Review paper
UDC 641.016

CONTAMINATION OR CREATION: AN EVOLUTIONARY DESIGN WORKSHOP ON FOOD

Ahmet Can Ozcan[1*]

[1]Department of Industrial Design, Faculty of Fine Arts and Design, Izmir University of Economics, Sakarya caddesi no: 156, Balçova, 35330, İzmir, Turkey

[*]e-mail: can.ozcan@ieu.edu.tr

Abstract

Contamination or Creation is a series of design workshops using kitchen and food as a design metaphor and apply participatory design methods to create new recipes. Evolutionary principles mostly originated from Charles Darwin and memes originated from Richard Dawkins were also a part of the theoretical background for the design process. People with their design backgrounds and cultural identities contributed to the evolution and creation of new cuisine recipes specific to that specific location and event. The 1st Contaminazione workshop in Universita di Palermo, Sicily (2008) was a combination of Turkish Sicilian Cuisine. The 2nd workshop (2009) turned out to be more Aegean and Mediterranean in a very small village in Western Anatolia. The 3rd one was in Eskisehir, Turkey (2011) where the aim was set not as designing, but creating "the unexpected but possible".

The paper covers not only the theoretical background and the complexity of arguments on issues related to evolution, design, and food, but also the unique outcomes of the three workshops. The practices accumulated in these three workshops lead us to conclude that the evolutionary principles have given human beings a major role by rewarding them with design ability that's been reflected on everything artificially created including food. Any simple recipe that goes through our throat is a complex evolutionary designed artefact that depends on 1. Diversity, 2. Continuity, 3. Novelty and 4. Selection [2].

***Key words**: Evolution, Design, Food, Uniqueness, Change, Selection.*

1. Introduction

Contaminazione: Contamination or Creation is a series of 4 workshops in total, started in 2008 in Palermo, Sicily; repeated twice in a slightly different format in 2009 in Yahsibey village by Aegean Coast in Turkey and finally in 2011 in Eskişehir, Turkey in a radically changed fashion for the last time. Though the formats showed slight modifications the framework of the workshops remained the same. It was an experience to discuss if designing is an evolutionary phenomenon which can be linked mainly to Darwinian principles and concepts like memes developed by Richard Dawkins [5]. Food and cuisine (in every sense) served as a medium of existing materials and recipes to design new things in all the workshops and the main principle was designing rather than developing new culinary recipes. Almost all the participants were designers and design students. Only two professional chefs were involved - one in Sicily and one in Eskişehir, and they were kindly asked not to interfere with the process for the aim is not culinary but evolutionary design related. All three workshops depended on the following principles:

- transdisciplinary participation of people from various design disciplines, cultures and traditions,
- complexity of arguments on issues related to design, culture, creation, evolution,
- practical handling and manipulation of objects and materials. Mixing, touching, opening closing, cutting, constructing and destroying during the food process like it is used to be in any design activity.

Design and designers are usually associated with independent creative actions, which are independent from external and preceding factors. Design and originality goes hand in hand with an independent creative act. Terms like talent, inspiration, creativity all refer to innate qualities of a designer that sets them apart from external realities. The term creativity has appeared long before science and been attributed to supreme beings in the forms of gods, goddesses, semi gods, semi goddesses or to humans with exceptional qualities. Mythologies, holy books, even rhetoric's of non-fiction like history have never hesitated to use the word "create" and/or "creation" from natural occurrences to acts of making from arts to architecture, from design to

food. The first lines of the Old Testament starts with "In the beginning when God created the heavens and the earth" and repeats the word "create" in different forms all along the script. Such an image of the Genesis, the creation of the universe and the earth in seven days have been inherited for generations even until now especially by the disciplines of art to explain new things being realized from nothing by internal drives like talent, inspiration, creativity. Though it is almost impossible to imagine something 100% new, all things must come into existence out of existing things providing basis for new things, as has been realized in the Old Testament as well: "And the rib that the Lord God had taken from the man he made into a woman".

Figure 1. Poster for the 1st "Contaminazione" Workshop

2. Darwinian Design

Objects providing basis for new objects has been well claimed in George Basalla's book "The Evolution of Technology" and systemized in 4 categories: 1. diversity, 2. continuity, 3. novelty and 4. selection (Basalla, [1]). Instead of evolution John Z. Langrish [6] prefers the word "Darwinian Change" but it does not change the basic evolutionary character of new things emerging from existing things by "numerous, successive, slight modifications" (Darwin [4]).

What might be called "Darwinian design under the influence of natural selection" was first used to make money by the German dyestuffs industry in the nineteenth century. Teams of skilled synthetic organic chemists were employed to make novel, colored chemical compounds. Since there was no way of knowing which of these would make useful dyes, the new compounds were tested in a dye house where most were found to be useless, but some were selected for further chemical modification in the hope of improving them. By 1910, it was calculated that ten thousand new compounds had to be tested to find one new commercial dye, but the profits from the one, successful dye were much greater than the cost of producing the ten thousand (Langrish [6]).

Following German dye chemists and independent from the question of whether they were intentionally following the ideas of Darwin, we can focus on the basic principles of chemistry in terms of how new things emerge and discuss if we can establish a Darwinian Design out of it. " As Pirsig points out whether the metric system is true and the avoirdupois system is false; whether Cartesian coordinates are true and polar coordinates are false. One geometry can not be more true than another; it can only be more *convenient*. Geometry is not true, it is adventageous (Pirsig [10]).

So looks chemistry and periodic table as a start even for design activities as in the case of designing new recipes of food in the workshops to be explained.

2.1 Diversity

The diversity of artificially designed objects has exceeded the quantity of living organisms in the world (if not also the elements and compounds of inorganic chemistry). According to George Basalla the world of technology is as three times bigger as the world of biology in quantity (Basalla [1]). Not only the world of design itself has become much more complicated quantitatively and qualitatively, scientific and intellectual research tools to deal with this world have become much more elaborate and confident more than they had been since the times of Darwin. Even the concepts like "memes" and "memetics" (Dawkins [5]) of last thirty something years have brought a new insight to design researches and studies from an evolutionary point of view.

The ability to recognise a possible design from among a range of alternatives is a significant attribute in designing new things. Range of alternatives and possibilities in chemistry has been well modelled in the

Periodic table of elements and it also explains how new "things", f.k.a. compounds emerge. The internal stability conditions and the external conditions for reaction cooperate for new things to be created in this model. H and H and O well combine to reach a more stable condition by forming a totally new compound which is H_2O, which goes almost similar as in the case of familiar compounds like NaCl (Sodium chloride) or CaF_2 (Calcium fluoride).

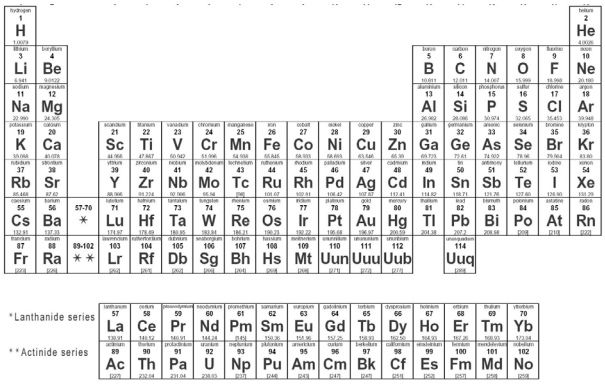

Figure 2. Periodic table of elements [13]

The principles set in the Periodic table don't just work in chemistry but in other areas including cultural issues, design and food as well. Following is another derivation of Periodical table depicting what type of alcoholic beverages combine to make other types of new cocktail recipes.

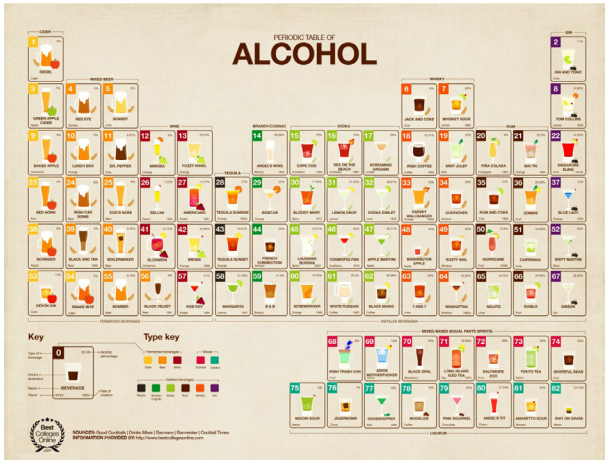

Figure 3. Periodic table of alcohol designed by Mayra Magalhães of Area 42 as a promotional tool for Best Colleges Online [14]

What the Periodic table model provides for design is the diverse characterisitics of the existing facts and factors with almost endless possibilities because of a) the internal characteristics, and b) the external conditions. Internal characteristics as in the case of elements provide a status for others to interact to form new things and external characteritics provide the condition for these reactions. The reason why there are no organic carbon compounds on Mars is not because there are no carbon atoms on that planet, but the external conditions don't allow them to behave like they've done on planet Earth. Diversity, which is a kind of variety acts as the main existing physical resource for design as well. In principle, regarding the case of food, the diversity of existing materials increases the diversity of outcomes in quantity at least. But as it will be discussed later the diversity and variety of the materials were lessened step by step from the first workshop to the last one, and the diversity of the outcomes were higher in quantity (and in quality though questionable) when the existing material was dropped into a single item, pasta in our case. Maybe this is also the case that the outcomes of a single atom, which is carbon, exceeds the outcomes of all the total otcomes of the inorganic reactions of the all other existing elements. Depending on the functions they are associated with, designed things including food come into existence in a wide variety of forms, and now a preferred new thing becomes an existent variety for the possible future design, or go extinct if not selected.

2.2 Change and Continuity

Change in nature is usually a random and conditional act while changes by design are intentional preferences and selections among a range of possibilities. Languages, traditions, gestures, social and political systems, products all change by slight design modifications through time. Changes in designed objects and food recipes are the acts of transformation either by preference or necessity from existing to new ones. While a recipe like immediately eating fish raw just after the catch because of hunger is necessity over preference, while a recipe depending on eating the brain while the monkey is alive is just the opposite.

Periodical table and chemistry provides the principles for designers to recognize change in natural environments. There certainly exists an inorganic, organic and artificial act of change but they are not evolutionary changes within a specific kind but rather an act of interaction with the other. In mitosis or asexual reproduction we observe very limited almost no change while meiosis or sexual reproduction provides endless possibilities of evolutionary change. The new approaches to evolution establish a common ground where design can be placed in relation to other entities; other designs, humans, nature, universe. Evolution is not an internal process of kinds, but it is a dynamic and total movement of the whole universe including everything from a singular hydrogen atom, to the most complex natural or artificially "designed" mechanisms within their environments [3]. We have used to think of evolution as a progress in a strict biological sense. In case of design it is not a reflection of biological principles

into technical structures, i.e., it is not only a progression of designs from primitive and simple structures into advanced or complex ones, into new machines, new technologies, new appliances, or in the case of food, new recipes. Change is not an evolutionary act, but a co-evolutionary act of interaction with others. If it is an interaction with chlorine in the case of sodium, it is an interaction of two sexes or two different kinds of dogs on another biological level, and an interaction of at least two (close or far) separate existing items in case of designing new things.

Figure 4. Even one of the first patented cars in 1886 by Benz is a transformational change based on existing horse carts, bicycles, and relatively a new development, a gasoline engine visibly brought together [15]

Figure 5. How existing things have been transformed into a preferrd state as in the case of tuna, cheese and herb stuffed tomatoes [16]

A strange fact about change in design is that in the first phase of development there may occur a variety of changes until some standards are accepted in cultural domains. It usually turns out to be a self-limiting factor for future changes. These limitations are sometimes very conservative and strict as in the case of food. Not only majority of the recipes tend to remain unchanged for too long once developed, but also the tools and designs used for food have changed not radically as in the case of some other design disciplines. The quantity and quality of design changes in car models are enormously more than the changes in the design of conservative kitchenware and table ware items like, spoons, forks, knives, plates, pots, etc. No matter how innovative a design regarding tableware and kitchenware is, it mustn't exceed the cultural design norms existing for a very long time. It is also valid for new recipes as well. There has been an accumulated set of cultural standarts and norms regarding the visual characteristics and qualities of taste.

Figure 6. Plate & Board Design by Josh Bechtel. Though new and innovative, it also has all the conservative characteristics of thousands of years old tableware design [17]

2.3 Novelty

Novelty, a new or unfamiliar thing or experience, is the fact what creates the identity in design and what designers aim to achieve. The concept of novelty separates a design that has existed before against a design that is wholly new or original and has not yet been experienced by the public before. Any design, like any living organism has unique characteristics of its own to be identified with. Yet, identical similarity among natural designs is far more less than artificial, and especially industrially produced designs. When compared with art and nature, designing for industrial mass/serial production brings about more and more products with less and less novelty. Not only technological production constraints but also the profit and efficiency paradigms of a mass consumer society limits the designer in terms of originality. The market asks the designer more profitable and more economical products with more surplus values added with less risks, aka less novelty. It is no surprise that for example fashion and mass media are very useful tools to increase a common and shared familiarity, but decrease originality, unfamiliarity and consecutively risks related to acceptance and selection. Designers all over the world and all these centuries have been designing and seem to continue to design original novelty chairs and take patents and registrations for them but the human body remains

the same. Though new, original chair designs emerge every day and still surprise us, the significant originality yet to remain in somewhere else or in a preceding design as in the case of evolution. A very common example of Philip Starck's juicy salif lemon squeezer as an original design is a good example of how new things and novelty comes from existing other things.

Figure 7a

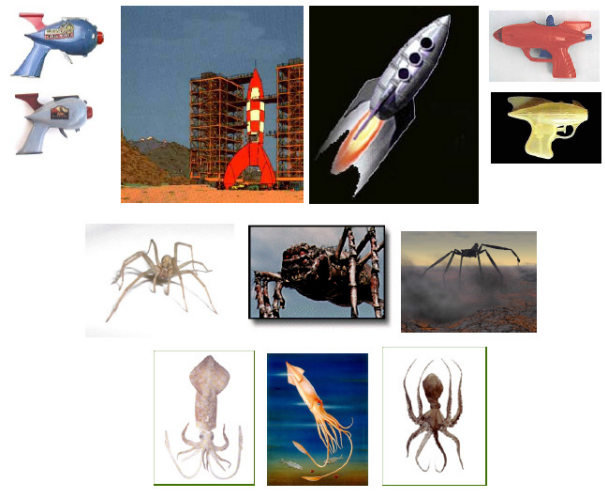

Figure 7b

Figure 7. Juicy salif, the lemon squeezer designed by Philip Starck for Alesi (Fig. 7a) and the other existing designs the novelty of Alesi come from (Fig. 7b) [9]

2.4 Selection and Memes

Darwin has explained characteristics that enhance an individual's survival and reproductive success passes on to subsequent generations - this is "survival of the fittest" or natural selection. In our design terminology we still do not have an analogical term for natural selection. No doubt that there is a selection of certain designs with respect to their characteristics. These are not usually akin to the products. What makes a a product selected can not be explained from a single point of view. You can not explain it aesthetically (..."because it was beautiful"), you can not explain it functionally (..."because it was more efficient"), you can not explain it economically (..."because the market was to afford such an economical concept"), you can not explain it zoologically (..."because it had a resemblance to beetles and bugs"), and you can not explain it with emotions (..."because it was lovely"). However I may say that you CAN explain it with all of these factors but each of them excludes the others and we still do not have the term for the basic fact that not that product, but this product is "selected". The term I will use at the moment will be *Design Selection* to cover all the aspects of a product to exist, survive and develop in our lives. QWERTY keyboard is an example of how some design characteristics sustain through selection. Though QWERTY keyboard design was an order developed to prevent mechanical typewriters from getting jammed, it still remains though we do not require it with the latest technologies. Memes developed by Richard Dawkins (Dawkins [5]) or the process of being selected are the issues well interrelated with the concept of inheritance.

I remember a discussion among my colleagues about bicycles. The main issue was if someone could recognise and ride a bicycle if he or she was to see it for the first time in his/her life. It was a matter of interrelating designs with our life accumulations and experiences. The answer seems to lie in the concept of memes and memetics which has been introduced by Richard Dawkins in 1976 [5], and now being considered as important as above principles for evolutionary theories.

Memes are entities that primarily inhabit human minds (but you can find them in other places as well). To express it simply, a meme is an idea. Some modern day examples of memes are musical phrases, jokes, trends, fashions, car designs, and poetry. Any thought or idea that has the capacity to replicate is a meme. A well used example of a meme is the first four notes of Beethoven's 5th symphony. Another example is the "Happy Birthday" song. These are ideas that inhabit our minds and have been very successful at replicating. Not only have these memes found their way into literally millions of minds, they have also managed to leave copies of themselves on paper, in books, on audiotape, on compact disks, and in computer hard-drives (Silby [12]).

Meme can be considered to be facts inherited by humans apart from genetic vehicles, and mostly by imitation. All human activities and culture as a whole can be considered as a huge memepool. Riding a bicycle is a meme that makes bicycle an evolutionary design entity fitting into all the basic principles.

A meme can be found variously described as: a self-replicating element of culture passed on by imitation, a unit of imitation, a unit of information residing in a

brain, culturally transmitted instructions, any permanent pattern of matter or information produced by an act of human intentionality. Whichever the description is, it is convenient to address design activities. Whatever we design is an end product, a conclusion of our behavioural patterns, called as memes. Riding a bicycle is a behavioural pattern that makes us design bicycles.

2.5 Contaminazione 1: Palermo, Sicily – November 21st to 22nd, 2008b

The 1st Contaminazione Workshop was held in Palermo, Sicily, under Erasmus Program with Univerity of Palermo and with the sponsorship of Hanabi Restaurant on November 21st and 22nd in 2008. After a theoretical introduction to Darwinian Design, two traditional recipes of Turkish cuisine was prepared and served by me to almost 30 students of design in the first day. One of the recipes were "suböreği" (wet börek), a type of börek made of layers of noodle-like pastry filled with cheese or meat, and "şıhilmahşi", a very special kind of stuffed zucchini originated from Armenian cuisine which goes back to the historical civilizations of Southeast Turkey and Mesopotamia.

Figure 8. "Su Böreği" and "Şıhilmahşi", two classical Anatolian recipes used as combinational and contaminational Sicilian recipe to be developed. One of the groups combined the processes of two recipes, layering the dough and stuffing it combined with local ingredients. The new recipe was named as "Carnoli" and it consisted both Anatolian and Sicilian characteristics of both materials and processes

Figure 9. "Carnoli" the new recipe of Sicilian-Turkey combination and contamination both in terms of materials and processes. The sweetness in the taste was something unfamiliar for Turkish cuisine while layering the dough and stuffing it employed from "Su Böreği" and "Şıhilmahşi" (Photos: A. Can Özcan)

Both recipes were familiar to Italians in terms of materials an deven taste but they were totally unfamiliar in terms of preparation process and overall design. The main ingedient of "suböreği" was same with the dough of classical Italian pasta, but the process of shaping it in such layers and cooking it "layer by layer" first in boiling water and then in cold water followed by putting all in an oven was an unfamiliar process. The significance of the recipe was not the raw material or the process of boiling and then submerging in cold water but the first layering process of the pasta dough which was set as one of the contamination components for the new recipes that the students were asked to develop. It was almost the same with *şıhilmahşi* that the materials from zucchini to rice, garlic and yoghurt were all familiar ingredients, but the process of stuffing was not. Whence the students witnessed the processs of stuffing one kind with others and combining familiar with unfamiliar were opening up new design possibilities they were

asked to form groups of three to eight and bring about their new, original, novel recipes the day after and realize in the restaurant kitchen. It was an explosion of new ideas and recipes the next day.

Figure 10. A view from the last presentation session at Hanibi restaurant. The participants and presentations of Contaminazione workshops were alike as seen in this picture (Photo: A. Can Özcan)

What the students have experienced was not something different from what usually occurs in nature and in design. Though the ingredients may be similar in different parts of the world, novelty and originality comes from different processes, or likewise, though some processes may be similar in different places, different ingredients reveal originality. If the internal and external factors are suitable, contamination and combination of these processes and materials provide basis for composing new recipes.

What the 1st Contaminazione Workshop evoked was the idea that change and evolution of things is possible by the coming together of two things from different histories, cultures, geographies as modelled in the case of Periodic table and emergence of new compounds – but it needed another test one year later.

2.6 Contaminazione 2: Yahsibey, Turkey August 17th to September 2nd, 2009

The 2nd Contaminazione workshop(s) were held in a lovely typical Aegean village, Yahsibey, where Emre Senan Foundation of Design and, Yahşibey Design Workshops are being held since 2007. It was late August in 2009 and everything was set to realize an international Contaminazione once again. The significance of these two workshops was that they provided time and variety of factors from participants to raw materials to test if there is something we can call "Evolutionary Design" or "Darwinian Design".

Yahşibey Design (YD) Workshops is an international project initiated by Emre Senan Foundation for Design (ESFD). ESFD is directed by Emre Senan and Prof. Dr Ayşegül İzer. YD Workshops project does not receive financial aid from any organization other than ESFD. However, friends of the foundation kindly provide support. Workshops are carried out in a special, dedicated building in Yahşibey village of Dikili İzmir in summers.

The creative environment hence provides allows young students of design to enjoy and to benefit from working together. The objective is to discuss design, create designs or even to create design problems and some times try to create answers to those problems. The common output of each period has been archived in different media from books to the foundation's website. No fees are required to attend the workshop. But the travel fares and the daily personal expenses of each participant will have to be undertaken by themselves. Yahşibey Design Workshops are "non-profit".

Following the first Contaminazione workshop in Palermo in 2008, the Advisory Board of ESF of Design in 2009 selected and invited me as a "Project Leader" for another Contaminazione experience. Participation was limited to 10 students of design for two weeks from different disciplines but because of high demand and qualified applicants from Italy and USA as well, instead of one 15 day workshop with 10 people, we made the workshop twice in two weeks with two different groups and with 20 students in total.

The brief for the 2nd set of Contaminazione workshops were very simple as the 1st one. It was set as designing and developing inspirational new recipes by using local and seasonal Aegean food combined with Darwinian and co-evolutionary principles. Yet, there was a slight change in the second workshop that, the second group were not to use red meat.

We met in Yahşibey at the determined date and participated in the workshop under my supervision to produce outputs of new inspirational local recipes with an identity. Using kitchen and food as a design metaphor and apply Darwinian design principles to create new recipes remained the same. Evolutionary principles were also a part of the theoretical background for the design process, as well as swimming in Aegean and sharing a common experience in a nice environment. Participation was limited to 10 students of design for two weeks from different disciplines but because of high demand and qualified applicants from Italy and

USA as well, instead of one 15 day workshop with 10 people, we made the workshop twice in two weeks with two different groups and with 20 students in total.

Figure 11. The Brief Page of the 2nd Contaminazione Workshop published in the Summer Workshops Compilation of ESFD [11]

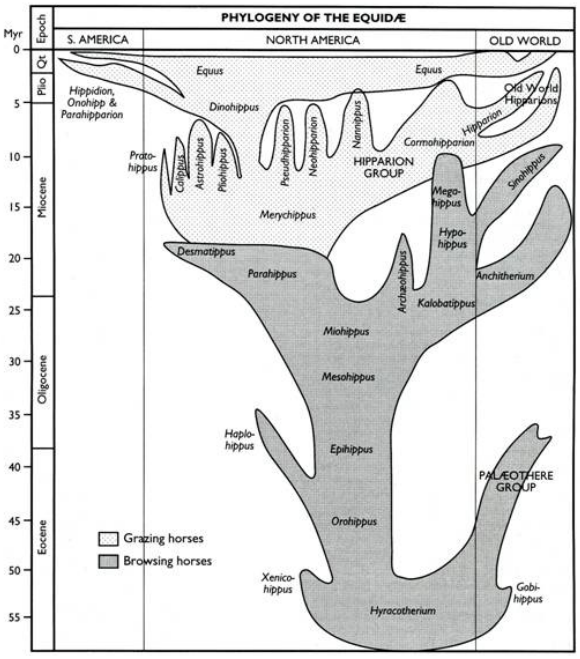

Figure 12. Evolution of horses. This diagram shows the horse family tree constructed by Bruce MacFadden, the foremost modern authority on fossil horses [8]. The family tree of the horse is more like a branching bush than a single straight trunk and this figure can act for any natural or artificial design to represent its evolutionary development in time. This figure was used also to for exhibiting how the the final recipes were developed during the workshop. Following is an example how two of the recipes evolved in time regarding their origins, interactions and interrelations with other factors

2.7 Contaminazione 3: Eskişehir, Turkey - May 21st, 2011

The 3rd Contaminazione workshop in Eskişehir Anadolu University, Turkey was different than the first two in many ways and the most crucial issue was the limitations of time and material. There were again almost

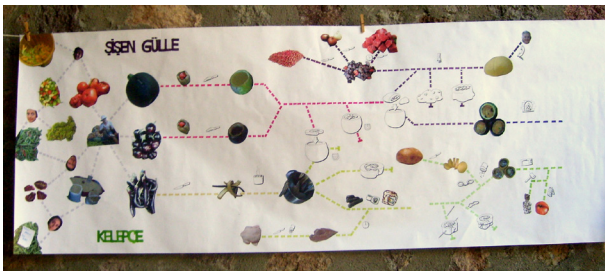

Figure 13. Evolution of two of the recipes in the workshop and its resemblance to the evolution of horses. This diagram shows how two designs developed during the workshop in their relation to their ingredient materials (internal factors) and to all the other external factors either as an act of calling one of the grandmothers to ask for a process or as an accidentally found extra ingredient added and worked

20 design students of industrial design involved in the workshop, a fully equipped restaurant kitchen and a chef were allocated for the workshop but there were only a few hours to complete the workshops in terms of materials there were only milk, pasta, sugar, fat, some herbs and nothing more. In fact these limitations dictated the brief by themselves and it was set as "designing a dessert (or something sweet) ou of pasta". With some minor editions from a local süpermarket the students this time actually developed things which resembled not previous pastas, but rather dessert and pastry recipes. In terms of creativity, the limitations of time and material seemed to have a positive effect on quality and quantity of the outcomes. Though limited in terms of taste, especially the visual quality of the designs were not different than the previous ones those had more materials and time to prepare and even test several times. In terms of novelty and change, the outcomes of the 3rd workshop were far ahead of the outcomes of the previous ones and it brought about a question whether limitations enhance creativitiy.

3. Conclusions

- All Contaminazione workshops revealed a fact that there certainly exists an evolutionary design based on what can be called Darwinian Change. Any simple recipe that goes through our throat is a complex evolutionary designed artefact that depends mainly on 1) internal conditions of ingredients to be processed and external conditions of the environmental factors, and 2) four evolutionary principles of change: diversity, continuity, novelty and selection.

- The internal conditions of the ingredients and the external conditions of the environment were interrelated if the design developed in the minds of the designers is possible in terms of making and processing. It was too much alike with the physical and chemical reactions of the elements in the periodical table. A noble and origi-

nal combination was possible only if both of the conditions were to allow that type of a new design.

- History, creation, and design all depend on change; and change as in the case of these three workshops come from somewhere else in an evolutionary fashion, either in the form of a material (Contaminazione 1), or in the form of processes (Contaminazione 1 and 2), or in the form of a meme, aka selected and ongoing pattern (Contaminazione 3).

Figure 14. A recipe from the 3rd workshop depending on the brief "Dessert or pastry from pasta". Limİtations of time and material conditions ended with more original designs, and more qualitative changes in existing patterns (Photo: A. Can Özcan)

- As John Z. Langrish points out we need to be much more modest in our beliefs that intentionality, rationality, reason, scientific understanding, good design and so on can lead to better things but we have to keep trying. Faced with the twin uncertainties of knowing what might be better and how to get it, future work will look at ways of providing some guidance to those who have to make decisions (Langrish [7]). These design workshops not only provided the grounds to test if there is a link between creativity and evolution on a large scale, they also contributed to recipe development and food design.

4. References

[1] Basalla G. (1988). *The Evolution Of Technology*. Cambridge University Press, Cambridge, UK, pp. 2.

[2] Bernsen J. (1986). *Design. The Problems Comes First.* Danish Design Council, Copenhagen, Denmark.

[3] Capra F. (1981). *Turning Point: Science, Society and The Rising Culture*. New York, Bantam, USA.

[4] Darwin C. (1859). *The Origin of Species*. Reprinted. London: Penguin.

[5] Dawkins R. (1976). *The Selfish Gene*. Oxford University Press, Oxford, UK.

[6] Langrish J. Z. (2004). *Darwinian Design: The Memetic Evolution of Design IdeasDesign Issues*. Volume 20, Number 4, pp. 16-19.

[7] Langrish J. Z. (2006). *The Wonder of Change: Where do new things come from and how do they get here? Design Research Society*. International Conference in Lisbon Book of Abstracts, 0333 - IADE.

[8] MacFadden B. J. (1992). *Fossil horses: systematics, paleobiology, and evolution of the family Equidae*. Cambridge University Press, Cambridge, UK.

[9] Mattozzi A. (2009). *A Model for The Semiotic Analysis of Objects, Design Semiotics in Use*. <URL:http://rice.iuav.it/80/1/mattozzi_model_semio-analysis.pdf. Accessed 24 March 2014.

[10] Pirsig R. M. (1974) *Zen and The Art of Motorcycle Maintenance, an Inquiry into Values*. Quill, New York, USA. P.264

[11] Senan E., Özge G. (Eds.) (2010). *Yahsibey Design Studies* (in Turkish). Yahşibey Design Workshops, ESTV Publication, Turkey.

[12] Silby B. (2000). *Evolution of Technology: Exposing the Myth of Creative Design*. New Zealand. <URL:http://www.def-logic.com/articles/evolution_of_technology.html. Accessed 18 March 2014.

[13] FFFFOUND! *Periodic table of elements*. <URL:http://www.bpc.edu/mathscience/chemistry/images/periodic_table_of_elements.jpg. Accessed 18 March 2014.

[14] Visual.ly. *Periodic Table of Alcohol.* <URL:http://visual.ly/periodic-table-alcohol. Accessed 18 March 2014.

[15] Benz Patent Motor Car, 1886. *The first automobile.* <URL:http://www.daimler.com/dccom/0-5-1322446-1-1323352-1-0-0-1322455-0-0-135-0-0-0-0-0-0-0.html. Accessed 19 March 2014.

[16] Yeni Yemek Tarifleri. *Fish Stuffed Tomatoes* (in Turkish). <URL:http://yeniyemektarifleri.com/balikli-domates-dolmasi.html. Accessed 19 March 2014.

[17] Plate & Board. *Kickstarter.* <URL:https://www.kickstarter.com/projects/joshbechtel/plate-and-board. Accessed 19 March 2014.