

Looking for the Philosophers' Stone

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Fragment

“Philosophers' Stone” – science context

When in September 2013 I arrived at the German Centre for Cancer Research, for my art residency – organised by the Helmholtz Synthetic Biology Initiative in cooperation with the University of Heidelberg – a group of students under the supervision of Professor Roland Eils was working on a project for the International Genetically Engineered Machine competition organised annually by MIT in Boston. One of the iGEM competition tasks is to build a simple biological system from standard DNA fragments called BioBricks to use it in living cells to achieve new functions and qualities. The students at Heidelberg University were inspired by the discovery of a peptide (a mini-protein) called Delftibactin produced by *Delftia acidovorans*, bacteria which lives on toxic gold ores in Australia. This inconspicuous chemical compound turns contaminated gold solution into gold particles with an unprecedented clarity of 99%. Heidelberg students ran successful tests using computer waste and a popular *Escherichia coli* bacteria they modified for the production of Delftibactin. Young scientists believe that their experiments not only will contribute to revolutionising the process of gold recovery from electronic waste, but also will actively influence the potentiality of non-ribosomal protein synthesis (NRPS) in pharmaceutical and basic research.¹

They entitled their project *Philosopher's Stone*. Contrary to ancient researchers, they are not looking for magical substances but for ways to create new tools in order to actively undertake the challenges of contemporary society. Amongst those challenges there are issues concerning problems with natural resources' exploitation and techno-waste exploitation, which accompany processes of modernisation. A concept of changing something valueless into an object of great value does not exhaust the interpretational possibility of the project's title. The philosophers' stone is also an embodiment of an eternal human passion to understand nature and to possess power over its processes. It also represents a tradition in which knowledge, leading to wisdom, is the highest value. An intersection of contemporary scientific practices with cultural wealth (including ethical and historical contexts) have become an inspiration for my artistic search developing in parallel with scientific experiments of iGEM Team, within the framework of 'human activities'.

“Philosophers' Stone” – cultural background

Though the philosophers' stone is associated mostly with a legendary alchemical substance capable of transforming common metals into silver and gold, transmutation was not an aim in itself in alchemical research. Much bigger ambitions were linked with the philosophers' stone. The oldest alchemic writings, by Greek alchemist Zosimos from Panopolis (around 300 BC) described it as *xerion* (Arabic *El Lksir*; Latin *elixir*). It was meant to cure all illnesses, ensure youth and even immortality. Alchemists believed that they will be able to explain the mystery of life and fulfil the deepest human desire: to overcome death. On one hand, the philosophers' stone may be perceived as the essence of human greed and pride. Furthermore, it seems to be an embodiment of human inquisitiveness and a passion to know. In many interpretations the philosophers' stone was not a material substance, but a metaphor for in-depth and holistic knowledge; a state of enlightenment, which gives a full understanding of nature and a power over its processes. The philosophers' stone, understood in this way, was the crowning of *Magnum Opus* and the main aim of the alchemy.

The word alchemy comes from the Arabic word *كيميا* or *kīmiyā'*, which quite probably has got its origins in an Egyptian word *kepi*, which means black. This interpretation is supported by the fact that Hellenic Egypt was the cradle of western alchemy.

In the middle ages, during the Translation Movement initiated by the House of Wisdom in Bagdad, Arab scientists translated many Greek, Hindu, Hebrew and Christian texts. By doing so, they lay the foundations for development of a universal knowledge.

Up until 17th century, alchemy was a significant element of the intellectual and cultural landscape. Perceived from our contemporary perspective as a protoscience, it influenced in a crucial way the development of today's chemistry and medicine. However, measurable benefits of alchemy are not the only heritage of alchemists' practices.

The search for the philosophers' stone show that a desire for knowledge expressed in passion to know and to understand nature goes beyond the political, religious and cultural boundaries.

It should be highlighted that the philosophers' stone was not understood as a property or an achievement of one, singular scientist, or a group of scientists, but a common good for all those who 'love wisdom'. Knowledge sharing is not only the basis for scientific progress, but also the progress of civilisation in general. The question arises if we will be able to overcome a particularism of thinking in order to achieve 'a universal knowledge' which we could use wisely. This question remains open.

The path to achieving the philosophers' stone led through to the studying of, development and implementation of the *Magnum Opus*. The process was going parallel on two levels: material and spiritual, joining two approaches: exoteric and esoteric. An exoteric attitude or extrovert attitude was focused on lab experiments and it encompassed technical activities by manipulating the subject of the research. The esoteric attitude, that is the introvert, contemplative and psychological one, was focused on the object of the research, the human internal.

This duality originates from Aristotle's division into matter (*hyle*) and form (*pneuma*), but also from a conviction that activities in the physical world require meditation and reflection. Contemplation should be translated into practice in the real world.

Therefore transmutation, expressed through chemical change of colours, was a reflection of internal and spiritual development. Although exoteric attitude turned into the contemporary chemistry sciences, the alchemistic model joining the western dualism of nature and *vita contemplativa* with *vita activa*, did not cease to inspire also in latter centuries. For Carl Jung *Magnum Opus* became a prototype of individuation, that is the full development of a personality aimed at integrating the human psyche – the self.

“Philosophers’ Stone” - artwork

This double status of *lapis philosophorum* is the basis for my artistic project entitled 'Philosophers' Stone' – a multimedia installation, which main part comprises of a video-animation in stereoscopic 3D technology.² The project juxtaposes contemporary scientific practice with alchemic phases of *Magnum Opus* with a particular interest in the philosophers' stone seen as a metaphor for deeper and consistent knowledge (leading to wisdom), internal transformation and higher ethical values.

The use of stereoscopic technology not only refers to contemporary methods of data visualisation and computer simulation, but also, in a particular direct way, activates the field of viewer's perception and his imagination. The multidimensional, illusionary space of *Philosophers' Stone* brings to life structures and narrations, reflecting and questioning the innermost human emotions and desires.

The main motive of my video-animation is a transformation of the model of Delfibactin and its composition is based on alchemic phases of the *Magnum Opus*. For the alchemists the first step towards lapis philosophorum was *nigredo*. In this stadium, all components were subjected to decomposition and decay forming *massa confusa*: a uniform black essence symbolising primary matter and chaos. In analytic psychology, *nigredo* was interpreted as a state visible only from the outside, without differentiating into a subject and an object; consciousness and the unconscious. This phase was accompanied by a growing awareness of the subject of its own shadow – hidden aspects linked with painful confrontation, self-criticism, delusion and a feeling of helplessness.

In my film the first stadium of *Magnum Opus* is expressed with an image in which computer waste, shredded storage media, humans and bacteria mix creating a uniform information and perceptual mass.

The next phase is *albedo*, white, which is the process of purification. In the film, from the digital *massa confusa* there starts to emerge an orderly structure of Delfibactin. The third phase *citrinitas* means

yellow and it literally refers to the transmutation of silver and gold, and metaphorically it refers to the rising of the sun and awakening. In my narration, in the phase *citriniatas*, the peptide model transforms itself into valuable and sought after gold, a symbol of the highest value, immortality and beauty. However this precious ore, in contrast to the natural gold, is built out of computer data and notes, drawings done by scientists while running the experiment. In the following final phase of the *Magnum Opus* formula, *rubedo*, red symbolises an achievement of 'wholeness' and the deepest knowledge about nature. My philosophers' stone breaks into fine particles – dispersed storages or seeds of information.

The truth about human condition and its limits is to be found in the non-fulfillment of *Magnum Opus*; in the impossibility to reach fully the knowledge and in the illusion accompanied by discovery. But a part of this truth is also a continuing desire to overcome boundaries and to create new structures of thinking in encompassing *massa confusa*. Today, at a time of great development of science, information transfer and inter-human communication, there rises a hope for a possibility to win against the chaos of particularistic aspirations and contexts. There is a hope for a more holistic quality in human awareness and activity. The changes, however, are appallingly slow. The old researchers were fully aware of this problem and for that reason they introduced into the formula of *Magnum Opus* two further stages: ***multiplication*** and ***projection*** (into the world). They were meant to enhance the strength of the impact of the philosophers' stone and values represented by it. In my film dispersed particles begin to come together to form new molecular structures of the peptide. They are developing in virtual Petri dishes, which towards the end, form a symbol of a tree of life. The tree of life, identified often as a tree of knowledge and an elixir of life, brings together in its diagram values represented by the philosophers' stone and a way of development from the roots-foundations through beauty, understanding and knowledge to the crown of wisdom. Simultaneously it represents a phenomenon of life as an inextricable network of relations; as a whole, in which every part is in the same sense alive. This interpretation is close to the novel way of understanding the ecology of life and system-thinking (which originates from system biology), that is a type of thinking within categories of relations, diversity and contexts.

Motifs of the philosophers' stone and the tree of life are present in many cultural traditions and they should be seen as a proof that ideas, which were born ages ago and delineated the paths of our thinking, do not die, but they constantly evolve with the changes in our perception of the reality conditioned by technological and scientific development.

(...)

¹ See: <http://2013.igem.org/Team:Heidelberg>

² See: www.johoffmann.com/philosophers.stone.htm