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Molecular Gastronomy: Basis for a new culinary movement or modern day alchemy?

Prof John Cousins
The Food and Beverage Training Company
London
admin@food-and-beverage-training.co.uk

Dr Kevin D O’Gorman*
Department of Management
Strathclyde Business School
199 Cathedral Street
Glasgow
University of Strathclyde
kevin.ogorman@strath.ac.uk
0141 553 6006

Mr Marc Stierand
Department of Management Science
Strathclyde Business School
University of Strathclyde
marc.stierand@strath.ac.uk

* Corresponding Author

Molecular Gastronomy: Basis for a new culinary movement or modern day alchemy?

Abstract

Purpose – To explore the phenomenon of molecular gastronomy by conducting empirical research focusing on renowned chefs.

Design/methodology/approach – Literature review summarising past culinary innovations then focusing on the origins and evolution of molecular gastronomy, followed by 18 phenomenological interviews with a snowball sample of world class chefs from across Europe.

Findings – There is far greater confusion about what molecular gastronomy might be than is implied in previous studies. The term has become wrongly used to describe a possible culinary movement mainly as a result of media influence. Leading chefs, whose new restaurant concepts have become associated with it, reject the term.

Research limitations/implications – With only 20 years of history molecular gastronomy is still a comparatively new phenomenon, this initial research presents a clear picture of its evolution so far and the increasing confusion the use of the term has created. It's still far too early to decide if these are heralding a new gastronomic movement.

Practical implications – Although molecular gastronomy itself may not provide a foundation for a genuine and lasting development of cuisine it is generating fascination with the fundamental science and techniques of cuisine and showy culinary alchemy. As with Nouvelle Cuisine poor quality copycat chefs could bring into disrepute the reputation and practices of those who are at the vanguard culinary and restaurant innovation.

Originality/value – First widespread primary study, across five countries, into recognised exceptional chefs' understanding of molecular gastronomy. It clarifies that molecular gastronomy was never intended to be the foundation of a culinary movement and identifies four key elements for the development of lasting cuisine movements and trends.

Introduction

Molecular gastronomy has become a key topic of the now and is being heralded as the latest gastronomic movement. However there also appears to be increasing confusion as to what molecular gastronomy actually is and what it was intended to achieve. The aim of this paper is to explore this phenomenon further. It first sets the scene by providing a brief overview of culinary change. The paper then summarizes the origins and background of molecular gastronomy and the current literature on the subject. A methodology is detailed and results from primary research focusing on gastronomic development are summarised. Conclusions are drawn about the increasing confusion over what molecular gastronomy was and is being interpreted as, and questions whether there is really anything new in the approaches put forward by the original

concept of molecular gastronomy. It also identifies how the term has become wrongly identified as a potential culinary movement. Finally the paper recognises the new restaurant concepts, or dining experiences that are being developed and leaves open the question of whether these will provide the basis for a lasting culinary movement.

Overview of Culinary Change

The greatest attribute of a chef has been to create a successful and lasting fashion. This is evident throughout history and the tradition has also continued to be well demonstrated over the last three hundred years, by chefs such as Antonin Carême (1784–1834), Alexis Soyer (1809–1859), Georges Auguste Escoffier (1846–1935), and Fernand Point (1897–1955). However other great gastronomic figures had also emerged to contribute to the development of cuisine and gastronomy, including Jean Anthelme Brillat-Savarin (1755–1826) a French lawyer, magistrate, politician and gastronome with many and varied interests including archaeology, astronomy, chemistry and appreciating good restaurants. The book, which would establish him a legendary figure is known by its shorter title, *La Physiologie du gout* (1825). This book remains for many a seminal work on gastronomy.

Alexis Soyer (1809–1859), apart from being the chef of the Reform Club, London, had also been involved in providing good food to large numbers of the poor through soup kitchens set up at the time of the corn harvest failure in 1845, and in Dublin during the potato famine. He subsequently volunteered to go to the war front of the Crimean War, at his own expense, and worked closely with Florence Nightingale making improvements to the conditions of the army in the field (Soyer, 1857). He centralised food production for the troops and developed the 'The Soyer Field Stove', which with minor modifications, was still in use within the British army until 1980s. His cookery books sold in their hundreds of thousands and included, *The Gastronomic Regenerator* (1846), *The Modern Housewife* (1849), a book aimed at the middle classes, and *Shilling Cookery for the People* (1854), a highly successful and influential book aimed at instructing the poor in good and frugal cooking, *The Pantropheon* (1853), a history of food and cooking still much respected.

There had also been moments of frivolity too; a Victorian cookbook published in 1885, suggests letting guests at a dinner party prepare their own ice cream by spooning the combined ingredients into a bowl of liquid nitrogen; Marshall (1885, p. 42) observes "Its powers are astonishing... and persons scientifically inclined may perhaps like to amuse and instruct their friends as well as feed them". However, it was to be Georges Escoffier (1846–1935) who would write the definitive text on classical cuisine, *Le Guide Culinaire* (1902) (Escoffier, 1921); and it was not until the 1970s that its supremacy was threatened by the arrival of Nouvelle Cuisine. His approaches to cooking, and to kitchen organisation (the *partie* system) travelled well beyond France and London and became truly international. In 1933 the *Guide Michelin* awarded Fernand Point's (1897–1955) restaurant La Pyramide, three stars – the first Paris three star awards ever made by the *Guide*. His pupils, many of who became great chefs, including Outhier, Bise, George Blanc, Roger Vergé, Raymond Thuilier, Alain Chapel, Paul Bocuse, and the Troisgros brothers, are all witness to his mastery.

By the end of the Second World War, dieticians, food experts and nutritionists were making themselves heard. This process gained momentum in France in the 1960s, when it was applied to the works of the chefs such as Paul Bocuse, Roger Vergé, Michel Guérard, Raymond Olivier, Jean and Pierre Troisgros, Alain Senderens, Jacques Maniere and Jean Delaveyne. Subsequently Michel Guérard had joined with the food critics and journalists Henri Gault and Christian Millau in 1972 to advance uncomplicated natural presentations in food: Nouvelle

Cuisine. A publicity campaign ensued with a contemporary ethic and novel recipes. With the theories that Guérard put forward, and the recipes provided in *La Grande Cuisine Minceur*, Guérard amalgamated dietetics, aesthetics, health, ethics, and gastronomy (Guérard, 1976). Stereotypic dishes from the times between Carême and Escoffier were rejected as over-rich and over complex, indigestible and with preparations that had become tired and associated with a previous age. The principles underpinning this new movement were total freshness of ingredients, lightness and harmony in all components and accompaniments, the use of the basic and simplest cooking methods and types of presentations; and the movements was made visible and championed by Gault and Millau in their magazine, and in other gastronomic guides (Mennel, 1996).

Paul Bocuse, a proponent of the original concept of Nouvelle Cuisine, was also one of the strongest critics of some of those culinary pirates who sought to emulate his efforts, stating “I thought a barge-load of kiwi fruit, had hit one loaded with broccoli spears, and the salvage operation had flung these rediscovered items widespread throughout the restaurants of Paris” (Cracknell and Nobis, 1985: 185-6). Bocuse also stated that too many chefs were operating confidence tricks on their customers, by serving very small portions, which were supposed to provide a lighter diet, with the accent on freshness of produce and new combinations of ingredients. Some felt that the new system opened itself to abuse from pretenders, caring little for the health and well being of their customers and Nouvelle Cuisine came to be associated with overpriced small portions.

Like the ideas of Carême and Escoffier, the influence of Nouvelle Cuisine spread around the world. The seed was sown in the students of Fernand Point. Codification came in the 1970s through the work of initially Roger Verge et-al, and the publicity from Gault and Millau, it then spread in Britain through the work of chefs like Anton Mosimann, Raymond Blanc and the Roux Brothers and throughout the world. What had happened was not an overthrowing of the past, but a moving forward in the long-term process of cuisine development, utilising the very best from each evolution. Alongside all of this has also been a wide range of technical innovation such as: cookchill; cookfreeze; *sous vide*, and induction hobs. More recently further cuisine developments have included the various fusion cuisines, such as Asia-Pacific, and now a movement becoming to be known as Molecular Gastronomy.

Origins of the term Molecular Gastronomy

Hervé This (2006a), a French physical chemist who works at the *Institut National de la Recherche Agronomique* dates the invention of molecular gastronomy to 1988, but openly acknowledges that there is still a great deal of confusion surrounding the term, in part because of mistakes he and Nicholas Kurti (former Professor of Physics at the University of Oxford physicist and gourmet) made when they created the study as branch of food science. Kurti’s interests in applying scientific knowledge to culinary problems date from at least 1969 when he gave a talk at the Royal Society titled ‘The physicist in the kitchen’, and amazed the audience by using the recently invented microwave oven to make a ‘reverse Baked Alaska’ (Kurti & Kurti, 1988).

Molecular gastronomy was the name given to a series of international commercial workshops on the physical and chemical aspects of cooking run by This and Kurti (This, 2006b). The term was developed from two angles. Brillat-Savarin’s (1825, p. 62) definition of gastronomy was the starting point, stating that “gastronomy is the reasoned knowledge of all that relates to man feeding himself. Its aim is to attend to the preservation of man by means of the best possible food. It relates to and manages, following certain principles, everybody who explores, supplies or

prepares those things which may be converted into food.” The epithet “Molecular” was then chosen to limit the scope of this new scientific enterprise on gastronomy; initially, Kurti and This used the term “molecular and physical gastronomy”, but after Kurti’s death in 1998, This decided to use the less cumbersome term molecular gastronomy that he had always preferred (This, 2006b).

This (2006a, p. 1062) defines the phenomenon as the “chemistry and physics behind the preparation of any dish” and hopes that the knowledge gained through the scientific study of food preparation will enable: more healthy food; more attractive food, and more people to cook better food. He argues that engagement in molecular gastronomy will allow chefs “to create exciting new dishes and inventions. All sciences are useful for this enterprise, not only chemistry and physics, but also biology, as well as history and sociology... the main aim is to surprise and delight their guests or their family with exciting, tasty and healthy food” (This, 2006a, p. 1065). However he also reinforces the principle of being able to cook better though a fuller understanding of the underpinning science in a later book “Kitchen Mysteries. Revealing the Science of Cooking” (This, 2007a)

The Phenomenon of Molecular Gastronomy

Blanck (2007, p. 77), conducting a literature review and charting the evolution of molecular gastronomy, observes that the phrase is “often misused in the media to refer to chefs who apply techniques developed by scientists to their own style of cooking”. Blanck (2007) argues that molecular gastronomy is misunderstood as a trend in cooking or as a set of cooking techniques, possibly caused by chefs successfully adopting tools and techniques more traditionally associated with the sciences than culinary arts. At one level this would seem to be correct where Donald (2004) describes Heston Blumenthal of the Fat Duck, as a chef practicing molecular gastronomy in the kitchen, however, Tyrangiel (2005) notes that Blumenthal is also hesitant to embrace this title. Moreover Walkup (2006) states that Ferran Adrià is often credited as being a founder of the molecular gastronomy trend in cooking, and his restaurant *el Bulli* has been called “ground zero for the world’s molecular gastronomy movement” (Richman, 2006, p. 56). In a very clear juxtaposition both Blumenthal and Adrià (2006) emphasize that the workshops run by This and Kurti did not influence their approach, and the term molecular gastronomy does not describe their cooking, or indeed any style of cooking. Indeed, it is clearly stated by Hervé This that molecular gastronomy was never intended to describe cooking or styles of cooking, hence why it was not called molecular cooking (This, 2006b, p. 2).

Molecular gastronomy initially seemed to be a European phenomenon, however in the United States of America there are two high profile studies into the scientific study of cooking: culinology and experimental cuisine. Cousminer (1999) notes that the term culinology was coined in 1996 by the American Research Chefs Association (ARCA) to describe and formalize the fusion of two disciplines - culinary art and food technology - to allow the blending of culinary arts and the science of food. Through colleges and universities, the ARCA offers degrees that are focused on the science of mass food production and preservation of restaurant-like dishes based on culinary artistry (Cornwell, 2005). More recently, in 2007, New York University’s departments of nutrition, food studies, and public health and chemistry a group of leading chefs created the ‘experimental cuisine collective’. ‘Experimental cuisine’ seeks, amongst other things, seeks to: contribute to a rigorous scientific understanding of the physical basis for cooking processes; enhance understanding of the social contexts for cooking and the societal ramifications of new food technologies; and accelerate the discovery of scientific and experiment-based approaches to innovative culinary practices, unorthodox flavours, and new dining traditions (Experimental

Cuisine, 2007).

A summary of the academic literature surrounding molecular gastronomy and similar phenomena is presented in Table 1. The first column gives the author and date of publication, whereas the second column clearly indicates the wide variety of fields of study that have published papers in molecular gastronomy; these include: food engineering; food biophysics; food science and technology; nutrition; molecular biology; organizational behaviour; dental medicine and law. Disappointingly these fields of study do not bring an equally diverse range of methodologies; the third column shows that most of the papers are either literature reviews or conceptual articles. With the exception of the legal report (Buccafusco, 2006) only two papers are based on primary research (Arbolea, et al., 2008; Svejenova, Mazza, & Planellas, 2007) who interviewed two chefs.

[Take in table 1]

Media portrayal would certainly suggest that there has been a wide acceptance of the ideas and concepts of molecular gastronomy, although the limited empirical data highlighted in this literature review would suggest otherwise. Table 1 highlights the lack of direct engagement with chefs and the corresponding empirical work that is required to explore if (and how) the phenomenon of molecular gastronomy, originally proposed by This and Kurti in 1988, are being used by chefs today. This research redresses that balance by interviewing some of Europe's leading chefs to explore their thoughts and ideas about molecular gastronomy.

Methodology

Sample Design

The Michelin Guide is often used as a benchmark for evaluating chefs (although strictly speaking it is restaurants that are awarded stars), however, there are many other institutions, magazines, culinary events, but particularly journalists who enforce expectations on chefs to meet the terms with convention and innovation. The S. Pellegrino World's 50 Best Restaurants, published by the British Restaurant Magazine, is a recent modern ranking that presents a counterbalance to the more traditional Michelin Guide. Both guides were used to design the sample used in this research. Michelin-starred restaurants are rare, capital-intensive and demanding (Chossat & Gergaud, 2003). The experimental cuisine collective, highlighted in the previous section, is typical of the increased academic interest, often emanating from the natural sciences, amongst chefs. The Harvard School of Engineering and Applied Sciences (SEAS, 2008), for example, invited Ferran Adrià (Spain), who was also interviewed in this study, for a conversation on creativity. Professor Peter Barham (UoB, 2008), a physicist from the University of Bristol, works together with Heston Blumenthal (UK). And Hervé This (2007b) from The French National Institute for Agricultural Research works together with Pierre Gagnaire (France) all from three star restaurants. A similar sample was used by Ottenbacher and Harrington (2007) when exploring how 'Michelin-Starred chefs' developed new dishes for their menus. The purpose of this paper is significantly different as it explores genesis of a culinary movement rather than the creation of a new dish.

All chefs were chosen according to a snowball sample design as long as all the chefs restaurants either held one or more Michelin star or appeared in the list of 50 top restaurants; in most cases they did both. The sample began with the support of Harald Wohlfahrt whose restaurants have held 3* status for the last 18 years and in 1994 the New York Times named him one of the ten best chefs in the world (FAZ.NET, 2009). Wohlfahrt signed a letter to support this study that was

sent to 36 extraordinary chefs in Europe; in total 18 out of the original group of 30 agreed to participate and were able to be interviewed. First, emails were sent to those chefs whom the researcher was certain they knew Harald Wohlfahrt personally; their consent was in turn used to motivate the next group of chefs. In some cases, several emails were required to motivate a reply and then several other emails were needed to finalise the actual date of the interview. However, this prior communication was a very useful way to gain familiarity with either the chefs who responded in person or their wider organisations.

Data Collection

The interviews were phenomenological in style, lasting between 90 minutes and two hours, conducted in English, Spanish, French or German (languages spoken by the two researchers) with the 18 chefs who agreed to take part in the study; these interviews were recorded and then transcribed. Whilst, of course, it is the individual chefs that are being interviewed for this research the Michelin Guide (2009) makes it clear that 'Stars' are awarded to the restaurant and not individual chefs. However the Guide highlights that they do not take into consideration interior decoration, service quality or table settings - only what is on the plate. During the data collection, all the chefs were interviewed in their own restaurants and in their own language. Table 2 Details of Chefs Interviewed for the Research gives the name of their restaurant, date and time of the interview, and a very short biographical detail, where they are available a link to their website is also given.

[Take in Table 2]

Patton (1990, p. 68) observes that the term phenomenology has become fashionable and its various meanings have often been confused: "Sometimes phenomenology is viewed as a paradigm, sometimes as a philosophy or as a perspective, and it is sometimes even viewed as synonymous with qualitative methods or naturalistic inquiry". Phenomenology is used in this research as the context of inquiry; however, the paradigmatic and philosophical dimensions of phenomenology give foundation to the form of the interviews. As Thompson, Locander, and Pollio (1989) note phenomenological interviews, with a small number of pre-planned questions, allow an emergent dialogue and thus the discovery of the interviewee's unique experience of the phenomenon being studied.

A similar method was used by Thompson (1997) when illustrating a hermeneutically grounded interpretive framework for deriving marketing-relevant insights from the analysis of customers' stories. The phenomenological interviews in this research consisted of, the interviewer who was a chef and already familiar with the interviewee and their organisation, encouraging the chefs to talk. As recommended by O'Gorman and Gillespie (2008), before the interviews, a period of sensitisation and familiarisation with the chefs, their organisation and their publications was also undertaken. This enabled the interviewer to have a greater understanding of the organisational culture and obtain a more in-depth perspective of the chef in question. As with Thompson (1997), these interviews typically employ very few pre-planned questions and in particular the interviewer did not offer the chefs a definition of molecular gastronomy to avoid influencing the data collection, rather the chefs were encouraged to talk about what significance the term held for them.

Words, whether spoken or written, remain ambiguous. Yet, interviewing is considered to be the most powerful and common method to understand the reality of others (Fontana & Frey, 2005).

However, the data collection exercise clearly transcended the interview. Meaning and understanding came from the wider interview experience which included tours of the restaurant complex, explanations of technical equipment in the kitchens (often built and designed by the chefs), shared food and wines, and other artefacts and publications including books, menus, and recipes. Often some of critical insights came from the chefs after the formal interviews were over. These experiences, and the impressions of the chefs formed during the formal interviews, were recorded and reflected upon in a research journal.

Data Analysis

As the data collection exercise transcended the interview, the data analysis technique must also allow for the analysis of more than words alone. Often this important aspect of data analysis is overlooked and forgotten, but it is exactly this tacit and subjective experience during the data collection that gives richness and depth to the qualitative research process. The method of data analysis used is the hermeneutic analysis; Kvale (1983) states that by their nature phenomenological interviews are predestined to this analysis. This is a clear development to the method used by Morrison and O’Gorman (2008) to analyse the relevance of the Rule of St Benedict for contemporary hospitality management and O’Gorman and Gillespie (2008) who explore how leaders in the international hospitality industry create, disseminate and sustain corporate culture within their organisations, as this study openly acknowledges that data collection transcends the written word. Both Morrison and O’Gorman (2008) and O’Gorman and Gillespie (2008) use the applied hermeneutical analysis of Alvesson and Sköldbberg (2004); Denzin (1989); and Hayllar and Griffin (2005) adopt four epistemological practices of: bracketing previous experience and focusing on the collection of data; researching the phenomenon; reflecting on the essential themes that emerge from the research and finally developing the discussion and conclusions through writing and rewriting. These epistemological practices are undertaken in tandem with two methodological principles for hermeneutical interpretation: Maintain a strong and oriented relation to the phenomenon under investigation, and the findings should make sense as a coherent whole as well as in distinct parts.

Bracketing previous experience was undertaken to the extent that was actually possible and this was reflected on in the research journal. Focusing on the collection of data was discussed in the previous section. The data analysis was conducted in English and the interviews were translated for the data analysis. However, there were no translation issues as the researchers are fluent in the four languages (English, Spanish, German, and French) that were used in the data collection. After the interviews were transcribed, they were printed and the formal analysis process began. The researcher started by reading each interview several times to familiarise with the text and to “dream back” in space and time to when the interview happened. This was done in conjunction with reading over the notes from the research diary and reflecting on the various artefacts that had been collected throughout the research process. During this process the various themes began to emerge. This was repeated with each interview and was followed by a rigorous repetitive analysis to find increasing strength for the final themes of the argument that is presented in the next section.

Summary of interview outcomes related to gastronomic development

What makes a great chef?

All respondents gave examples of a relatively small number of current and historical people whom they considered to demonstrate the characteristics of being a great chef. Generally there was a consistent view that to be a great chef it is important to be a master technician and to have a good depth of knowledge and experience. The other main attributes identified were a desire to do things well and to want to continue to improve. There was some mention of personality, character and own trademarks, alongside contribution to the advancement and enhancing the prestige and recognition of the profession. This however did not always mean that it was necessary to be at the forefront of innovation; it could equally be achieved by working well to the highest standard. One specific observation was "... the best way to advance, when everyone is running, is to stay still ...".

Culinary trends

A general reflection of the approach to identifying and discussing culinary trends is probably summarised in the statement "...all great movements are often started by wonderful people, by great people who truly have deep understanding of food and work by seasonality and by produce. They are also people that are totally curious, open to new ideas." Apart from the developments underpinned by classical cuisine, two other key culinary developments were consistently referred to: Nouvelle Cuisine and then molecular gastronomy. Cyclical approaches were identified where a trend was initiated and then became polarised with the development of the best and worst extremes being evident. Then things would settle down with only the best being retained and then this becoming a lasting influence, such as happened with Nouvelle Cuisine; "it took 30 years of mistakes to understand Nouvelle Cuisine" "When it is in the right hands, when you take great masters from the Nouvelle Cuisine like Chapel, like Troisgros, like Freddy Girardet, like Verger, like Guerard, you look at what Nouvelle Cuisine was meant to be; a departure from Escoffier where he put the all cooking into a Bible ... that is why chefs drank because they were so bloody bored, there was no excitement for those people, there was no passion".

During the interviews a clear distinction was drawn between culinary innovation and culinary fashion; with Nouvelle Cuisine being identified as belonging to the former, fusion cuisines identified as belonging to the latter, and molecular gastronomy, or at least the new restaurant concepts being referred to by that term, yet to be identified as either. However although molecular gastronomy was also seen as the latest example of a possible trend it was too early to say what the longer-term outcomes might be. Some discussion also took place on food as art, with a distinction being drawn between artistic ability, in terms of high levels of craftsmanship, and artistic ability, in terms of presentation skills, which are not the same. Also identified was the influence of the media "...sadly, the media does not notice simplicity and taste. They can write well but look for sensation..."

Technological development

The key topical issue consistently identified as being a potential technological development was molecular gastronomy but views were not at all consistent about the either value or use of it. Certainly there is recognition that to achieve culinary mastery it was important to understand, and be able to apply, the principles of the science (chemistry, physics, nutrition etc) that underpin it, alongside a will to enhance and improve. However there was a range of differing interpretations as to what the application of molecular gastronomy actually was. Extremes of view ranged from identifying the novelty elements of the movement, to the potential value of it in the advancement of culinary understanding and expertise. Similar polarisations were over the question of it being a cuisine or a technique. However most of the interviewees also identified

that the science and techniques were already in use and had been known about for a long time – it was just that the processes were now being moved from the kitchen to the table, and with this a greater media interest and influence. It was also recognised that increased knowledge and understanding of the food preparation and cooking processes provide the greater potential for the technological development of foodservice equipment.

Molecular Gastronomy

In all cases the key person identified with the molecular gastronomy movement was Ferran Adrià with Heston Blumenthal not far behind. Certainly there was respect for these two men, however at the same time other key chefs were identified as being of equal if not greater importance, such as Ducasse and Robuchon. However there was recognition of innovation “Ferran Adrià has certainly introduced new aspects that did not exist before - this does not mean however that I see him superior to other 3 star chefs, but for what he is doing...he has certainly given the most innovative impulses in the last years. You can see this by looking how often he is copied. This is extraordinary. He definitely got the ball rolling; a big one. You have to acknowledge this”.

Much of the discussions on the influence of molecular gastronomy continued to reflect the wide range of views on what it was, what its value was, and what it was intended to achieve. The fad and fashion aspects were identified alongside the potential for it to be a trend and there were also many anecdotes such as: “I was at the World’s Best 50 Restaurant presentation two times. It was nice, but they had nothing proper to eat “and “But please, one should not take these lists too seriously. You can vote in the Internet and this cannot be serious! This list is also very molecular and just yesterday I have read a report where it was criticised that seven out of the top ten chefs on this list cook molecular”. However there was general agreement of the value of using understanding and applying scientific techniques in order to achieve a better understand and to improve culinary processes and outcomes.

Apart from the variety of views, other issues identified were to do with the potential for discrediting the potential advances that it could bring “It is by no means better. There is no best cuisine. It builds on the traditional cuisine. Today we say traditional, but the Nouvelle Cuisine was at the beginning a scandal as well. And the same will happen to this cuisine. It will become classic. Thanks to scientists and the food industry we have a whole different set of possibilities”. Another observation perhaps summarises many of the views: “...Let’s take the molecular gastronomy, it was surely ingenious. But what went wrong was too many people try to follow and emulate it. You can do molecular gastronomy when you have no regular guests, because it is interesting once or twice a year. Yes, the new things that come out are interesting because they are new, because the techniques that stand behind it are just mega-ingenious. But the biggest mistakes are made by those gastronomes that try to copy it”. At the most extreme are views such as: “What worries me about molecular gastronomy that you have to look clever now. You have to make some comments that have to be: oh god, I am going to look clever... for me it is misusing food. It is putting it in a different context and it is more and more becoming a freak show.” “A show to say how clever we are.”

Role of Ferran Adrià

Every interviewee spoke about Ferran Adrià in terms such as ingenious, innovative and courageous and statements such as “he is a genius of cooking, marketing and communication and is very clever”. However although Ferran Adrià was identified as being synonymous with molecular gastronomy, he himself does not like the term mainly as he believes it is too simplistic to cover his boarder gastronomic philosophy. He identifies that it is a completely new world and

everyone is now trying to position him or herself; and as a chef you want your customers to be happy. He also suggests that cooking is a personal realisation and for him he is one of the few people that saw cooking as a way of expressing himself. For this reason he is doing new things. The others are traditional. For those at the vanguard, or at the point of being new, are completely different from those who aren't. He believes that cooking is one of the oldest languages in the world. When he gives you a dish to eat he is talking through the dish. He also argues that his cooking is absolutely not like home cooking or familiar cooking. He states that he cannot relax with his my food and shuts for 6 months to have a process of disconnection. He is also adamant that *El Bulli* is not a restaurant but it is the whole experience. He believes that it cannot be called a restaurant, as it is a new classification. "Just now it is a space, in the future there is going to be more, but just now we do not have a word for it. Or this might be the only one. Each year it is completely different". He also believes that the ultimate would be to have one table and a direct line of communication between the creator and the receptor; and that would be the ultimate experience possible.

Conclusion

The aim of this paper was to explore the phenomenon of molecular gastronomy. The literature review highlighted that throughout history there has been culinary innovation and change and this paper has exemplified only a handful of people from the last 300 years. These great people had all contributed to the advancement of culinary practice through better understanding and the desire to improve. Most had contributed by working outside of the confines of their professions and recognised that all true advancement only takes place at the boundaries of disciplines. These people had included the chef Alexis Soyer, who had contributed substantially both to society and to technical innovation; the philosopher Brillat-Savarin, who harnessed his board range of education and achievement across a number of disciplines and brought a better understanding of the principles of gastronomy, and the chef Escoffier who codified the cuisine of the time and had also laid the foundations of modern professional cookery and food production management. At the end of the 20th Century the movement, now known as Nouvelle Cuisine, was initiated. This was inspired by a range of chefs at the top of their profession and also supported by the influential and knowledgeable publishers at the time. It was also underpinned by sound gastronomic principles.

More latterly the physical chemist Hervé This and the physicist Nicholas Kurti had explored the underpinning sciences of cookery. Having used the term molecular gastronomy, it has since become also associated with a possible culinary movement. However what is different here is that there is no specific link between the later identification of a possible culinary movement and what molecular gastronomy was actually about. The original intentions of Hervé This were simply concerned with the "chemistry and physics behind the preparation of any dish" (2006a, p. 1062) and that better understanding would lead to more healthy and attractive food, and more people being able to cook better food. Although Hervé This had clearly stated that that molecular gastronomy was never intended to describe cooking or styles of cooking, (This, 2006b, p. 2) the term has nonetheless become used to describe a possible culinary movement. The key reason for using the term in this way seems to be stemming from the observation made by Blanck (2007, p. 77) that the phrase is often misused in the media. It is then hardly surprising that there is also great confusion amongst the interviewees about what molecular gastronomy actually is as the term itself, and what it is has become applied to, is also confusing: i.e. it is a set of techniques or a cuisine, a fad or a trend? However all the interviewees understood and embraced the original and straightforward intentions of Hervé This and also believed they were already applying the approaches as part of their desire to be better at what they do.

What has also always been clear, which has also been reinforced by the interviewees, is that the development of lasting cuisine movements and trends have traditionally been, and will continue to be characterised by four key elements. These are: initiation by established chefs at the top of their profession; understanding and application of the broad range of sciences and technology; support and promotion from knowledgeable media, and a long time to become fully established. Certainly within in the development of Nouvelle Cuisine these four elements are clearly evident. In answer then to the basic question of whether molecular gastronomy provides any real basis for a culinary movement, the simple answer seems to be no. It has not been initiated by experience and respected chefs, does not have clearly identifiable gastronomic principles underpinning it, certainly lacks the understanding and support of knowledgeable media, and has not been around long enough.

Where there are parallels with the development of Nouvelle Cuisine, as identified by the interviewees, is in the science and techniques of cuisine being abused and copied without the depth of understanding or the competence to make sense of them. This abuse is characterised by an over fascination with the fundamental science and techniques of cuisine, moving cooking processes into the restaurant, and showy displays of culinary alchemy.

However, there are modern restaurant concepts or dining experiences that have been developed, although they are not a direct reflection of the original intentions of Hervé This and Nicholas Kurti. This is something that is fully acknowledged by Adrià and Blumenthal as the two key pioneers of the new restaurant concepts, as identified by the interviewees. Both of these chefs are clearly developing new and distinctive types of restaurant concepts, or dining experiences and they are also following in the traditions of the great innovators of the last 300 years by working beyond the confines of their professions. It is in these new restaurant concepts, and in the innovative approaches to cuisine associated with them, that there may be evidence of genuine gastronomic development. It may however be simply too early in the culinary evolution process to tell if these developments will lead to a lasting gastronomic movement; and if they do the movement will clearly need a universally accepted and understood name.

Table 1: Academic Literature Surrounding Molecular Gastronomy

Paper	Field of study	Method	Key Findings / Conclusions
Aguilera (2005)	Food Engineering	Conceptual	Molecular gastronomy aims to achieve new structures and techniques such as drying, liquefying, gassing and subjects such as heat transfer to foods in ovens, u in the kitchen and novel techniques such as the use
Arbolea, et al (2008)	Food Biophysics	Conceptual	The public tend consider molecular gastronomy to so complicated, and unsafe. The term should be modifie representative one; collaboration between the scie should be encouraged
Buccafusco (2006)	Law	Legal Report	While recipes may be amenable copyright, granting f necessary, because a vibrant system of social norms assign credit, and promote innovation.
Edwards-Stuart & Valverde (2008)	Food Research and Technology	Report	Molecular Gastronomy should be considered a part of culinary transformations that occur in the home or eating, rather than just the physical and chemical transformations as researched by the food industry
Rodgers (2008)	Food Production	Conceptual	Use of analytical methods combined with the princip supported by predictive models can result in outsta development including the design of functional meal
Slavkin (1999)	Dental Medicine	Conceptual	The flavour of the simplest dish presents a dauntin analysis. A food item that is particularly appealin and micronutrient constituents that stimulate eithe or the nose's olfactory receptors—often at a sensit
Svejenova, et al (2007)	Organizational Behaviour	Case Study	A case study on Ferran Adrià and Spanish chefs from and the 'Nueva Nouvelle Cuisine'. Essential in unde chefs to achieve recognition in an international ga relationship they establish and maintain across gen
van der Linden, et al (2008)	Food Biophysics	Conceptual	Molecular gastronomy should prove its merit via its public and emphasize the importance of food and its quality of life
Vega & Ubbink (2008)	Food Science and Technology	Conceptual	Despite media attention, molecular gastronomy remai poorly communicated. For this reason, it stirs deep among cooks, scientists and the lay public alike

Table 2: Chefs Interviewed for the Research

Name of Chef	Michelin Stars	Interview Language	Name of Restaurant and web link
Adrià, Ferran	3	Spanish	'El Bulli' Cala Montjoi S/N, 17480 Roses, Spain. www.elbulli.com
Aduriz, Andoni Luis	2	Spanish	'Mugaritz' Aldura Aldea. Caserío Otzazulueta, 20; 20100 Renteria, Spain www.mugaritz.com
Amador, Juan	3	German	'Amador' Vierhäusergasse 1, 63225 Langen, Germany www.restaurant-amador.de
Blanc, Raymond	2	English	'Le Manoir aux Quat' Saisons' Church Road, Great Milton, OX44 7PD www.manoir.com
Bras, Michel	3	French	'Michel Bras' Place Prat, 12210 Laguiole, France www.michel-bras.fr
Bras, Sébastien	3	French	'Michel Bras' Place Prat, 12210 Laguiole, France www.michel-bras.fr
Haas, Hans	2	German	'Tantris' Johann-Fichte-Str. 7 - Schwabing, 80805 München, Germany www.tantris.de
Henderson, Fergus	1	English	'St John's' 26 St John Street, London. www.stjohnrestaurant.co.uk
Henkel, Nils	3	German	'Schlosshotel Lerbach' Lerbacher Weg, 51465 Bergisch Gladbach, Germany www.schlosshotel-lerbach.com
Klein, Jean-Georges	3	German	'L'Arnsbourg' 18, Untermuhlthal dir. Zinswiller, 57230 Baerenthal, France www.arnsbourg.com
Müller, Dieter	3	German	'Dieter Müller' Lerbacher Weg, 51465 Bergisch Gladbach, Germany www.schlosshotel-lerbach.com
Reitbauer, Heinz	2	German	'Steirereck' Am Heumarkt 2A, 1030 Wien, Austria www.steirereck.at
Roca, Joan	2	Spanish	'El Celler de Can Roca' Can Sunyer 48, 17007 Girona, Spain www.cellercanroca.com
Trettl, Roland	1	German	'Ikarus im Hangar-7' Wilhelm-Spazier-Str. 7a, 5020 Salzburg, Austria. www.hangar-7.com
Troisgros, Michel	3	French	'Troisgros' Place de la Gare, 42300 Roanne, France. www.troisgros.fr
Winkler, Heinz	3	German	'Residenz Heinz Winkler' Kirchplatz 1, 83229 Aschau, Germany www.residenz-heinz-winkler.de
Wissler, Joachim	3	German	'Vendôme' Kadettenstr. 2, 51429 Bergisch Gladbach, Germany www.schlossbensberg.com
Wohlfahrt, Harald	3	German	'Schwarzwaldstube' Tonbachstr. 237, 72270 Baiersbronn, Germany www.traube-tonbach.de

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