found in natural ingredients became industrialised for the purpose of artistic creation. Colours no longer needed to be produced from flowers, insects and blood (for example); they became readily-available materials for painters which could be blended and utilised in new ways. The same is true of music. Instruments, which began by mimicking sounds found in nature, grew more complex as these sounds became independent from nature. Additionally, colour and music both developed codified notations which could be used to create more effectively, as well as to communicate and replicate ideas expressed through sound and vision to others. The invention of musical notation and colour palates has facilitated the boundless articulation of ideas which appeals to our senses of vision and audition.

Up until the middle of the 19th century flavours and fragrances have been bound to natural ingredients. Since that time, flavour and fragrance science has begun the

long work of identifying and codifying the chemical compounds found in nature, creating a universal alphabet for the manipulation and application of flavours and fragrances. This is exciting for art because it offers the possibility to reproduce and create with the same potency as the colour palate and musical notation. The potential to unleash human creativity through the precise communication of flavours and fragrances has only just begun to be realised, however, I believe that it promises to be as transformative as the human expressions of its sensory counterparts.

The ascension of flavour and fragrance technologies

The flavour and fragrance industry has come under significant scrutiny for the application of this technology. Negative associations with 'chemical additives' are pervasive, however, the reality that all of our food is comprised entirely of chemicals is often overlooked. Additionally, the science of flavour and fragrance is not only aesthetic but also may have an impact on our health and ecology; flavour researchers have hopes that this technology can also be used to address global issues such as obesity and diabetes (Dr Gary Beauchamp, pp. 36-38). Additionally, the experience of consuming flavours without having to consume those ingredients found in nature can only benefit our fragile ecology by reducing the human footprint. Also, as we travel beyond our planet the ability to reproduce the flavours and fragrances most dear to us may play an important role in our mental wellbeing and cultural integrity.

Flavour and fragrance science is relatively young but as it matures it will present possibilities for the communication of flavours and fragrances that are yet unknown to us. The idea of digital flavour/fragrance printing, or the communication of

flavour/fragrance experiences over the internet is in its infancy but it is slowly becoming a reality. In time, these innovations may become an integral and indispensable part of our cultural lexicon. As one of the largest growth sectors in the food industry we are already well on our way.

Philosophical aspects of flavour science

In classical art theory two separate arguments have been levied against the 'sense of taste'²³ that can be addressed by the emerging technology of flavour science. The first is that, with food and drink the object of artistic consideration is destroyed in the act of its appreciation; that is, the issue of material artefacts the ephemeral nature of the appreciation of flavour (Sibley, 2001, p. 208). The second is that of the functionality of food, as it serves to nourish the body (Kant, p. 22). Although neither of these arguments hold validity in the context of contemporary art, it is interesting that the notion of separating flavour from its corresponding ingredients has been a topic of philosophical discourse. The philosopher David Prall suggested that in order to appreciate food's aesthetics without having it serve a self-interested function an audience could simply not swallow the food that they were appreciating (1929, pp. 60-61)²⁴. Korsmeyer retorted that, 'This line of defence, if pursued, would improbably sever the pleasures of tasting from the pleasures of eating. Tasting would be what makes food aesthetically valuable, swallowing an incidental matter of nutrition. Why would one want to draw these conceptual lines were it not for the hold that the sense hierarchy possesses over the terms of evaluation employed?'

²³ I use this term erroneously with intention as this is the phrasing used in the classical literature.

²⁴ It is worth noting that this is common practice in the appreciation and consideration of wine.

(1999, p. 105). I agree that this logic could only be employed to address 'the hold that the sense hierarchy possesses over the terms of evaluation employed' and am grateful that this ridiculous discourse is no longer of importance for the evaluation of contemporary art. As with Prall's suggestion, the flavour industry now presents us with the possibility of detaching flavour from food, not to avoid the functional nature of food but instead to empower it. Food is transforming into something beyond nature, and as with digital visuals and acoustics it seems logical that digital olfaction will also serve to enhance our existence.

I was pleasantly provoked by the question of Chef Ferran Adria who asked, 'Imagine for a moment that food wasn't a physiological need; what would our relationship with food be then?' (Andrews, 2010, p. 32). The incredible growth of the flavour industry reflects our strong desire for taste stimulation, more so than our need to eat, where flavour is an expression of human culture in contrast to the survival instinct of digestion.

Curatorial Considerations for the Chemical Senses in Contemporary Art

While my research in the field of contemporary gastronomy provided insights into possibilities for conceptual communication through the manipulation of food, and the flavour and fragrance industry illuminated new possibilities for flavour manipulation, two additional priorities needed to be satisfied: 1) examples where the chemical senses were employed in contemporary art needed to be identified and considered; and 2), theory concerning the chemical senses within curatorial practice needed to be applied.

An example of the application of the chemical senses in contemporary art

While my work with Oskar Dawicki (pp. 23-24) and Shweta Bhattad (pp. 25-26) provided examples of the employment of the chemical senses in contemporary art, I was looking for additional examples of contemporary artwork that could clearly illustrate the conceptual potential of these senses. During my time as Critic in Residence at Khoj International Artists' Association in Delhi I had the opportunity to work with Spanish artist Alfonso Borragan, who was part of the residency programme. Borragan's artwork prioritises the ephemeral and often takes the form of Happenings. After leaving India, Borragan returned to London where he presented his Master's degree thesis at Slade School of Fine Art. The work that Alfonso presented was entitled '*æthēr*' which earned him the title 'one to watch' in an Artlyst review (artlyst, 2012). In Borragan's work, large glass bottles were presented which possessed unlabelled flavours. Participants could place their mouths over the bottles and experience the flavours trapped within them. For some participants, these

flavours were unfamiliar and this first encounter with them would create a marker of time and place in their memories. For other participants, these flavours carried them back to familiar memories; re-encounters with their pasts. At the centre of the exhibition space a large balloon hovered above the room with four hoses dangling beneath it. Participants could take a breath of helium from the taps on the hoses and continue their conversation with voices altered by the gas. A key idea behind this exhibition was the fact that the experiences presented by Borragan lay trapped within the installation objects, only creating experiences once the participants engaged with the objects and took the vapours inside of their bodies. When they exhaled, the experiences of the participants became a part of the air that was shared by all, creating a common experiential space. At the end of the Happening, Borragan vacuumed the air in the room and compressed it into a steel cylinder, which stood in a monumental manner as the documentation for the event. In this clever twist, the combined breath of his participants, laced with their memories and experiences, became Borragan's documentation; however, once the bottle was opened to release this air, the documentation returned to the aether. Borragan's work was brilliantly conceptual and the chemical senses formed the core of his artistic concept.

A pioneer of olfactory art

Another important reference point for this research has been the work of artist and scientist Sissel Tolaas, who has been an early pioneer in the application of fragrance in contemporary art. Tolaas works with fragrances that she has captured in the field, as well as those created in laboratories, in order to produce works of art that explore the importance of olfaction for both human culture and nature. One ongoing project that Tolaas has been developing since she founded her multidisciplinary research laboratory in Berlin in 2004 is entitled NASALO (Tolaas, 2011); a language of context-

free words that allows for the communication of ideas and values concerning fragrance. Tolaas correctly explains that we have a language to describe visual objects, but the lexicon for describing olfactory sensory encounters is largely metaphoric. NASALO represents Tolaas's efforts to work with fragrance on terms that allow for the communication of olfactory encounters that do not default to a visual orientation of the world. As was expressed by Dr. Lundstrom (p. 34), the importance of labelling olfactory stimuli is of particular significance as the choice of descriptor may significantly alter individual hedonic response. Through both raising awareness of the unexplored dimension of olfaction, as well as through breaking ground for institutional acceptance of the chemical senses in art, Sissel Tolaas has paved the way for work such as my own.



Figure 5 - Aether - Alfonso Borragan, Slade School of Fine Art, London (2012)

Curatorial practice with the Chemical Senses in Contemporary Art

From the onset of my research one of my primary aims was to position my work within the context of art practice. One way that I achieved this was by building research exchanges which fostered thoughtful discourse about my research questions. I feel that I achieved this aim through my exchanges with Khoj International Artists' Association, Monell Chemical Senses Center, Max Planck Institute, Nordic Food Lab, Basque Culinary Center, Arzak, Akelare and Mugaritz. While those research exchanges were constructive, I believe that it is two different things to research within the industry and to practice within the industry. My collaboration with Oskar Dawicki provided a solid starting place for applied work in contemporary art, however, my role was more in the role of artist than as curator. In order to realise my aim of positioning curatorial practice within the industry I constructed two public events, each with differing aims. The first event was a public discussion with accompanying workshop in the Warsaw Museum of Modern Art, Poland. The second was a public talk with artist-curator Shuddha Sengupta of the Raqs Media Collective in Khoj, India.

Warsaw Museum of Modern Art - Polish Gastronomy: Inside the Global Avant Garde

My first large event took place on November 30, 2013, at the Warsaw Museum of Modern Art. My principle aims for this event were to: 1) position a mature conversation surrounding gastronomy within the context of a national contemporary art institute; 2) delineate disciplinary distinctions at the intersection

of gastronomy, design and art; and 3) to show the Polish public how Poland was contributing at the forefront of international trends in gastronomy.

This event took ten months to programme, much of which was spent securing commitments from the museum and the participants. To my knowledge, there had never been a public event in an art museum in Poland that focussed on gastronomy prior to this event; additionally, I was aware of only a few such events having taken place in art museums around the world. What made this conversation distinctive was that it brought contemporary practice in food-related design, gastronomy, and art theory concerning the chemical senses together into a single conversation. For me, it was important to position this event in a formal institution of contemporary art because I believe that industry acceptance of my research could be demonstrated and validated through such participation. Art institutions tend to be careful about what they programme because inclusion within their programmes can be interpreted as validation, and even promotion of the content as their contribution to artistic discourse. I remain grateful to Director Joanna Mytkowska and curator Sebastian Cichocki for their support of my research in this way.

The programme that I assembled included contemporary gastronomy chef, Wojciech Modest Amaro, who was the first chef to guide a Polish restaurant to a Michelin star; Marek Cecuła, Professor of design and director of the most important porcelain factory in Poland²⁵; and myself, to discuss the chemical senses in contemporary art. I managed to arrange for the Adam Mickiewicz Institute, an organ of the Polish Ministry of Culture responsible for the promotion of Polish culture, to support the event financially, which allowed it to take place. Finally, I also secured the

²⁵ Marek Cecuła also hosts an international design residency, *Modus Design Studio*, within his factory and has focussed considerable attention in his *Art Food Project*, which explores the formal relationship between food and design.

participation of Kuchnia+, Poland's leading cookery TV station, who covered the event and aired an edited recap of the event across Poland.

Attendance for the event reached full capacity of around 200 people, including some of the city's leading designers, chefs, food journalists, and art personalities. Each speaker presented research from our own practice and the public event was followed by a sensory workshop for around thirty people. During the workshop Chef Amaro provided tastings of flavours from his restaurant that represented his distinctively Polish approach to cuisine. In the workshop I presented a practical sensory experience demonstrating the aesthetic theory of Rasa (Encyclopaedia Britannica, n.d.) as an alternative system for the critical consideration of encounters with flavour and fragrance.

For me, having realised an event that explored the role of the chemical senses in the context of contemporary art, including a mature conversation about research at the forefront of each of the contributing disciplines, marked a form of institutional validation. This sense of achievement felt warranted given Poland's pedigree of classical and aesthetic art in the European tradition – a tradition that was responsible for the exclusion of these senses from art. What remained to be achieved was to receive validation from a professional voice within the theory of contemporary art and curatorial practice.

In Conversation with Shuddhabrata Sengupta, Raqs Media Collective:

Curating Conceptual Gastronomy

My final PhD project took place a little over a year after my event in Warsaw and included an art professional that I respect deeply both for his scholarly mind as well

as his practice in contemporary art. Shuddha Sengupta is one of three members of the *Raqs Media Collective*, an artist collective that has participated in most of the major international art shows, including *Documenta 11* (2002), the *Venice Biennale* (2003,2005 & 2015), the *Shanghai Biennale* (2010), were co-curators of *Manifesta 7* and have been appointed as Chief Curator of the 11th *Shanghai Biennale* in November 2016 (2015). My event with Shuddha Sengupta was a public conversation that took place on the 26th of March 2014, contributing to the programme of Khoj International Artists' Association's international residency, *In Context: Public. Art. Ecology – Food Edition III*.

If the aim of my event in the Warsaw Museum of Modern Art was to position myself within the formal institutional infrastructure of contemporary art, the aim of this event was to gain critical insights from an international authority of theory in contemporary art pertaining to the suitability of the chemical senses in contemporary art practice. For me, Shuddha Sengupta is such an authority. The event was made possible thanks to ongoing partnerships with Khoj and the Cervantes Institute in New Delhi. Mrs. Pooja Sood is not only Director of Khoj but has also been a part of my PhD supervisory team, supporting my research through her professional insights as well as through my inclusion in her programming. The Cervantes Institute in New Delhi had been very helpful in mediating my correspondence with the Basque Culinary Center in San Sebastian while also supporting my public lecture with Sengupta at Khoj.

The event with Sengupta explored the conceptual nature of gastronomy from a curatorial perspective, with a focus on the theoretical criteria pertaining to the participation of the chemical senses in art. After my research presentation, Sengupta constructed a framework of musings that wove a theoretical thread from the co-

dependent relationship between food and knowledge, through the dual nature of the tongue as instrument of perception and author of language, to the currency of exchange between the artist and the witness of art. Sengupta began by citing John Baldessari's statement, 'I didn't know we could do that!' as a defining virtue in contemporary art. Through a discourse that highlighted the co-dependence of food and knowledge (the apple as the fruit of knowledge) and the dualism of the tongue, Sengupta closed the circle gracefully by stating that,

The tongue itself, as the organ of speech and the organ of taste, and as the organ of distinction, produces the experiences necessary for us to know that one thing is one thing, and another thing is another thing. Think of the tongue as the thing that said to the body, 'I didn't know you could do that' (2014).

Sengupta spent considerable time expressing the notion that art is transitioning away from what it once was.

I think that we're at the moment right now in the arts where, having liberated ourselves from our servitude to objects, and objects alone, we are returning at some fundamental level to art and art making as making the crux of a conversation that is philosophical [and nourishing at the same time]²⁶. It is about experience.

... this delicate balance between what we eat, who we become, and what becomes of us - what we ingest, what happens to us when we ingest it, and what we become as a result of ingestion - is for me, the fundamental understanding of what happens when we encounter art. We no longer have to deal in the world of aesthetics, thankfully, with the idea that an art object refers to some abstract material entity that lives above, beyond and far away from us, at some abstract [universe]²⁷ decreed by Plato. We now live in a world where the relationship between the arts and us is far more neurological, far more corporeal, far more contingent in terms of the way that we think about memory, experience, our drives and our pleasures.

²⁶ Some of the audio from this talk was corrupted owing to poor recording quality and loud environmental noise. While I have interpreted the spirit of Sengupta's words to the best of my abilities, some of the specific wording has been lost for technical reasons.

²⁷ *ibid*

... the Neo-Platonists won the 'battle' [with the Epicureans]²⁸ and they put on a pedestal an idea that, I think, its time has come for removal; that is the notion of the sublime. And the sublime went a long way in the arts and aesthetics. The sublime was the mixture of all mystery and wonder and horror and the beautiful. So basically, everything that takes us away from our senses (2014).

With regard to gastronomy, Sengupta explained that,

The question for me is not just about what we as artists, as curators, as writers as connoisseurs of the arts, and the world of gastronomy can learn from art, it's about what the world of art can learn from the world of gastronomy. Learn from gastronomy not in terms of the surface questions of texture and taste and presentation, but in terms of what I think are the core philosophical questions of what it means to be nourished, to be nourishing, to create a climate in which we can grow healthily, and be prepared to share things with each other. Food is all about sharing, eating together, sharing an experience together, remembering tastes together, and anticipating future possibilities (2014).

In conclusion, Sengupta made a statement that both surprised and pleased me; an unsolicited confirmation of my research question:

I believe that it is possible to build a conceptual vocabulary based on the chemical senses which have to do with metaphors of taste – which we already have when we say 'that's a sweet song', 'that's a bitter loved one'; we know what we're talking about (2014).

My event with Sengupta was a rich and rewarding experience that I believe marked a concrete starting-place for the chemical senses in art. Through the combination of my technical and practical examples, and Sengupta's philosophical rationale, an affirmation in favour of multisensory inclusion in an expression of art that prioritises experience, memory, emotion and exchange was formally asserted.

²⁸ See the online documentation for this event for a complete account of Sengupta's conversation.

Conclusions

The chemical senses are the sensory organs through which we engage the world at a chemical level. They are responsible for the experiences of degustation and olfaction, but they are also important for our emotional composition, memory recall, health and reproduction (and more functions are being discovered). Until recently, very little has been known about how the chemical senses function and their contribution to our lives and wellbeing. We have only recently discovered how these senses play a complex role in our daily lives and we are beginning to understand how we can utilise this knowledge in order to alter fundamental aspects within our societies. It is now conceivable to develop technology which engages with our chemical senses to improve public health (such as the early detection of cancer, solutions for diet-related illnesses, and cures for anosmia²⁹), to communicate sensory data that was previously confined to local spaces, and to manipulate our cognitive and emotional dispositions. Additionally, much work remains to be done to codify the fragrance and flavour compounds that are found in nature, as pioneered by companies such as Givaudan; yet such databases provide a glimpse into the vastness and the rich possibilities of the olfactory world in which we live.

The importance of the chemical sense in the sciences and in the arts

Until recently, the chemical senses have been largely ignored in art because of the highly subjective, variable nature of their perception and experience, and because of a lack of any shared language to reflect upon these experiences. The contribution of the chemical senses to cognitive processes has been undervalued or

²⁹ Anosmia is the inability to smell or perceive flavour.

misunderstood and, as such, hasn't formed an important part of the narrative in art. Additionally, artwork which engages with these senses are impermanent, which was an obstacle for artwork produced prior to the 20th century.

The chemical senses are powerful avenues for unlocking memories and evoking emotions. Because we engage with the world and inquire into it with all of our senses, art should also communicate with the full scope of our human faculties. This is important because art is a discipline that considers and expresses human ideas that are informed by our senses.

For science, much remains unknown about how these senses function, however, it is now evident that the role of the chemical senses is much greater than the enjoyment of pleasures associated with eating and smelling. By better understanding the chemical 'operating system' of our bodies, and how that system engages with the chemical system in the world in which we live, we are unlocking a frontier that possesses vast potential for technological advancement and solutions for our problems.

The artistic potential of the chemical senses

The chemical senses have been engaged with by artists throughout the past century, however, with increasing knowledge of how these senses function the potential to utilise them in artwork has also grown. By utilising the chemical senses, stronger memories can be created by marking experiences with flavours and fragrances. Additionally, by manipulating the chemical senses, stored memories can be recalled for the purpose of empowering works of art. The ability of the chemical senses to evoke emotional responses is distinctive in that such emotional responses are less

cerebral and more intuitive. The subtle difference between cognitive emotional response (such as the anger we feel when confronted by injustice) and intuitive emotional response (such as our disgust at eating rotten things) is important because it represents a distinction that is rarely referenced in art. These two levels of emotional responses working together in artwork have a much greater impact upon us than one or the other functioning in isolation.

As we expand our scientific knowledge of the chemical senses we are able to unlock new possibilities for their utility in art. Just as the digitisation of visual images has had a profound impact on visual art, so also have the chemical senses benefited from our technological advances. The remarkable success and growth of the flavour and fragrance industries are testament to the potential of harnessing this knowledge, and to our appetite for exploring this sensory dimension. Our engagement with these senses reaches beyond the practical function of sustaining life, which speaks to their cultural importance. This importance has inspired new edible and fragrance materials and processes, such as 3d printed foods and flavours, headspace technology for capturing ambient odours, and the transmission of odours and flavours via the internet; each of which show great potential for these senses to be utilised in art practice in ways that haven't previously been possible³⁰.

Art harnesses the power of our imaginations and our ability for critical thought. As science continues to discover how the chemical senses function and the role that they play in our lives, artists will be better able to utilise this knowledge to unlock their potential in art. Emerging technology that amplifies the role and potency of the chemical senses will have a compounding effect upon this potential. Just as one of

³⁰ One example of such a project is the Hi-SEAS Mars Analogue concept, which I proposed for my application to their programme. This proposal can be found in the 'Paperwork & Off-Cuts' section of my online portfolio.

our earliest popular films portraying 'A Trip to the Moon' (1902) fuelled our technological development to finally travel to the moon, so also can artwork pertaining to the potential of the chemical senses lead to the realisation of technologies that transform our lives³¹.

Art based upon the chemical senses has already resulted in greater inquiry into aesthetic theory, particularly in the area of multisensory research³². We should no longer consider the senses in isolation, as we now know that our senses work in concert with each other to much greater effect. Multisensory investigations in aesthetic theory are already taking place but the impact of the emerging findings, and the theories resulting from these findings, have had a minimal impact on art. To date, art simply has not championed the impact of emerging sensory knowledge in a significant way – which is unfortunate, as art is a discipline which is dependent upon the senses. Discussing all of our senses as an interdependent faculty, rather than independent organs, requires that we disregard many of the assumptions upon which art theory has been constructed. While artists continue to utilise the chemical senses in their practice, a push in the direction of understanding, educating and practicing a unified theory for multisensory art could break down the arbitrary divisions between the senses in art. Resigning from the sensory segregation in art (visual/sonic/tactile) in lieu of a unified multisensory theory would provoke critical discourse, as is most often the case in the wake of discovery and synergy.

Multisensory research investigations and critical discourse in the field of gastronomy, underpinned by aesthetic philosophy, provide one example of how

³¹ An example of this in popular culture is the 'replicator' on the Star Trek series, which fabricates food at a molecular level. Our 3D food printers could be understood as a primitive precursor to such technology.

³² Such as the multisensory research of Charles Spencer and its influence on works such as Heston Blumenthal's 'Sounds of the Sea' (2007) and Marina Abramovic's 'Volcano Flambé' (2011), which have, in turn, popularised this field of research.

such discourse can be structured; as well as demonstrating how the practice of gastronomy is moving closer to that of art.

The impact of this dissertation and future directions

This dissertation presents theory and practice that can inform future artwork and discourse pertaining to the chemical senses, as knowledge of how these senses function, and of their potential application in art, can support related works of art. This theory can also serve to popularise critical discourse in art on the topic of the role of the chemical senses and multisensory art. This dissertation can be utilised as a reference point for future work on the subject of the chemical senses in art; leveraging this multidisciplinary starting-place to pursue deeper investigations in related fields.

In the future, there are three areas which I would like to investigate more deeply. The first is that of cognitive sciences, with the aim to better understand how perceived sensory information impacts cognitive processes and in turn affects our lives in qualitative ways. Such research would enrich artistic discourse pertaining to these senses and provide more examples of how the chemical senses can be applied in art. The second area of investigation is an exploration of the technological potential of the chemical senses and how such technology might impact social reality. Finally, a greater amount of curatorial work needs to be done within art practice in order to educate people concerning the importance of the chemical senses and of multisensory art. I would like to see multisensory art as a curatorial theme of a major art fair, such as Kassel Documenta or the Venice Biennale; with subthemes focussing specifically on the chemical senses.

The specific contributions of this work

This work contributes in two specific disciplinary spheres, those being art and gastronomy. In art, this work can be utilised by art schools to inform their curriculums for artists seeking to work with materials pertaining to the chemical senses; such as fragrances, flavours and food. At present, these materials, and a theory that informs them, are largely absent in art schools. In artistic residencies, the theme of the chemical senses can be a curatorial focus. This work provides resident artists with theory and examples pertaining to the chemical senses which presents an opportunity to apply theory to practice. Art museums can utilise this theory in order to present programming that advances the understanding of the contribution of these senses to art, as well as to present curated exhibitions upon the existing body of artwork that utilises the chemical senses.

The second disciplinary sphere where this work applies is that of gastronomy; in particular, the development of a critical theory for contemporary gastronomy. Much work has been done in the area of cultural studies of food, however, the structure and tools of critical thought that are utilised in the field of art could be applied to greater affect in the consideration of contemporary gastronomy. This work, with its focus on the senses pertaining to gastronomy, presents an example of how that theory can be applied. In particular, this paradigm could be used to inform an enriched role for food critics.

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