## THE TURING MACHINE ON THE DISSECTING TABLE

**Abstract:** *Since the beginning of the twenty-first century there has been an increasing awareness that software represents a blind spot in new media theory. The growing interest in software also influences the argument in this paper, which sets out from the assumption that Alan M. Turing's concept of the universal machine, the first theoretical description of a computer program (software), is a kind of bachelor machine (Carrouges). Previous writings based on a similar hypothesis (Daniels, Baudrillard, Turkle, Ascott) have focused either on a comparison of the universal machine and the bachelor machine in terms of the similarities of their structural features, or they have taken the bachelor machine as a metaphor for a man or a computer (artificial intelligence). Unlike them, this paper stresses the importance of the context (the imitation game of the Turing test) as a key to interpreting the universal Turing machine as a bachelor machine and, potentially, as a self-portrait.*

**Keywords:** *Turing machine; bachelor machine; Turing test; dissecting table; magic*

## Turingův stroj na pitevním stole

**Abstrakt:** *Od začátku 21. století roste vědomí, že software je slepou skvrnou teorie nových médií. Vzrůstající zájem o software ovlivnil také tezi předkládaného příspěvku. Vychází z předpokladu, že koncept univerzálního stroje Alana M. Turinga je jedním z mládeneckých strojů (Carrouges). Předchozí texty založené na podobné hypotéze (Daniels, Baudrillard, Turkle, Ascott) se zaměřily buď na srovnání univerzálního stroje a mládeneckého stroje na základě jejich strukturálních podobností, nebo užívaly mládenecký stroj jako metaforu člověka nebo počítače (umělé inteligence). Na rozdíl od nich, tento příspěvek zdůrazňuje význam kontextu (imitační hry Turingova testu), který je klíčem k interpretaci univerzálního Turingova stroje jako mládeneckého stroje a potenciálně jako autoportrétu.*

**Klíčová slova:** *Turingův stroj; mládenecký stroj; Turingův test; pitevní stůl; kouzlo*

**JANA HORÁKOVA**
Masaryk University / Faculty of Arts
Department of Musicology / Theory of Interactive Media Studies
Arna Novaka 1
602 00 Brno // Czech Republic
email / horakova@phil.muni.cz

## The software turn

Since the beginning of the twenty-first century, there has been an increasing awareness among humanities scholars that software, the internal structure and the processes performed inside a computer have remained a blind spot in new media studies. Software had hitherto been considered a tool, a thing that merely figures in the realm of a machine's functionality. Now that the bubble of newness of the new media has burst, it is clear that a systematic and critical analysis of the functional features of new media and a reconsideration of them in a historical perspective and in the cultural production context have yet to be done.[1]

### *Inside the black box*

The turn to software in the discourse of new media studies has been motivated by an effort to open up and to analyse the black box of the computer from the inside. The belief now is that it is not the interface but the inner structure and programmability of the computer that defines the medium. Thus, the turn to software marks a shift from interface to the layers of the new media below the surface, which mostly operate unconsciously.

The internal functional features of computers affect a broad spectrum of cultural practices that occur through and around them. The power and influence of computational processes over different cultural practices is even higher because they have remained in the dark, inside the box, for a long time. Thus, the black box of the computer must be opened and examined in the way other cultural products and practices are analysed and interpreted.

### *From code to context*

The paper focuses on Alan M. Turing's concept of the universal Turing machine (also just called the Turing machine), which is the first theoretical description of the computer program (software). The universal machine has already captured the attention of a number of new media scholars. Approaches within software studies are represented by Friedrich Kittler and Mathew Fuller. While Kittler deals primarily with code as the language of

[1] For more information on the software turn in new media studies, see: Jana HORÁKOVÁ, "K recepci informatiky v kontextu společenských věd: Obrat k softwaru." In: KLÍMOVÁ, H. – KUŽELOVÁ, D. – ŠÍMA, J. – WIEDERMANN, J. – ŽÁK, S. (eds.), *Hovory s informatiky*. Praha: Ústav informatiky AV ČR v.v.i. 2011, p. 117–135.

programming media, Fuller calls for a broader understanding of the programming and processes that occur through the computer to link technology with its context.

Kittler was one of the first media theorists to deal with software in the new media studies perspective.[2] He considers the computer to be a descendent of the typewriter and points to the symbolic and transformative power of the universal Turing machine. In his view, while the typewriter transformed handwriting into a chain of discrete letters of the alphabet, the computer completed the transformation of the symbolic order by replacing letters with a (secret) code of numbers (ciphers).[3] He writes:

> From the Remington via the Turing machine to microelectronics, from mechanization and automatization to the implementation of a writing that is only cipher, [...] one century was enough to transfer the age-old monopoly of writing into the omnipotence of integrated circuits. [...] All data streams flow into a state n of Turing's universal machine; Romanticism notwithstanding, numbers, and figures become the key to all creatures.[4]

According to Kittler, the code of programming languages has become the dominant mode of representation in the computer age.[5] As a result, the historical order, based on narratives, has been replaced by the programmable media order, which involves/is based on the abstract, isolated, and, in its isolation, omnipotent universe of mathematics. At the core of the mathematic order is a seductive concept of general substitution.[6] Thus, the computer can be seen as an isolated universe of symbols within which it is possible to completely represent the world or even to replace a human with a simulation of one.

[2] Friedrich A. KITTLER, "There Is No Software." In: KROKER, A. – KROKER, M. (eds.), *C-theory net* [online]. Available at: <http://www.ctheory.net/articles.aspx?id=74> [cit. 12. 8. 2013]. Originally published as Friedrich A. KITTLER, "Es gibt keine Software." *Draculas Vermächtnis: Technische Schriften*. Leipzig: Reclam 1993, p. 225–242.

[3] Friedrich A. KITTLER, *Gramophone, Film, Typewriter.* Stanford: Stanford University Press 1999. Originally published as Friedrich A. KITTLER, *Grammophon, Film, Schreibmaschine*. Berlin: Brinkmann & Bose 1986.
[Se]e also Friedrich A. KITTLER, "Code (or, How You Can Write Something Differently)." In: FULLER, M. (ed.), *Software Studies: A Lexicon*. Cambridge: The MIT Press 2008, p. 40–47.

[4] KITTLER, *Gramophone, Film, Typewriter,* pp. 18–19.

[5] KITTLER, "Code," p. 40.

[6] Wendy Hui Kyong CHUN, *Programmed Visions: Software and Memory*. Cambridge, MA: MIT Press 2011.

Mathew Fuller adopted a different perspective. His focus is the programming and other practices that occur around and through computers. It is his belief that in order to know more about the influence programmable media have on our culture we must study not only the media itself, but also the activities that occur through and around them. He writes:

> Software marks another of its beginnings in Alan Turing's desire to chart the computable, [...] within the terms of mathematics. Computation establishes a toy world in conformity with its axioms, but at the same time, when it becomes software, it must, [...], come into combination with what lies outside code. [...] And it is this paradox, the ability to mix the formalized with the more messy - non-mathematical formalisms, linguistic, and visual objects and codes, events occurring at every scale from the ecological to the erotic and political - which gives computation its powerful effects, and which folds back into software in its existence as culture.[7]

### *Software as a toy*

Within the effort to make software a part of culture, there is a complementary ambition to discover new, appropriate, and often subversive methodologies for software studies. Wendy Chun talks metaphorically about the *in media res*[8] perspective, referring to giving up the critical distance of general statements in favour of close readings, microanalyses, and interpretation of particular features and principles of computation.

This paper contributes to the software studies perspective, in which software is seen as being part of wider cultural production and imagination and is treated not as a tool but as a *toy-concept* that we can deal with playfully. The argument is placed within and beyond the formal scientific discourse, as well as within conscious and unconscious parts of human mind activities. The universal machine is treated both as a self-portrait (in the sense that it represents activities of the human mind) and as a symbol of Alan Turing's personal and professional life tragedy. My hypothesis is that the universal Turing machine can be seen as a kind of compiler, which is transcoding the bachelor machine (the symbol of the vain urge for transcendence) into the Turing machine (the symbol of the transformation).

[7] Matthew FULLER (ed.), *Software Studies: A Lexicon*. Cambridge, MA: MIT Press 2008, p. 5–6 (1–13).
[8] CHUN, *Programmed Visions.*

## The universal Turing machine

Alan Turing's universal (computing) machine (later renamed the Turing machine) warrants special attention because it is the first theoretical explanation of the stored program computer (software), which directly influenced early thinking on the nature of computation and the modern electronic computer's architecture. Moreover, the supposition that Turing based the concept of the universal machine is that any complex operation can be reduced to a series of simple steps described as mathematical functions (add, subtract, multiply, etc.) is what lies at the heart of all programming.

Turing presented the concept of the universal machine for the first time in "On Computable Numbers, with an Application to the Entscheidungsproblem".[9] He explained that the universal machine consists of an infinitely long piece of paper comprising an infinite number of boxes and through these a mathematical calculation, even a very complex one, can be performed by following a series of actions based on the symbols in the boxes. The hypothetical machine was described in the chapter Computing Machines as follows:

> The machine is supplied with a "tape" (the analogue of paper) running through it, and divided into sections (called "squares") each capable of bearing a "symbol". At any moment, there is just one square [...], which is "in the machine". We may call this square the "scanned square". The symbol on the scanned square may be called the "scanned symbol". The "scanned symbol" is the only one of which the machine is, so to speak, "directly aware". However, [...] the machine can effectively remember some of the symbols which it has "seen" (scanned) previously.[10]

As the quotation itself implies, rhetorical figures based on analogies between the human mind and computing machines are applied next to exact mathematical formulations on the paper. One more example for all:

> For the present I shall only say that the justification lies in the fact that human memory is necessarily limited. We may compare a man in the process of com-

[9] Alan M. TURING, "On Computable Numbers with an Application to the Entscheidungsproblem." In: *Proceedings of the London Mathematical Society*, vol. 42, 1936, no. 2, p. 230–265. Available online at: <http://www.cs.virginia.edu/~robins/Turing_Paper_1936.pdf > [cit. 14. 8. 2013].
[10] TURING, "On Computable Numbers," p. 231.

> puting a real numbers to a machine, which is only capable of a finite number of conditions.[11]

However, the association of the universal Turing machine with man is made not only on the level of metaphor. Explaining the machine's operations Turing refers to the similarities and analogies between a human's and a computational machine's invisible functional characteristics. To enable a comparison and link the concept of a human to the concept of a computer, the model and definition of man must be reduced to an "information processing system".[12] Hayles regards this reduction within Turing's argument as a significant contribution to the discourses of cybernetics and posthumanism.

The mechanical aesthetics of Marcel Duchamp's seminal work *The Bride Stripped by Her Bachelors, Even (The Large Glass)* enables us to compare it with the universal Turing machine. This way we can develop thinking in analogies between the computing machine and the exercises of the human mind to describe their similarities in such features that lie outside the "retinal world". Moreover, both (conceptual) apparatuses refer to the notion of the "bachelor machine" that makes it possible to articulate the dominant image-myth of the mechanical age that has spread through the collective unconscious. [13]

## The bachelor machine

Marcel Duchamp coined the term bachelor machine (or machine célibataire) around 1913, when he named the lower glass plate of his seminal work *The Bride Stripped by Her Bachelors, Even* (1915–1923) or in short *The Large Glass*. The bachelor machine referred to the realm of mechanical components, a water paddle, scissors, a chocolate grinder, a sledge, and nine balloon-like pods called the Malic Molds. These Malic Molds represent nine bachelors condemned to eternal longing for the Bride that remains remote in the upper glass plate realm.

[11] *Ibid*., p. 231.
[12] Katherine N. HAYLES, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago – London: University of Chicago Press 1999.
[13] Dieter Daniels was probably the first new media theorist to see certain resemblances between the functional features of Turing's computing machine and *The Large Glass* by Marcel Duchamp, and elaborated this observation by using the term the bachelor machine. Dieter DANIELS, "Duchamp: Interface: Turing: A Hypothetical Encounter between the Bachelor Machine and the Universal Machine." In: GRAU, O. (ed.), *Media Art Histories*. Cambridge, MA: MIT Press 2007, p. 103–136.

However, later on the bachelor machine acquired the status of a broader concept in the art theory. Michel Carrouges appropriated the term to point out the structural similarities between Marcel Duchamp's *The Large Glass* and different apparatuses described by writers in the second half of the nineteenth and the early twentieth century.[14] For example, a punitive apparatus described by Franz Kafka in the short story *In the Penal Colony* (1919), or apparatuses designated in novels *Impressions d'Afrique* (1915) by Raymond Roussel, or *Le Surmâle* (1915) by Alfred Jarry, and many others.

By deciding to articulate the shared structure of these apparatuses with the term bachelor machine Carrouges pays homage to *The Large Glass*, which is the only visual, and not literary, depiction of a bachelor machine within Carrouges's theory. According to him, all bachelor machines share "the sexual origin of *The Large Glass* mechanics and their signification of death". They assume the form of a blueprint or a diagram made of mechanical and visceral structures, referring both to mechanisms that are "unfinished, unfinishable, and incapable of operating in reality" and to the "mental machines, the imaginary working of which suffices to produce a real movement of the mind". Thus, bachelor machines are usually reminiscent of scientific images or technical drawings, which mediate knowledge about un-presentable and unconscious phenomena and forces. Carrouges interpreted the bachelor machine as a concept that emerges from and refers to the collective imagination and that thus acquires the status of the myth of the man of the mechanical age.

### *The bachelor machine's anatomy*

All bachelor machines share certain structural features. They operate as closed circuits between an upper and a lower part, within which the message from the upper zone is inscribed upon the lower one. Each bachelor machine consists of two overlapping mechanisms, the desiring machine and the suffering machine. It is a kind of diagram made of two overlapping layers, which represents the forces of the vain desire for transgression, both towards love and death, which characterize modern man.

The desiring machine: *The Large Glass*'s apparatus represents the layer of the desiring machine. It consists of two distinct realms, the realm of the bride above and the realm of the bachelors below. There is a vertical boundary between them, which makes impossible their immediate contact. The

[14] Michel CARROUGES, *Les Machines célibataires*. Paris: Arcanes 1954.

bachelors in the lower part are imagining and desiring the bride without any possibility of comprehension because the mechanism of communication is frozen into death in the glass.

The suffering machine: A torture apparatus similar in structure to *The Large Glass* is found in Franz Kafka's *In the Penal Colony* and represents the layer of the suffering machine. The apparatus consists of a lower part, the bed, and the upper part, the designer. Between them, there is a section called a harrow, which is a piece of glass in which needles are fixed and that can be moved up and down. The condemned man has to lie on the bed and his offence is written into his back with the harrow. The man is not told of his offence. He must learn it through his body, sentenced to death.

The universal machine: The universal machine shares its functional features with other bachelor machines. It consists of two horizontally separate realms, the upper part called the head and the lower part made of the tape. The head scans, writes, and reads the tape according to its current state. The writing device, in the shape of a needle, writes and erases signs according to its program, while the tape moves back and forth, mediating communication between the upper and lower part.

### *The bachelor machine in the new media discourse*

Dieter Daniels made a comparison of Marcel Duchamp's *The Large Glass* and Turing's universal machine in an attempt to prove that the bachelor machine, which emerged in the world of art, can offer new, illuminating insight into the understanding of computer-mediated communication which has become the dominant means of communication and self-representation in the computer age. He suggested naming the current information and communication technologies "the universal bachelor machine". This neologism embodies his opinion that the most significant articulations of the bachelor machine are no longer found in the world of art but in the realm of new media, which are more and more defining and restricting the ways in which we communicate with other people and experience the world we live in. He wrote, "[the] bachelor machine, having started out as an artistic vision, has turned into a way of embracing and developing technologies".[15]

[15] Dieter DANIELS, "Duchamp: Interface: Turing: A Hypothetical Encounter between the Bachelor Machine and the Universal Machine." In: GRAU, O. (ed.), *Media Art Histories*. Cambridge, MA: MIT Press 2007, p. 130 (103–136).

Daniels made the most refined contribution to rethinking the bachelor machine concept in new media theory. However, other remarkable examples of applications of the bachelor machine concept or of analogies between computers and *The Large Glass* can be found in the new media discourse. Jean Baudrillard wrote that the bachelor machine represents the artificial intelligence of computers because they are unable feeling pleasure. He insisted that this is the last difference between man and machine. "What will always distinguish the functioning of even the most intelligent machine from man is the ecstasy, the pleasure of functioning [...]."[16] Sherry Turkle, focusing on the computer user, wrote that the geeks, nerds, and hackers who spend nights with computers live in so-called "bachelor mode".[17] Roy Ascott used an analogy between *The Large Glass* and the computer monitor to provide an insightful description of the interface. He wrote that:

> We see in the work known as [...] The Large Glass a field of vitreous reality in which energy and emotions are generated from tension and interaction of male and female, natural and artificial, human and machine. [...] Its subject is attraction [...]. As "ground", The Large Glass has function and status anticipating that of the computer monitor as a screen of operations – of transformations and as the site of interaction and negotiation for meaning.[18]

## The universal machine as a self-portrait

The following argument deals with similarities between functional features of the universal machine and the bachelor machine as well. These two concepts are treated as portrayals of the hidden (unconscious) processes that go on beneath the computer desktop in the case of the universal machine, and the unconscious forces inside the mind of a man in the case of the bachelor machine.

The universal machine is seen not as a counterpart of the bachelor machine in the techno-science discourse,[19] but as one of many articulations of

[16] Jean BAUDRILLARD, "Videowelt und fraktales Subjekt." In: Ars Electronica (ed.), *Philosophie der neuen Technologien*. Berlin: Merve 1989, p. 130 (113–133).
[17] Sherry TURKLE, *The Second Self: Computers and the Human Spirit*. New York: Simon and Schuster 1984, p. 198.
[18] Roy ASCOTT, "Is There Love in Telematic Embrace?" In: SHANKEN, E. (ed.). *Roy Ascott. Telematic Embrace. Visionary Theories of Art, Technology, and Consciousness*. Berkeley – Los Angeles – London: University of California Press 2003, p. 235 (232–246).
[19] *Cf*. DANIELS, "Duchamp: Interface: Turing".

the bachelor machine. Thus, their relationship is not based on a dichotomy and should rather be ideated as a kind of palimpsest, as a drawing on which one can see at first glance the universal machine description, but upon second glance will see the diagram of the bachelor machine emerge from within its background.

The link between subject of Alan Turing and the concept of the universal machine is constituted by playing with significant slips of the tongue within scientific writings rhetoric. The genre of the universal machine image that is going to be drawn is close to the self-portrait.

## The human computer

We can ask what kind of man served Turing as the inspiration for the computing machine. Turing described the man he had in mind in chapter 4, Digital computers:

> The idea behind digital computers may be explained by saying that these machines are intended to carry out any operations which could be done by a human computer. The human computer is supposed to be following fixed rules; he has no authority to deviate from them in any detail. We may suppose that these rules are supplied in a book, which is altered whenever he is put on to a new job.[20]

Thus, the universal machine resembles a human computer, someone who is counting all the time. It could be a bookkeeper, an accountant, or a bureaucrat, simply someone who is "squirreling around in the back office, shuffling through stacks of rigged paper, reading, writing, and erasing numbers in little boxes".[21]

## The freak of numbers

However, Turing points to the much better performance and accuracy of the counting done by the universal machine than the man-computer. Thus, we can say that the model is not merely a conscientious bureaucrat, but rather someone who has an extraordinary memory, who is very accurate and persis-

[20] Alan TURING, "Computing Machinery and Intelligence." *Mind*, vol. 59, 1950, no. 236 (433–460). Available online at: <http://loebner.net/Prizef/TuringArticle.html> [cit. 12. 8. 2013].
[21] Warren SACK, "Memory." In: FULLER, M. (ed.) *Software studies*, p. 188 (184–193).

tent in his counting, and who is able to solve very complicated mathematical and logical problems. Hence, Mathew Fuller calls precursors of computers "freaks of number"[22] and he refers to computers as the descendants of these eccentric freaks or prodigies, whose talent reveals itself in the form of monomaniacal, enormously fast, and extremely accurate counting.[23]

### *The mathematician*

We can speculate that it is almost impossible that Turing would be able to avoid any self-reflection while describing the human mind in a state of computing. Therefore, another possibility is to search for analogies between the computational abilities of the universal machine and the excellent performances of the mind of its inventor, Alan Turing himself.

Turing's biographer, Andrew Hodges, suggested certain relations between the universal machine concept, in particular the first of its two axioms, its isolation (the second one is its completeness), and the person Alan Turing. He wrote:

> [T]he discrete state machine, communicating by teleprinter alone, was like an ideal for his own life, in which he would like to be left alone in a room of his own, to deal with the outside world solely by rational argument. It was the embodiment of J. S. Mill liberal subject, concentrating upon the free will and free speech of the individual.[24]

The demand for the isolation of the universal machine from the outer world can be interpreted as a decision that belongs in the realm of the cold logic

[22] Matthew FULLER, "Freaks of Number." In: COX, G. – KRYSA, J. (eds.), *Engineering Culture: "On The Author as (Digital) Producer"*. New York: Autonomedia (DATA browser 02) 2005, pp. 161–175. Available on-line: <http://www.spc.org/fuller/texts/freaks-of-number/> [cit. 12. 8. 2013].

[23] Fuller noted the strange but significant structure of the book *Le Calcul simplifié par les procédés mécanique et graphique*, subtitled *A History and Description of Instruments and Machines of Calculation, Tables, Abacuses and Nomograms* by Maurice d'Ocagne published in 1894. D'Ocagne included a list of individuals with exceptional counting skills into the Introduction of a book dedicated to taxonomy of counting tools and machines. Fuller regarded the arrangement as the inaugural moment of the computer age. He wrote: "What is interesting though is that this list of numerical freaks appears at the beginning of a sober text on the means of automating mathematical operations. It is as if it were something that has to be acknowledged, marveled at, but disowned. The chemist describes the alchemists. This shudder of recognition and of admiration passes. The thing is safely out of their clammy hands, but the continuum between these persons and these machines is established." *Ibid*., pp. 163–164.

[24] Andrew HODGES, *Alan Turing: The Enigma of Intelligence*. London: Unwin 1985, p. 425.

of mathematics. However, Hodges's psychological explanation of this demand suggests that the rational purity of mathematical models may be just an illusion. Instead, they should be recognized as being entwined within human desires, fears, and hopes, as well as the human will to control and manipulate the world.

**From model to index**

Taking the universal machine as a model for the human computer, a prodigy, or a mathematician, means effacing its status as a blueprint for computational machines in favour of treating it as a model for a human. Based on the argument establishing a link between the universal machine and (the person of) Alan Turing, we can refer to the universal machine as a kind of self-portrait. However, we should ask, what is the nature of the relationship between Turing and the universal machine?

It is common to treat the relationship between the model and the original as representation or substitution on the basis of shared features. However, dealing with signs in this way can lead to certain misunderstands and even mistakes. Turing discussed the risk of thinking in terms of analogies between an original and a model in his paper "The Chemical Basis of Morphogenesis"[25]. He wrote:

> [... the] mathematical model [...] will be described. This model will be a simplification and idealization, and consequently a falsification. It is to be held that the features retained for discussion are these of the great importance in the present state of the knowledge.[26]

Turing's words about the weak status of a model express a certain scepticism towards a mathematical model's ability to provide a rich enough representation of the original.

To avoid thinking in analogies between a model and an original, in this case between the universal machine and the person Alan Turing, we shall instead employ the speak in terms of indexical references. While in the first part of the paper the concept of the bachelor machine was introduced as a suitable analogy for the universal machine by listing their structural

[25] Alan TURING, "The Chemical Basis of Morphogenesis." In: *Philosophical Transactions of the Royal Society of London. Series Biological Science*, vol. 237, 1952, no. 641, p. 37–72. Available online at: <http://www.jstor.org./stable/92463> [cit. 12. 8. 2013].
[26] *Ibid.*, p. 38.

similarities. In the argument below the bachelor machine will represent an indexical relationship between the author, Turing, and the universal machine. This will enable us to interpret the relationship between the person Alan Turing and the universal machine within the structure of the two overlapping diagrams that the bachelor machine comprises. This kind of relationship can help us to avoid the reductionism of a scientific model and be more sensitive to the context or the background of the universal machine. With this approach we can show that the universal Turing machine is both the result of a brilliant exercise in mathematical logic and an index of the person Alan Turing, the conscious and unconscious parts of his desires and will. We could say that below the universal machine will be subjected to a kind of x-ray examination to expose the hidden layers of unconscious and (deleted) embodied experience.

## The universal Turing machine on the dissecting table

### *Dissecting table*

Carrouges described the bachelor machine as a "fantastic image that transforms love into the technique of death" that is first of all an "improbable machine", and said that "the determinant structure of these unlikely looking machines is based on mathematics".[27] In the effort to explain the basic principles shared by all bachelor machines, he pointed to its simpler precursor, Lautréamont's formula from *Le Chants de Maldoror* (1869, Chant VI):

> He is beautiful [...] like the chance meeting of a sewing machine and an umbrella on the dissecting table.[28]

Carrouges turns the interpreter's attention away from the heterogeneous setting created by the umbrella as a male symbol and the sewing machine as a female symbol to a third object in the background of the image, the dissecting table. The dissecting table does not figure among the bachelor machine's mechanical and sexual components. However, its importance for understanding the bachelor machine is crucial.

[27] Michel CARROUGES, "Istruzione per L'uso / Instructions for Use." In: CLAIR, J. – SZEEMANN, H. (eds.). *Le macchine celibi / The Bachelor Machines. Catalogue La Biennale di Venezia*. Venice: Alfieri Edizioni d'Arte 1975, p. 21 (21–49).
[28] *Ibid*. p. 22.

> [The dissecting table] represents a specific function arising out of the system of the two ensembles. Instead of love bed, signifying union and love, the dissecting-table expresses the bachelor machine's specific function, which is solitude and death.[29]

The principal importance of the background, which unites the bachelor machine's components into one system, is confirmed in Marcel Duchamp's response to the letter sent to him by Carrouges, in which he explained the concept of the bachelor machine on the basis of the correspondence between *The Large Glass* and Franz Kafka's short novels *Metamorphosis* and *In the Penal Colony*. Even though Duchamp expressed doubts about using a method based on searching for structural analogies between the upper and the lower part of *The Large Glass* and, for example, between the sewing machine and the umbrella in *Les Chantes de Maldoror*, he appreciated the analogy between the transparent glass plates and the dissecting table. He wrote:

> 6 Feb. 1950
> My dear Carrouges,
> [...]
> I can tell you that the introduction of the ground theme explaining or provoking certain 'acts' of the Mariée and the bachelors, never came into my mind – but it is likely that my ancestors made me "speak" like them [...].
> Celibately yours,
> Marcel Duchamp[30]

### *The Turing test*

Analogically to the transparent glass plates of *The Large Glass*, the crucial role of the background in the universal Turing machine setting is played by the imitation game of the Turing test. Turing explains the rules of the game as follows:

> The new form of the problem can be described in terms of a game which we call the "imitation game." It is played with three people, a man (A), a woman (B), and an interrogator (C) who may be of either sex. The interrogator stays in

[29] *Ibid.*
[30] Jean CLAIR – Harald SZEEMANN, *Le macchine celibi / The Bachelor Machines, catalogue La Biennale di Venezia*. Venice: Alfieri Edizioni d'Arte 1975, p. 49. Available online at: <http://www.scribd.com/doc/46775310/The-Bachelor-Machines> [cit. 12. 8. 2013].

> a room apart from the other two. The object of the game for the interrogator is to determine which of the other two is the man and which is the woman.[31]

In the second round of the game, one player is replaced by a machine. Turing asks:

> [...] "What will happen when a machine takes the part of A in this game?" Will the interrogator decide wrongly as often when the game is played like this as he does when the game is played between a man and a woman? These questions replace our original, "Can machines think?".[32]

However, it is not the rules for the players' actions that plays the crucial role in the experiment but rather the arrangement of Turing test's based on remote, mediated communication. Turing described this as follows:

> [...] the answers should be written, or better still, typewritten. The ideal arrangement is to have a teleprinter communicating between the two rooms. Alternatively the questions and answers can be repeated by an intermediary. [...] The new problem has the advantage of drawing a fairly sharp line between the physical and the intellectual capacities of a man.[33]

### *The magic trick*

Katherine N. Hayles has noted the importance of the setting in which Turing's imitation game takes place. She writes:

> Like all good magic tricks, the test relies on getting you to accept at an early stage assumptions that will determine how you interpret what you see later. The important intervention comes not when you try to determine which is a man, the woman, or the machine. Rather, the important intervention comes much earlier, when the test puts you into a cybernetic system in which represented bodies are joined with enacted bodies through mutating and flexible machine interfaces.[34]

The Turing test was intended to serve as a means of eliminating the body from the definition of man. Thus it was possible to reduce man to an in-

[31] TURING, "Computing Machinery and Intelligence," p. 433.
[32] *Ibid*., p. 433.
[33] *Ibid*., p. 433.
[34] HAYLES, *How We Became Posthuman*, p. xiii.

formation processing system and intelligence to the "ability to manipulate formal symbols rather than enaction in the human life-world".[35] While in the first round, the game deals with the performativity of gender, in the second one, it deals with the performativity of intelligence. This way, Turing was able to make his audience/readers accept the comparison and the hypothetical intersubstitutability of a human's and a computational machine's intelligences. Hayles wrote that: "[I]n the push to achieve machines that can think, researchers performed again and again the erasure of embodiment at the heart of the Turing test."[36]

It is significant that Hayles highlighted the ritual and performative quality of the Turing test in the introductory chapter of her book *How We Became Posthuman*.[37] She saw in the imitation game "the inaugural moment of the computer age", for it erased the embodied experience from the model of human and established a close circuit of references between human and machine within a mediated environment. According to Hayles, the Turing test proved that:

> [T]the overlay between the enacted and the represented bodies is no longer a natural inevitably but a contingent production, mediated by technology that has become so entwined with the production of identity that it can no longer meaningfully be separated from the human subject.[38]

The Turing test's setting of mediated communication, as well as the transparent glass plates of *The Large Glass*, or the dissecting table in *Les Chants de Maldoror* are just different examples of the background which unites the mechanical and sexual components of bachelor machines to trigger their meaning production. It is as though the imitation game of the Turing test were taking place on the "dissecting table", where a man is divided into a body and a mind to be transposed onto the level of their symbolic representations. The magic trick of the Turing test allows a human or a machine to be judged by the interrogator on the basis of the communication established through symbolic exchange and on intellectual arguments only.

However, Turing learned first-hand during his judicial proceeding that neither a typewriter nor a computer interface could protect him if he breaks

[35] *Ibid*., p. xi.
[36] *Ibid*., p. xi.
[37] *Ibid*.
[38] *Ibid*., p. xiii.

the laws of the society he lives in. The sentence for his "crime" was inscribed deep in his body by his hormonal treatment.

## Alan, the Bachelor machine

Alan Mathison Turing was born on 23 June 1912 in London in the district of Paddington, and he died on 7 June 1954 in Winslow in Cheshire. He was an outstanding mathematician, logician, cryptanalyst, and computer scientist. His homosexuality resulted in a criminal prosecution against him in 1952, when homosexual acts were still illegal in the United Kingdom.[39] He was arrested, convicted of homosexuality, and put on trial for "acts of gross indecency" between adult men. To avoid imprisonment, Turing agreed to submit to a one-year course of oestrogen therapy. In other words, he underwent a chemical castration. The treatment caused gynecomastia as a side effect. However, the sentence he was subjected to also had other side effects. He was excluded from all government research projects owing to a loss of confidence in him and his unclean criminal record. Two years later, in 1954, he committed suicide by eating an apple laced with cyanide.[40]

## Coming out of "the toy world"

The Turing test's magic power, which lies in its ability to change someone's identity (a man into a woman or a man into a machine) within the setting of the imitation game, was re-enacted by Duchamp and Turing them*selves* later when their work on their bachelor machines was done. In this sense, it was as though *The Large Glass* and the universal Turing machine were just blueprints or sketches for further embodiments of the invisible forces whose traces maps the bachelor machine diagram.

Subsequently, Marcel Duchamp playfully dealt with performativity of a gender identity on his famous transvestite photographs made by Man Ray, which show his alter ego Rrose Sélavy. Alan Turing wrote later on "On the Chemical Basis of Morphogenesis"[41], his prophetic contribution to the math-

[39] The law was not repealed until 1967.
[40] Turing's biographers, Hodges and Leavitt, suggested that Turin's death was the re-enactment of a scene from his favourite film *Snow White* (Walt Disney, 1937). Andrew HODGES, *Alan Turing: The Enigma of Intelligence*. London: Unwin 1985; David, LEAVITT, *The Man Who Knew Too Much: Alan Turing and the Invention of the Computer*. New York – London: W. W. Norton & Co. 2006.
[41] TURING, "On The Chemical Basis of Morphogenesis."

ematical biology. He wrote the paper at the same year when he underwent his judicial proceeding, which ended with condemnation to the hormonal treatment of his homosexuality.

Both, Duchamp and Turing, had undergone similar development in their interests from mechanic arrangements to organic matters. While Duchamp had focused on the optical effects, which can unsettle our faith into empirical experience, thus he remained on the surface of things. Turing's affair with the organic matter was much more deep-seated, for he not only contributed to the mathematical biology, but he underwent the substantial body transformation during the hormonal therapy, and he committed suicide just two years later.

Within these regrettable events, he underwent transformation from the male to female body, and from the life to the death. Turing made coming out of the toy world of representation (the metaphor fits the world of both art and mathematics) and entered into the embodied, physical experience of becoming someone else.

It can be said that Turing performed the perfect magic trick of the Turing test for it was not a trick or an illusion.[42] Unlike Duchamp, his transformation occurred, literally, within his own body. Thus, he should be recognized as not only the father of modern computing but also the first post-human, the "new mutant",[43] in the radical sense of the word.

### *Epilogue*

Turing's mathematical hypotheses concerning the universal machine and the Turing test failed in practice. The personal tragedy of Alan Turing proved that the universal machine's axioms, its isolation and completeness, can work within the clean laboratory of theory only, but cannot be accomplished once the universal machine acquires material form, for example, the form of a personal computer, and becomes part of culture. However, we can say that Turing won the hypothetical competition between him and the other magician, Duchamp, in terms of the magic of transformation. Moreover, he became aware of the illusion of his conviction that scientific discourse evolves within the logic of scientific discourse. He feared that the sentence he had to face in his private life would affect the way his professional work is

[42] See the film *The Prestige* (2006).

[43] Leslie FIEDLER, "The New Mutants." In: *Collected Essays of Leslie Fiedler*. 2nd vol. New York: Stein and Day 1965, pp. 392–400. Available online at: <.http://www.texaschapbookpress.com/newmutants01.htm > [cit. 12. 8. 2013].

treated by scientific society. He expressed his apprehensions in a syllogism at the close of a letter to his friend Norman Routledge.

> Turing believes machines think
> Turing lies with men
> Therefore machines cannot think.
> Yours in distress,
> Alan[44]

Turing's contributions to computer science and his influence on disciplines like artificial intelligence and advanced robotics are enormous. However, his personal tragedy was not discussed in public for a long time. Not until 10 September 2009, when, following an internet campaign for Turing, British Prime Minister Gordon Brown made an official public apology on behalf of the British government for "the appalling way he was treated".

Meanwhile, Turing's chemically crippled body has worked like an archetype, in the deep layers of the discourse of computer culture, sublimated in Turing's writings, and interpreted as a logical slip.[45] Turing, the man, the numbers freak, the excellent (human) computer, was for a long time erased from the history of computing, and substituted by the universal machine, referred to in short, but significantly, as the Turing machine.

To add the universal machine to the list of bachelor machines is a gesture of transposition from the realm of mathematics to the realm of culture, from the realm of pure logic to the realm of self-expression. By treat the universal machine as the bachelor machine the unconscious, the sublimated "personal obsessions"[46] that cannot be excluded from the realm of science are made

[44] LEAVITT, *The Man Who Knew Too Much*, p. 5.

[45] Hodges interprets Turing's inclusion of gender in the imitation game of the Turing test as a "red herring". He wrote that the passage of the argument "was not expressed with perfect lucidity. The whole point of this game was that a successful imitation of a woman's responses by a man would not prove anything. Gender depended on facts which were not reducible to sequences of symbols." HODGES, *The Enigma of Intelligence*, p. 415.

[46] Curator Harald Szeemann revisited and expanded Carrouges' argument in 1975, when he organized exhibition inspired by Duchamp's The Large Glass entitled *The Bachelor Machines*. The exhibition belongs to the series of his exhibitions on personal obsessions. His attempt was to visualize the myth, thus he displayed fabricated full-scale models of different bachelor machines, including the torture and execution device, which Kafka described in *In the Penal Colony* at the exhibition. Szeemann interpreted the bachelor machine in a later interview: "It had to do with a belief in eternal energy flow as a way to avoid death, as an erotic of life: the bachelor as rebel-model, as antiprocreation." Hans OBRIST, *A Brief History of Curating*. Ostrava: Ringier Print 2008, p. 92–93.

visible. Paradoxically, from this point of view, the universal machine loses its uniqueness as the foundation of individual genius, and it becomes part of the many articulations of the bachelor machine myth. This way the universal machine becomes part of general cultural production and its significance penetrate far and deep into our culture.