Machines Machines

Humans Humans

and and

Robots Robots

Andreas Broeckmann

The relationship of human beings to technology is fraught with tension and characterized by attempts of segregation, but also by instances of imitation and even intimacy. In the following we shall discuss these issues with reference to some artistic works that can be considered as “machine art”.

Machine art

Since the early 20th century, forms of art have been called machine art in so far as they address how humans perceive and use technical systems. Machine-art works may be either machines created by artists or “art works” produced by machines.

Due to his popular machine sculptures, the Swiss artist Jean Tinguely is considered as one of the best-known artists of the 20th century. Tinguely has con-

sistently created installations which in themselves work technically, but without performing any useful function. That he was able to construct a "useless" machine such as the large outdoor sculpture "Heureka" for the Expo in Lausanne in 1964 not only demonstrates Tinguely's sense of humor, but also the openness of the organizers of this industrial showcase towards such a playful critique of technological rationality.

Another variant of machine art foregrounds not the critique of the functional, but instead its aesthetics. In 1934, the exhibition "Machine Art" took place at the Museum of Modern Art in New York, where the curators Philip Johnson and Alfred Barr exclusively presented objects derived from American industrial production. According to the half-serious, half-polemical premise of the exhibition, true beauty arises where something functions optimally, which is why ships' screws, springs, and petri dishes were of an aesthetic perfection virtually impossible to achieve by any human artist.

The machine art of the last century is situated within this field of tension between either critical or affirmative approaches. It confronts us with the question whether the human-machine relationship is to be understood as co-operation, rivalry, or even as an existential threat.

Machines

It is now important to clarify what I mean by "machine", or rather what we generally speaking think of when we label something as a "machine". I will try to show that by "machine" we usually do not mean specific devices, but that the use of this term directly relates to the special relationship between humans and technics.

If we ask about what is called a "machine", the first answer has to be the big plants of the industrial age, such as steam engines and combustion motors, which produce or transmit the power for production processes. The mathematician Gotthard Günther calls such systems the "first machine", the principle of which can be traced to the mechanical lever, whereas he uses the term "second machine" for the cybernetic machine which only controls such processes, without mechanically executing them itself. This would include electronic steering or a computer. A third use of the expression "machine" refers to the technical and bureaucratic structures of the state and other social institutions. The social scientist Lewis Mumford called this the "mega machine". A fourth variant is the application of the machine term to mathematical systems by Alan Turing. And finally, the expression machine has since the 1970s regularly been applied to describe the human psyche, in which, according to French philosophers Deleuze and Guattari, not oedipal and other drives, but "desiring machines" are at work.

Despite the semblance of such radically different definitions of the expression "machine", the latter does not seem to us vague or inconsistent. The reason for this in my view is that it denotes something which in most cases resonates only implicitly, without being explicitly stated.

The modern individual's relation to technology is sensitive, because one's self-image as a free, au-

tonomous and rational being hinges on not experiencing oneself as predetermined, or that one's actions and opinions might be defined from without. The basis of this self-concept, which emerged around 1800, was among other things the dissociation from nature and religion in the context of early industrialization. In the sciences and in the arts, the human confronted nature, extracting oneself from it in order to be able to determine one's own destiny and the shape of the world.

Somewhat later, we can observe something similar with respect to technics. Around 1900 the technical infrastructure begins to massively influence daily life – through electrification and the telephone, automobiles and railways. It is at this point that a new attitude to technics emerges, which uses the term "machine" for that from which one wishes to disassociate oneself, thereby making it clear that one is not a machine, but indeed a human being. The term "machine" therefore does not designate a certain type of technical apparatus, but performs via speech act the subjectivity of the human as a non-technological being.

Accordingly, the immensely varied forms of machine art involve this kind of subjectivity and relationship to technics. A radical example for this is the installation of the "Sealed Computers" (1992) by Maurizio Bolognini, in which a series of networked computers appear to process and exchange data – noticeable by the sound of the hard drives and ventilators. The results of these calculations, however, remain hidden from human observation, as the monitor busses of the computers have been sealed with wax.

To point out the strangeness of this "machine" installation also means to say: "I, the speaker, am not a machine, I am a human being, I am not a technical entity – and my being, my ontology is not based on a technology, a knowledge of technics, but on anthropology, a knowledge of the human."

Robots, humans, and machines

This fascinating relationship between human beings and technics is particularly poignant in the case of the robot, who might make us think of the technical characters of science-fiction films, but also of manufacturing robots in automated industrial production. The expression "robot" also derives from this context, first used at the beginning of the 1920s by the Czech writer Karel Čapek. In his stage play "R.U.R." (Rossum's Universal Robots) "robots" are anthropomorphic, similar to human beings, but artificial work slaves, which in Čapek's story rise up against their human masters.

It makes sense to clearly distinguish between robots and machines, even if these terms are often used interchangeably and unsystematically. The difference between machine and robot on the one hand is linked to the concept of work – a crucial part of the modern self-definition of man –, and on the other hand what is called anthropomorphism, i.e. a form similar to the human shape or based on human physical attributes. The robot works like a human, performing tasks which at least theoretically a human worker could also carry out. The robot might work faster or more untiringly, or it can perform movements

or operations which humans are anatomically incapable of. The robot is a servant, a colleague, and hence also a rival who can replace humans as workers. The machine by contrast can in principle perform operations which a human being precisely cannot – typically the generation and transmission of power in the manufacturing process, or the execution of calculations the complexity and speed of which exceed human capacities. In industrial manufacturing, the machine allows for new work procedures, while the robot directly replaces the human being. In this sense the figurative automatons of the 18th century belong to the genealogy of the robot and not of the machine: the scribes, dancers, and chess players visualize the substitution of the human and his or her activities by technical characters. Contrary to this the machine is what the human is not, and the machine principally performs what the human cannot.

Chico MacMurtrie's "Tumbling Man", who unsuccessfully attempts to stand upright on his legs, displays the classical characteristics of a robot: it is anthropomorphically shaped according to the human body, and its labors convey a seemingly tragic inability to muster the ultimate bit of bodily control which would enable the upright, bipedal walk. By contrast, one would call the uncontrolled drawing "Méta-matics" by Jean Tinguely machines, because here there does not seem to be any rivalry with the traditional painterly gesture of an artist, while the painting robot of the artist group Robotlab performs a diligent task which could also be carried out by a patient and accurately working human being.

The Canadian artist Norman White has created quite a different artistic robot, named "Helpless Robot". The upright standing box with handles and a pedestal, above which the upper part of the sculpture can be rotated, in no way resembles a typical robot. The base contains built-in loudspeakers through which a nagging, squawking voice requests the exhibition visitors to move the robot. When a visitor obeys, soon the voice complains about the direction in which it is being turned, or about the speed being either too fast or too slow. The installation subverts the usual serving role of the robot and inverts the relation of master and servant.

Robots follow an aesthetic of similarity and of behavior, while machines serve an aesthetic of function and processing. Both terms are seemingly used in a purely technical sense, but there is always a resonating cultural content. Hence it is important not to regard this tense relationship and the anthropomorphization of technics as "naturally given,", but as a myth, as a narrative we tell ourselves in order to come to an understanding of our place in the world. In this myth the human is replaced by a robot, and nature is substituted by a machine. The robot stems from automated industrial production and is to be understood, very much in accordance with the Taylorist optimization of work, as a derivation of the human, or the laboring human body, respectively. By contrast, the machine in its modern appearance derives from the forces of nature, which are effected independently from any human effort.

Mythologies, or "We have always been cyborgs"

In the works of machine art the figures of the robot and the machine become apparent as mythological projections intended to confirm the ontological difference between humans and technics. Related to this is the discourse of "artificial intelligence". The term "artificial intelligence" gains its anthropological, human poignancy because it insinuates that there is a cognitive ability which may develop identically in human beings and computer systems. The rhetorical figure is reinforced by descriptions of the human brain in terms of media technology, such as storing, transmitting, and processing, while at the same time technical systems are being anthropomorphized. So, for instance, there is talk of "bots", i.e. programs which in computer networks can execute certain routines of sorting, searching, or modifying. Such algorithmic robots run processes in computers and are "bots" in so far as they "work", as in Čapek's play; but do we really want to anthropomorphize this form of algorithmic processing in computers and call it "work" corresponding to human work? What are the consequences of using the same expression for both kinds of action?

Talking about machines and robots therefore always means speaking within the realm of myth. Also, the human-machine schema misleads one to think of the human being as ahistorical, immutable, and supposedly in conflict with continuously changing technics. But it is far from exigent that technical systems should be described in anthropomorphic

metaphors. The relationship between humans and technology can also be grasped in non-antagonistic fashion. Hence a contemporary subjectivity would also be feasible, as a form of human self-reference – "that which says 'I'" – which comprehends itself not in opposition, but in interdependence, in a mutual conditionality of itself with its natural and technical environment. Similarly, we see ourselves in relation to our social surroundings and recognize the interdependence between the individual and society. Accordingly, human beings and technics can be conceived of as mutually conditional and as developing together.

The Japanese artist Mikami's installation "gravicells" offers a fitting image for this. Visitors are included in a field of interdependencies, in which natural gravity as well as the weight and the movement of the installation, of the visitors, and of satellites high up in orbit above the exhibition location are related to one another. Here the human is neither victim nor master of technics, but a co-operating actor, inscribed into a larger system and its eco-technological conditions.

The discourse of the "machine", by contrast, serves as the affirmation of the ideology of non-technical humanness, just as for 200 years – but not much longer – talk of the "human being" has served to affirm the ideology of non-human technics. In this respect the notion of a gender-specific attitude to machines, implying that men and women have different relationships to machines, is also part of this powerful myth.

The insight that as human beings we are always also technical creatures is supported by some impres-

sive sources. The cyborg myth that the social scientist Donna Haraway already narrated in the 1980s in her "Cyborg Manifesto", should encourage us to accept our hybrid origins, without seeking purity and segregation. On the contrary, very much in the sense of "queer" thinking, we should strive to develop the emancipatory potentials of blending and – like the cyber feminist Allucquére Rosanne Stone – surrender, together with the binary opposition of "man" or "woman", also the "either/or" in the relationship between humans and technics.

A bibliography and a list of works mentioned in the text can be found in the appendix of this book.

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Belletristik (chronologisch)
Fiction (in chronological order)

Ovid: Metamorphosen: 1. Jh. v. Chr.
P. Ovidius Naso: Metamorphosen. Übersetzt und herausgegeben von Michael von Albrecht. Stuttgart 2013.

E.T.A. Hoffmann: Der Sandmann (1816) Hoffmann, E.T.A.: Der Sandmann. Stuttgart 2016.

La Mettrie: L'homme machine (1748)
La Mettrie, Julien Offray de:
Die Maschine Mensch. Übersetzt und herausgegeben von Claudia Becker. Hamburg 2009.

Karel Čapek: R.U.R. (1921)
Čapek, Karel: W.U.R. (Werstands universal robots). Utopistisches Kollektivdrama in drei Aufzügen, Prag. Übersetzt von Otto Pick. Leipzig 1922, S. 16 f.

Paul Gurk: Tzubu (1935)
Gurk, Paul: Tzubu. Der Mythos von der grauen Menschheit oder die Zahl 1. Meitingen 1983.

Isaac Asimov: Roboter Geschichten / Robot Stories (1939–1950)
Asimov, Isaac: Alle Roboter-Geschichten. Bergisch-Gladbach 1982. (English: The complete robot. All robot stories. New York 1983).

Stanislav Lem:
Sterntagebücher (1957)
Lem, Stanislav: Sterntagebücher. Frankfurt am Main 1976.

Philip K. Dick: (Blade Runner)
Do androids dream of electric sheep? (1968)
Dick, Philip K.: Do androids dream of electric sheep?. London 2004.

Dietmar Dath:
Maschinenwinter (2008)
Dath, Dietmar: Maschinenwinter – Maschinen, Technik, Sozialismus. Eine Streitschrift. Frankfurt am Main 2008.

Ausstellungskataloge
Exhibition Catalogues

Anna, S. (Ed.): Ex Machina: A History of Robots from 1950 to the Present Day. Ausst.-Kat. Museum für Angewandte Kunst, Köln. Ostfildern 2002.

Serexhe, Bernhard/Weibel, Peter: Wolfgang von Kempelen. Mensch in der Maschine. Zentrum für Kunst und Medientechnologie Karlsruhe ZKM. Berlin 2006 (English: Man in the machine).

Museum Tinguely Basel: Robotertträume. Basel 2010 (English: Robot dreams).

Museum Tinguely Basel: Méta-Harmonie. Musikmaschinen und Maschinenmusik im Werk von Jean Tinguely. Basel 2017 (English: Méta-Harmonie: machine music and music machine in Jean Tinguely's oeuvre).

Kries, Mateo: Hello Robot. Design zwischen Mensch und Maschine. Weil am Rhein 2017 (English: Hello Robot: Design between human and machine).

Russell, Ben: Robots. The 500-year-quest to make machines human. London Science Museum. London 2017.

Allgemeine Darstellungen
General Publications

Harari, Yuval Noah: Homo Deus. Eine Geschichte von Morgen. München 2017 (English: A brief history of tomorrow).

Kurzweil, Ray: Menschheit 2.0. Die Singularität naht. Berlin 2014 (English: The Singularity Is Near: When Humans Transcend Biology).

Mumford, Lewis: Mythos der Maschine. Kultur, Technik und Macht. Frankfurt am Main 1977.

Beck, Stefan: Umgang mit Technik. Kulturelle Praxen und kulturwissenschaftliche Forschungskonzepte. Berlin 1997.

Broeckmann, Andreas: Machine Art in the Twentieth Century. Cambridge, MA 2016.

Burckhardt, Martin: Vom Geist der Maschine. Frankfurt am Main 1999.

Caronia, Antonio: The Cyborg. A Treatise on the Artificial Man. Lüneburg 2015.

Gendolla, Peter: Anatomien der Puppe. Zur Geschichte des Maschinen-Menschen bei Jean Paul, E. T. A. Hoffmann, Villiers de l'Isle-Adam und Hans Bellmer. Heidelberg 1992.

Günther, Gotthard: Die «zweite» Maschine. In: Günther, G.: Das Bewusstsein der Maschinen. Eine Metaphysik der Kybernetik. Krefeld/Baden-Baden 1963, S. 179–203.

Haraway, Donna: Ein Manifest für Cyborgs. Feminismus im Streit mit den Technowissenschaften. In: Haraway, D.: Die Neuerfindung der Natur. Primaten, Cyborgs und Frauen. Frankfurt am Main 1995, S. 33–72.

Jordan, John: Roboter. Wiesbaden 2017.

Muri, Allison: The Enlightenment Cyborg: A History of Communications and Control in the Human Machine, 1660–1830. Toronto 2007.

Popitz, Heinrich: Der Aufbruch zur artifiziellen Gesellschaft. Zur Anthropologie der Technik. Tübingen 1995.

Rabinbach, Anson: Motor Mensch. Energie, Ermüdung und die Ursprünge der Modernität. Wien 2001.

Sarasin, Philipp: Reizbare Maschinen. Eine Geschichte des Körpers 1765–1914. Frankfurt am Main 2001.

Stone, Allucquére Rosanne: The War of Desire and Technology at the Close of the Mechanical Age. Cambridge, MA 1996.

Zylinska, Joanna (Ed.): The Cyborg Experiments: The Extensions of the Body in the Media Age. London 2002.

Edited by Dominik Landwehr with Inputs by Andreas Broeckmann, Philipp Theisohn and Roland Wetzel.

Aelita (Yakov Protazanov, SU 1924)

Metropolis (Fritz Lang, D 1927)

The Day the Earth Stood Still (Robert Wise, USA 1951)

Westworld (Michael Crichton, USA 1973)

The Stepford Wives (Bryan Forbes, USA 1975)

Star Wars (George Lucas, USA 1977)

Blade Runner (Ridley Scott, USA/HK/GB 1982)

Terminator (James Cameron, USA 1984)

Robocop (Paul Verhoeven, USA 1987)

Terminator 2: Judgment Day (James Cameron, USA 1991)

Death Machine (Stephen Norrington, GB/J 1994)

Ghost in the Shell (Mamoru Oshii, J/GB 1995)

Bicentennial Man (Chris Columbus, USA/D 1999)

The Matrix (Lana & Lilly Wachowski, USA 1999)

A.I. Artificial Intelligence (Steven Spielberg, USA 2001)

Transformers (Michael Bay, USA 2007)

Pacific Rim (Guillermo del Toro, USA 2013)

Ex Machina (Alex Garland, GB 2014)

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