The (Short) Robot Chronicle
(On the 20th Century Cultural History of Robots)

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***Abstract**: The contribution is dedicated to the history of the word robot, notably to its meaning transformations during the 20th (and a beginning of the 21st) century. In order to show the vitality of Karel Capek's concept of robot we will deal with fields of art, popular culture, science and engineering. We assert that vitality of Capek's robot is a result of both, its ability to incorporate different connotations and representations (as a concept) and to provoke vide range of emotional reactions(as a physical object).*

***Keywords**: Robots, Robotics, History, Science Fiction, Art, Engineering*

I WHAT IS A ROBOT?

The question in the title of this paragraph is the same with which *´The Robot Chronicles´*[1] by Isaac Asimov begins. He provides two answers, two descriptions, referring to two cultural contexts – context of myths, mysticism and art, and to the context of science fiction and scientific and technological development. In this contribution we would like to indicate that if we want to talk about a history of robots we are not able to reduce it only to one of these contexts. It is just the intersection or the interaction between fields and contexts of art, popular culture, science, and technological development in which circulates ideas and concepts of artificial life, super machine, super man and mechanised man that are associated with and articulated by a concept of *robot*.

Asimov's introductory definition of a robot is simple enough, and generally acceptable. A robot is, according to him *'an artificial object that resembles a man.'* (Asimov, 2003:191). This definition traces a link between robots and the long history of artificial creatures starting in the Ancient Greek (see Hephaestus' golden handmaids), goes through medieval mystics' experimens (Homunculi and Golems), the unique clockworks of the Enlightenment (e.g. the androids by Droz family or Vaucanson) and the romantic Frankenstein´s monster (introduced by Mary Shelley in 1818).

In the second part of his robots' history Asimov describes a shift in understanding of robot that is possible to trace from about half of the 20th century. He connects this shift with the American science fiction context (see e.g. production of magazines as

[1] Chapter in the book *GOLD: The Final Science Fiction Collection* (1995, EOS, 2003)

Amazing Stories, *Astounding Science Fiction*, *Super Science Stories* – so called pulp-fiction magazines). Since this time, the robot is understood not anymore as a metaphor (of man and technology relationship) but merely as a machine, better to say as a technology of the future.

We can see as a certain turning point of the ´Robots Chronicles´ work by Isaac Asimov, particularly some of his short stories. The first one has been the *Robbie* (1939-40), perhaps the most famous one, the *Runaround* (1942), in which he introduced the word *robotics*, and presented his influential *three laws of robotics*). These stories were originally written in an opposition to science fiction stories of these times in which human and robots where presented in an impassable opposition and conflict. Asimov doesn't share the fearful attitude against robots. He wrote all his stories with an effort to overcome the bias against them, that he calls the '*Frankensteinian complex'*. For Asimov the robot is not a symbol of hi-tech of the future in general but rather certain kind of technology that he has defined by the statement: '*robot = machine + computer'*.

In a contrary to Asimov's statement presented e.g. in his *Robot Chronicles* we would like to present Capek's play *R.U.R., the Rossum's Universal Robots* (1921) as a source of imagination of human – machine relationship in a 20th as well as 21st century. From our point of view Asimov's robots express only one of many possible faces of robots' re-presentations, however very powerful because of their convenience for a broad public. (See movie *I, Robot (2004*) which script was inspired by Asimov's stories published in 1950 in his collection *I, Robot.* In PR of the movie was many times Asimov presented as an author of the word `robotic` but names of Karel and Josef Capek as authors of the word robot was completely ignored.

We assert that, however, Capek's understanding and interpretation of robot cannot be reduced into a short anecdotic definition (or mathematical equitation) as it is possible in a case of Asimov's robot, it is just this irreducible character of Capek's robots that gives them a power to become a conceptual source (wherever knowingly or not) for scientists, artists, and engineers of the 20th and 21st century. Moreover, Capek's robot is able to transform itself from image of the man oppressed by mechanical work in the beginning of the 20th century to the man powered by technological prosthesis (the *cyborg*) of the beginning of the 21st century, and even to become a symbol of technology of post-humanism – an autonomous intelligent and emotional machine that is not anymore seen as an alter ego of its creator but as a creature yarning for its emancipation and respect for its 'mechanic' otherness.

II ROBOT, THE WORD

It is a generally known fact that an author of the word *robot* was not Karel Capek (1890-1938) but his brother and for many years close collaborator Josef (1887-1945). Karel Capek described the birth of the word robot in an anecdotic way for the *Lidove noviny* newspaper (Dec. 24, 1933)

It was like this: the idea for the play came to said author in a single, unguarded moment. And while it was still warm he rushed immediately to his brother Josef, the painter, who was standing before an easel and painting away at a canvas till it

rustled.
"Listen, Josef," the author began, "I think I have an idea for a play."
"What kind," the painter mumbled (he really did mumble, because at the moment he was holding a brush in his mouth). The author told him as briefly as he could.
"Then write it," the painter remarked, without taking the brush from his mouth or halting work on the canvas. The indifference was quite insulting.
"But," the author said, "I don't know what to call these artificial workers. I could call them Labori, but that strikes me as a bit bookish."
"Then call them Robots," the painter muttered, brush in mouth, and went on painting. And that's how it was. Thus was the word Robot born; let this acknowledge its true creator.

In 2006 we celebrate the 85th anniversary of the event when the word *robot* was introduced to the public and put to use. Alike the word robot has in fact two authors, we can say that the play *R.U.R.* has two first nights as well. The official one that took part in *National Theatre* in Prague, January 25, 1921, and the un-official but historically the first one that was executed by group of theatre amateurs called *Klicpera* in a municipal house of town Hradec Kralove already at January 2, 1921. Since the first night of the play in the Prague *National Theatre*, the word *robot* has penetrated to languages all around the world. It is understandable that etymological[2] roots of this neologism were more or less 'lost in translation'to different cultural and language contexts. The word robot has its origins in the old Czech word 'robota' referring primarily to *serfdom* (robiti that means hard manually work, or to enslave somebody).

Figure 1
A cartoon of Karel Capek by Josef Capek with a date of official first night of R. U. R. on his chest, and the Robot Radius from an official first night in National Theatre in Prague, January 25, 1921

In other words, we can say that Capek sees his *robot* (a dramatic character) as a tool restricted for *robeni* (for doing hard work in the English translation). Important for appreciation of conceptual potential of the word robot is that an old Slavic basis of the word robot – 'rob' is present in words referring to living creatures as well: The old Czech word *rab* means slave, *robě* means little child, a baby, but originally not every child but pure baby or orphan only, and *roba* means a woman or a girl.
We can conclude that connotations of the word *robot* refer both to tool for hard manual work (robot as a technology, machine) and to human beings (robot as an intelligent or living machine or an artificial man). This conceptual width makes possible to express the metaphorical meaning

[2] Etymological aspects of the word *robot* are presented according to information by V. Saur from the Silesian University at Opava, Czech Republic (provided to the author by J. Kelemen)

given by an author to robots as dramatic characters in the play *R.U.R.*

III ROBOT, THE DRAMATIC CHARACTER

Let us see now how Karel Capek describes robots in a list of characters of the *R.U.R.* play:

*'In the Prologue the robots are dressed like people. Their movements and speech are laconic. Their faces are expressionless and their eyes fixed. In the play proper they are wearing linen shirts tightened at their waists with a belt, and have brass numbers on their chests….'(*Capek, 1921) [3]

This characteristic of robot characters together with an etymology of the word robot enable us to reconstruct Karel Capek' understanding of concept of robot. We can say that he used the word robot in a sense of a tool restricted for hard work as well as a dehumanised man or restricted man. As we have shown above, that is clear in a context of Slavic languages, but e.g. in German as well, see 'arbeiten'. However, in the Anglo-Saxon cultural context has the word robot quite different association referring to 'to rob' that means 'to steal'. Robots are than seen as our enemies we shut be aware of them or to protect our selves from them. That is maybe the reason why Asimov understood Capek's robots (and the play *R.U.R.*) as a culminating point of the 'old' (archaic) history of artificial man, as a story in which is even strengthened so called 'Frankensteinian complex' referring to traditionally private conflict between the human master and the artificially created slaves made by him. According to Asimov, in *R.U.R.* play is this motif even enlarged from private to global conflict between humankind and robots, presented as a machines with a super-human power that aspire to annihilate the whole mankind.

Figure 2
A cartoon illustrating the first night of the R. U. R. in St. Martin's Theatre, London, UK (June 23, 1923)-left, and robot drawings from production in the Guild Theatre, New York City (October 9, 1922)

Interpretation of Capek's *R.U.R.* as a drama based on an adventurous dis-topian (instead and in contrast of an utopian) plot dealing with conflict between group of humankind heroes (scientists and engineers) on one side and mechanical beasts that wrenched out from human control on the other side is generally accepted. I have shown in other writings of mine that this kind of *R.U.R.* play interpretation is inadequate and refers not so much to an author's intentions but rather to the above mentioned Anglo-Saxon reception of the play (1922 USA, 1923 UK).[4]

Analysing the structure and classification of dramatic characters of

[3] Capek, K.: *R.U.R. Rossum's Universal Robots R, List of Characters*, translated by Novack-Jones, C., and accessible at the http://www.czech-language.cz/translations/rur-introen.html

[4] See e.g. (Horakova, 2005)

the *R. U. R.* we can assert that the play is not (only) a science fiction adventure, but its plot is in fact based on principles of a *comedy of substitution* with certain features of a *social satire*. (Kind of "hide and seek play" that is possible to express as: Who is a man and who is a robot on the RUR factory island?) This kind of understanding of the play is usually closely connected with stage productions of the RUR play in an European cultural context, in the beginning of the 20th century and often connected with social-political interpretations (see the Czech, the French and the German productions and reviews from that time.)

Differences in interpretations of *R.U.R.* plot have important impact on perception of robots. We can shortly summarise these differences in years 1921-1924, so in the period in which the play had first nights all around the word:

- In the Anglo-Saxon context is the robot understood as a symbol of the technology that get out of human control, and becomes autonomous and dangerous.
- In the European context is the robot comprehended as a symbol refering to more abstract concepts of tendencies toward "dehumanisation" or mechanisation of man perceiving by many thinkers in the Euro-American society of the beginning of the 20th century.

It is a paradoxical fact that it was not USA nor England where robots have been presented as a humanoid machine for the first time but a production of *R. U. R.* in Paris – the centre of avant-garde artistic movements of the beginning of the 20th century.

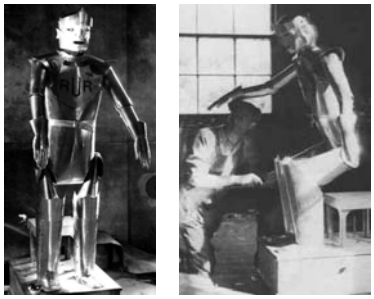

Figure 3
Robot Radius (Paris, 1923), a human-like machine made by human worker, perhaps an abbreviation of ludditian imagination

IV ROBOT, THE MECHANISM AND THE METAPHORE

Robots from *R. U. R.* have been not the only characters representing either an artificially made object that reminds a human (see Asimov) or a humanoid machine. We can meet with different characters, with more or less close or removed relation to the famous robots, in the work of both brothers before R. U. R. has been written.

First, the common works of Karel and Josef:

- A short story *System* (1908) often cited as an ur-version of *R. U. R.* dealing with the subject of a revolution of oppressed workers.
- A short story *L'Evenatille* (1909-10) with the historical character of J. Droz and his androids, in fact a plot comedy of substitution.
- *The Insect comedy* (1921), particularly the scene in which fight against each other two armies of ants, and that was

mentioned by by Karel Capek him selves as an impulse to write the play about robots.

Second, Josef Capek works:

- *The Drunkard* (from 1914-1915, included into *Lelio*, a collection of short stories published in 1917) where a mechanic alter ego of an engineer appears. The story is sometimes wrongly presented as a very first text in which the word robot appeared for the first time; see e.g. the *Cyberspace Lexicon* (ed. Jakobson, L. USA, 1992) or for very long time the only book dedicated to Karel Capek's life and work in English, the W. E. Harkins' Karel Capek (Columbia University Press, New York, 1962), however, the artificial alter ego of the engineer is in this text called simply a *mechanism*, not a robot.

  It is important to remark in a context of Josef Capek's writings also his artistic essay *Homo Artefactus* (1924) – a parody of futuristic manifestos.

Figure 4
Nam June Paik's and Shuya Abe's *Robot K-456* (see below for more about the authors and the robot), and the Josef Capek's drawing from *Homo Artefactus* which refers to the main character of the short story *L'Eventaille* mentioned earlier

Closing this paragraph we can conclude that the robots by Josef and Karel Capek originally symbolized the *state of humanity* in the time period called the *Machine Age*. We can define the brothers Capeks' robots as creatures that look like a man but his/her behaviors reminds mechanism performing demands of his master as a perfect tool or machine. In some cases and contexts robots can gain more humanoid appearance and behavior (e.g. social satire and cybernetic creatures in science fiction) or can be presented as more or less universal machines with ergonomic human friendly appearance.

V ROBOT, THE TECHNICAL PROBLEM

The concept of robots in the second half of the 20th century refers rather to servants than to slaves, rather to willingness to the master than to the revolt against him, and consecutively the fault of robots is seen rather as a technical problem than a symptom of rebellion. This understanding or robot refers to Asimov's concept of the robot as a mechanism executing demands of its 'positron brain' according to algorithms operating with respect of the well-known three laws of robotics. Equally, for the pioneers of cybernetics the only way to imagine and build robots was the combination of metal-based mechanics and electro-technics.

Stuart Chase (1929), one of the first critics of the Machine Age, recorded his impression from a presentation of the Westinghouse robot *Televox* in 1927. He described it as a metallic creature with humanoid outer features in cubistic style. This image of a robot lives until nowadays in the minds of

the majority of engineers and scholars of disciplines as cybernetics, robotic, Artificial Intelligence (AI), and in the field of Artificial Life (AL). So, let us say that the Asimov's tradition (robot=machine+computer) is generally accepted background of thinking/imagination in the above-mentioned fields. We can say that a concept of robot in hard sciences is strongly influenced by imagination of science fiction.

The best way how to recognise the close relationship between the territory of hard science and engineering and science fiction is to compare appearance of robot *Cog* by Rodney Brooks from MIT (late eighties of the past century) with the *Terminator* from a movie of the same name or Cynthia Breazeal's Kismet (form MIT, 2000) dealing with the behaviouristic understanding of emotions, and the emotional robots David and the Gigolo from the Spielberg's movie AI from 2001 (see Fig. 5).

We can find at least partially different or more speculative approach to the concept of robot in the field of art, specifically in art works belonging to the Robotic Art field that origins we can place into abound 1960 of the 20th century. Robotic art is possible to see as a part of a wider context of a development of robotics which, together with scientific branches as AI and AL, has developed from preconditions established by cybernetics and informatics and was inspired by concrete outcomes of scientists´ and technicians´ effort to create such a kind of system, which behaviour would simulate human behaviour (in the case of AI) or behaviour of living organisms (in the case of AL).

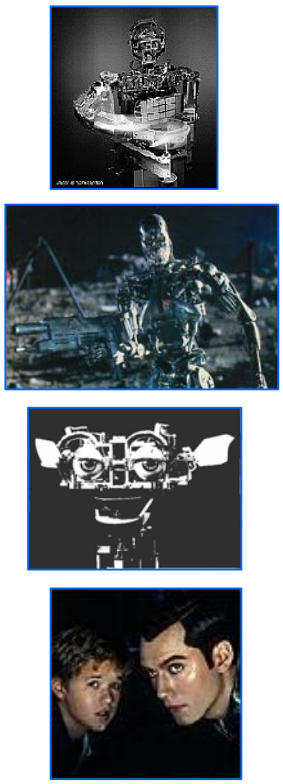

Figure 5
The Cog, the Warrior form the Terminator III (2000), the Kismet, and David with the Gigolo (both of hem robotic creations) form the movie AI

The characteristic feature of 'Robotic art' work is an effort to liberate machines from a mythopoeia of robots (as "an artificially made object resembling a man"; Asimov). This effort to emancipate these intelligent machines of our *knowledge society* is often connected with artistic re-presentation of robots as week, un-perfect creatures asking for a help and/or friendship of a man that in its' viewers evoke emotions as a mercy or

a laugh. We can recognize this trend in a very first pieces of Robotic art, e.g. in the *Robot K-456* (1964) by Nam June Paik and Shuya Abe, as well as in a case of Edward Ihnatowitcz´s first autonomous robotic structure *The Senster* (1969-1970) that exhibit a kind of shy behaviour, or in Roboret White's robot significantly named *The Helpless Robot*(1987).[5] As another example can be mentioned work by L. P. Demers and B.Vorm which reflects the complicated 'love and hate' attributes of the man-machine relationship of nowadays. The good introductory into the history of these tendencies in contemporary art can be found in (Whitelaw, 2004).

Conclusion

Robotics and Robotic art are two among many other fields of human creativity that participate on our evolution from era of humanism to the era called post-humanism. In other words, from era that sees robot as a machine-slave and follows an ideology of functional purity, to the era of human-machine cooperation and respect to differences and otherness. Turn of the 21st century brought about new attempts for unity of art, humanities, engineering and hard sciences. A history of concept of robot that we were able rather to indicate than to trace in this article is a good example and symptom of this process.

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[5] The theorist of the modern art E. Kac recognizes three milestones in the development of robotic art that emerged in the mid 60s of the last century: Name June Paik and Shuya Abe *Robot K-456* (1964), *Squat* by Tom Shannon (1966) and *The Senster* by Edward Ihnatowitcz (1969-1970). Besides their own value they represent three different aesthetical problems that aproximatelly formed main directions in Robotic art: a) remote control; b) cybernetics entities; c) autonomous behaviour.