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# TRANSHUMANISM IN EMERGING TECHNOSCIENCE AS A CHALLENGE FOR THE HUMANITIES AND TECHNOLOGY ASSESSMENT

**Abstract**. *The shaping of emerging technoscience by transhumanist ideology can be deemed a challenge for both, the interdisciplinary field of technology assessment (TA) and the humanities. The discourses on nanotechnology, 'converging technologies' and 'human enhancement' respectively are major examples of the influence of transhumanism on areas of new and emerging science and technology. It is argued that TA and the humanities often need to engage more strongly with transhumanism, as an ideology and a sociocultural movement, in order to help make sense of emerging fields of technoscience and their relevance for society.*
**Keywords**: *converging technologies, emerging technoscience, technology assessment, nanotechnology, transhumanism*

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## Introduction

Since the end of the twentieth century, the discourse on emerging techno-scientific fields has (again) strongly been shaped by transhumanism. The latter can be deemed both a specific ideology with roots in the late nineteenth and early twentieth centuries and a sociocultural movement which is still small but fairly influential in ethical and societal debates about fields such as biology, neuroscience, nanoscience and artificial intelligence, including those technologies developed on the basis of research in these fields. A manifesto published by a transhumanist organisation in the early 2000s aptly summarised the visionary core of this ideology: "Humanity will be radically changed by technology in the future. We foresee the feasibility of redesigning the human condition, including such parameters as the inevitability of aging, limitations on human and artificial intellects, unchosen psychology, suffering, and our confinement to the planet earth" (Schneider, 2009: 97). While not all of these goals are shared by all transhumanists, they have defined transhumanism as a futurist ideology since its genesis in the years between 1870 and 1930 (Coenen, 2014).

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In this essay, I will discuss the shaping of the discourse on emerging technoscience by transhumanist ideology as a challenge for the interdisciplinary field of technology assessment (TA) and for the humanities. The discourse on nanotechnology, 'converging technologies', and 'human enhancement' will be my main example. I will argue that TA and the humanities often need to engage more strongly with transhumanism, as an ideology and a sociocultural movement, in order to help make sense of emerging fields of technoscience and of their relevance for society.

## Transhumanism as an Ideology and a Sociocultural Movement

About 130 years ago, in *The Martyrdom of Man* (1872), the Africa explorer and controversial author Winwood Reade wrote: "These bodies which now we wear belong to the lower animals; our minds have already outgrown them; already we look upon them with contempt. A time will come when Science will transform them by means which we cannot conjecture [...]. With one faith, with one desire, [men] will labour together in a Sacred Cause: the extinction of disease and sin, the perfection of genius and love, the invention of immortality, the exploration of the infinite, and the conquest of creation" (Reade, 1910: 514, 548). Since then, transhumanists have eagerly been making reference to a wide variety of developments in science and technology in order to increase the plausibility of their hopes for the future.

About 1923 Jorge Luis Borges had learnt "what desperate and admirable men the Gnostics had been, and ascertained their fiery postulations" (Borges, 2000: 65). In a certain sense, the transhumanists are the Gnostics of our times (Brumlik, 2001), and I have similar feelings of astonishment and respect when I read their texts, as Borges apparently had when he became acquainted with the Gnostic tradition. As a matter of course, these feelings do not ensue from reading the often dull writings of the likes of Ray Kurzweil (see, for example, Kurzweil, 2005) but from the impressions masterpieces such as *The Discovery of The Future* (1902) by H. G. (Herbert George) Wells or John Desmond Bernal's *The World, the Flesh and the Devil. An An Enquiry into the Future of the Three Enemies of the Rational Soul* (1929) made on my mind.

The Gnostics in their times expressed somewhat bizarre but fascinating ideas concerning the old notion of the human body as a prison. Plato had seen the soul as a "helpless prisoner, chained hand and foot inside the body" (Phaedo 82e; translated by Hugh Treddenick, 1954). The Gnostics have imaginatively outlined how the divine within humans could escape from this prison as well as from that greater prison which, in their view, Earth was. Similarly, transhumanists since the 1870s have provided us with

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a blueprint for an "emancipation" of the human mind from both, the limitations of human corporeality and the species' "confinement to the planet earth" (Schneider, 2009: 97). In transhumanism, human beings are reduced to their minds and to information patterns. In *The World, the Flesh and the Devil*, a futuristic essay which has strongly shaped transhumanism and massively influenced the genre of science fiction, Bernal had written: "Sooner or later some eminent physiologist will have his neck broken in a super-civilized accident or find his body cells worn beyond capacity for repair. He will then be forced to decide whether to abandon his body or his life. After all it is brain that counts, and to have a brain suffused by fresh and correctly prescribed blood is to be alive – to think" (Bernal, 1929: 42–43). Starting with this thought experiment, Bernal develops a vision of the future in which neuro-electric interfaces used for the cyborgisation of a technoscientific vanguard of the human species, human minds are technologically interconnected and eventually fully separated from human biological corporeality.

About ten years ago William Bainbridge, a senior transhumanist and surprisingly influential figure in the research and technology policy discourse on nanoscience and converging technologies (see below), wrote that "[i]n the distant future, we may learn to conceptualize our biological lives on Earth as extended childhoods preparing us for the real life that follows in cyberspace" and that "the transition from flesh to data will not be so much metamorphosis as liberation" (Bainbridge, 2004: 119). In his vision, we "will travel across immensity" as "information contained in a star-spanning database", creating "new bodies along the way to dwell in every possible environment, and have adventures of the spirit throughout the universe" (ibid.). We should "no more lament the loss of the bodies that we leave behind than an eagle hatchling laments the shattered fragments of its egg when it first takes wing" (ibid.).

As a sociocultural movement, transhumanism has recently exerted considerable influence in the research and technology policy sphere (for the following, see also Coenen et al., 2009; Coenen, 2010a; 2010b; 2010c). A high-profile and policy-oriented activity shaped by transhumanist ideas, the so-called "NBIC (nano-bio-info-cogno) initiative" (Roco and Bainbridge, 2002) – which was started by Mike Roco, an influential science manager, and Bainbridge in the United States in the early 2000s (and has recently been kick-started) – provoked largely critical reactions in other countries and in the academic world. It has triggered a broad debate about 'human enhancement' and transhumanism in various academic and policy advice circles. It was launched or supported by major U. S. institutions such as the National Science Foundation, the Department of Commerce, and the Defense Advanced Research Projects Agency (DARPA), as well as by several information technology (IT) industry companies, and is heavily influenced by transhumanist ideas and activists. Participants in the initiative's first workshop even seriously

discussed the uploading of human minds to computers – the core transhumanist vision of so-called 'cybernetic immortality' – as popularised by Ray Kurzweil and, more recently, by the film *Transcendence* (2014), directed by Wally Pfister and starring Johnny Depp. Kurzweil, who has also popularised the quasi-messianist notion of the 'Singularity' in Silicon Valley and beyond, is now a key player at *Google* with regard to the field of artificial intelligence (Cadwalladr, 2014), and recent *Google* activities in the areas of artificial intelligence, man-machine interfaces, longevity research and robotics convey the impression that the company is developing an unequivocally transhumanist agenda (see, for example, Cadwalladr, 2014; McCracken and Grossman, 2013; Shanks, 2013). About a decade ago Larry Page, chief executive officer and one of the two co-founders of *Google,* already claimed that one of his guiding visions for the company's future was to connect Google directly to the brain, and more recently he was was quoted as having said: "Eventually you'll have an implant, where if you think about a fact, it will just tell you the answer." (Levy, 2011: 67) In an interview in July 2014, *Google*'s other co-founder, Sergej Brin, said that "we do have lots of proof points that one can create intelligent things in the world because – all of us around. Therefore, you should presume that someday, we will be able to make machines that can reason, think and do things better than we can" (Khosla, 2014: n. pag.). In 2008, the *Intel* company gave its annual *Developer Forum* the title *Countdown to the Singularity* and prominently referred to Kurzweil's ideas. Peter Thiel, who made a fortune with *PayPal* and was the first to heavily invest in *Facebook*, supports representatives of transhumanism in various ways, both financially and otherwise. The *(Global Future) 2045 Initiative*, founded by the Russian multimillionaire Dmitry Itskov in February 2011, "aims to create technologies enabling the transfer of a individual's personality to a more advanced non-biological carrier, and extending life, including to the point of immortality", with "particular attention to enabling the fullest possible dialogue between the world's major spiritual traditions, science and society" (see http://gf2045.com/about/: n. pag.). In a blurb for Kurzweil's book *The Singularity is Near* (2005), *Microsoft*'s Bill Gates is quoted as having said that Kurzweil "is the best person" he knows "at predicting the future of artificial intelligence" and that his "book envisions a future in which information technologies have advanced so far and fast that they enable humanity to transcend its biological limitations" (Kurzweil, 2005: back cover). In the same book, Kurzweil talks about a new transhumanist religion, asking rhetorically if there would be a God in this new religion and continuing: "Not yet, but there will be. Once we saturate the matter and energy in the universe with intelligence, it will 'wake up', be conscious, and sublimely intelligent. That's about as close to God as I can imagine" (Kurzweil, 2005: 375). And an important pioneer of transhumanist thought, the biologist J. B. S. (John Burdon

Sanderson) Haldane, opined in the 1920s that "there is no theoretical limit to man's material progress but the subjection to complete conscious control of every atom and every quantum of radiation in the universe" and that "there is, perhaps, no limit at all to his intellectual and spiritual progress" (Haldane, 1937: 144). In recent decades, such grandiose transhumanism has become an *ersatzreligion* and a kind of worldview for significant parts of the 'digital upper class' and other segments of the technoscientific elite in the U. S. and elsewhere (cf. Asprem, 2013).

Another example of the current relevance of transhumanism is its influence on academic bioethics. This influence also stems, in part, from the funding provided by another IT billionaire, James Martin, though some leading bioethicists, particularly in the UK, had already expressed transhumanist points of view before transhumanism became fashionable in the digital upper class. Like the transhumanism of the famous and – some would say – infamous artificial intelligence pioneer Marvin Minsky and the roboticist Hans Moravec, the transhumanism of some of these ethicists, such as John Harris and Julian Savulescu, is deeply misanthropic, even malign. They couple their transhumanism with an aggressive ableism which fetishises certain cognitive faculties and conceives of disabled people in much the same way as the old eugenicists did with regard to the so-called 'feebleminded' (Heil and Coenen, 2013).

Moreover, a new generation of cyborgs, following in the footsteps of technoscientist Kevin Warwick and artists such as Stelarc, are currently self-experimenting with various kinds of technological implants (see, for example, Lanxon, 2012), thus attracting considerable mass media interest in various countries. Not all of them are transhumanists in the ideological sense, but even when they do not aim to change their bodies to improve performance, they are still performing a sort of practical transhumanism.

Last but by no means least, it can be pointed out that the transhumanist vision of the future, and particularly the vision of a future in which humans and machines have merged, is very widespread in pop music, computer games and other segments of popular culture, particularly due to the influence of science fiction, a genre whose emergence was predated and deeply influenced by early transhumanist essays and fiction written by Bernal, Wells and others. Furthermore, these essays and other writings also deeply influenced the authors of the classical dystopian novels of the twentieth century, such as Yewgeny Zamyatin, Aldous Huxley and George Orwell, as well as the still very popular Christian authors C. S. Lewis and J. R. R. Tolkien who all focused on what they perceived as the dark side or the sinful character of transhumanism's hopes for the future (Coenen, 2010a). Their imagination is still with us today and deeply shapes popular culture and even the academic discourse.

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## Unlikely Encounters of Research Policy with a
## Techno-Eschatological Ideology

The following is a reflection on how transhumanism represents a challenge for technology assessment (TA), taking as example the closely interrelated discourses on nanotechnology, 'converging technologies' and 'human enhancement'. Although it might convey the impression of being a bit self-centred, the focus will be on TA activities conducted by our own institute, the Institute for Technology and Systems Analysis (ITAS) at Karlsruhe Institute of Technology (KIT), and in particular on a project of the Office of Technology Assessment at the German Parliament (Büro für Technikfolgen-Abschätzung beim Deutschen Bundestag, TAB) which was commissioned by the Bundestag and carried out by us in the early 2000s (Paschen et al., 2004). One excuse for the choice of this example might be that our project is widely seen as a pioneering activity on nanotechnology in Germany in the context of which we also already raised attention to the influences of transhumanism on the nanotechnology and NBIC convergence discourses.

Elsewhere the context of the project, including the shaping of the emerging policy, scholarly and public discourse on nanotechnology among futurists and their far-reaching visions, has already been described and analysed in some detail (Grunwald, 2013; Simakova and Coenen, 2013). I will build on these accounts and analyses but focus on the role played by transhumanism.

The unlikely encounter of research policy with this techno-eschatological ideology did not only influence our TA activities concerning nanotechnology but also forced us to more generally re-think the role and approaches of TA with regard to ethically controversial fields of new or emerging technoscience.

In this context we realised (again) how important it is to avoid the reproduction of a dichotomist cliché about science and the public. This cliché goes as follows: on the one hand, we have a general public or a number of specific 'publics' that are prone to irrational thought, relying on unconsidered ideological assumptions when discussing and evaluating science and technology. On the other hand we have science, represented by scientists and scientific communities who use rational approaches in their analyses and discussions and are mostly uncompromised by ideological prejudices and individual or group beliefs.

Questioning the notion of the "value-free" nature of science is, of course, an age-old endeavour, and in recent decades there has been numerous criticism of science, having significantly shaped the entire field of science and technology studies (STS). TA can be defined either as a subfield of STS close to political decision-making and with a rather technocratic past, or as a field in its own right, characterised by policy orientation and a highly

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interdisciplinary scientific-scholarly community. In TA, criticism of hidden value-based assumptions within the science system in a narrow sense is also no new phenomenon; more often than not, it has traditionally been embedded, often only as a minor element, in analyses of the vested interests of social forces in science and technology developments. It is only in more recent times, specifically when the nanotechnology discourse gained impetus around the year 2000, that TA has started to look more closely at the statements made by scientists and science managers about the present role of science and technology and the visions of the future developed or promoted by these groups in terms of their ideological content. This has also included a more thorough examination of cultural aspects relevant in this context, such as the cultural specificities of networks that are pushing forward visionary discussions on new and emerging technoscience within, at the margins of, or from outside the science system in a narrow sense.

While discussions and other activities that took place with regard to NBIC convergence (Coenen, 2010b) and human enhancement (Mali et al., 2012) since the early 2000s are the most obvious cases of the influence of transhumanism in the research and technology policy sphere, the role of nano-futurism in the emergence of, and in the early political discussions about, nanotechnology remains the most important instance of transhumanism's political relevance.

Ideologically and in terms of the involved networks and milieus, nanofuturism can be deemed a close relative, or even a subset, of transhumanism. While this fact had been known for quite some time (Regis, 1990; for an important recent study, see McCray, 2012) and brought to the attention of a wider public in the year 2000 by Bill Joy's much-discussed essay *Why the future doesn't need us* (Joy, 2000) – which subsequently played a crucial role in policy, academic and public discussions on nanotechnology in the early 2000s – the specifically nanofuturist visions of the future dominated the discourse and the broader transhumanist context was often overlooked.

The key figure of nanofuturism is Eric Drexler, a U. S. engineer who played a crucial role in popularizing the term 'nanotechnology'. In the 1980s, with forerunners in the 1970s, Drexler and his collaborators popularised their views of nanotechnology, in particular in highly technophile circles such as enthusiasts of space colonization (see also Schummer, 2009). Drexler's visionary book *Engines of Creation: The Coming Era of Nanotechnology* was published in 1986 and subsequently Drexlerian nanofuturism dominated the public image of nanotechnology (for the following paragraphs, see also Coenen, 2010c; Simakova and Coenen, 2013).

In Drexler's vision of the future, virtually anything can be nanotechnologically made from common materials without labour and ecological harm (Drexler, 1986). Nanoscience will thereby transform technology

and economy at their roots, providing humanity with 'engines of creation' and 'abundance'. Inspired by his mentor Marvin Minsky, an artificial intelligence (AI) research pioneer and transhumanist visionary himself, Drexler combined these ideas with visions of a very "strong AI", portraying his envisioned engines of creation as thinking machines. Moreover, he forecasted that around the year 2040 a futurist nanomedicine will usher in an era of indefinite lifespan. On the other hand, Drexler emphasised that new risks would come along with nanotechnology. His horror visions culminated in scenarios of total destruction (such as the 'grey goo' scenario, a kind of profane apocalypse caused by self-replicating nanorobots running amok) on which, in turn, some of Joy's dire warnings in the above-mentioned essay (Joy, 2000) were based. Drexlerian visions and ideas significantly influenced the emerging mainstream academic and policy discourse on nanotechnology until the end of the 1990s. Afterwards, with forerunners in the mid-1990s and in particular due to the publication of Joy's essay, Drexler was expelled from the 'nano community' (for this and the following, see also, for example, Schummer, 2009; Simakova and Coenen, 2013).

At our institute ITAS, nanotechnology was first discussed in the 1990s when Torsten Fleischer, one of our colleagues, had found out about both, ongoing U.S. activities in preparation of the U.S. National Nanotechnology Initiative (NNI) and strategic activities within the German Ministry of Research which already included some kind of a TA component. At this time the exorcism of Drexler and the expulsion of his ideas from the mainstream discourse on nanotechnology had not yet begun.

The situation was different when TAB, our office in Berlin at the German parliament, started its TA project on nanotechnology in the year 2001. The U. S. NNI had been established, Joy's essay had been published, and discussions about nanotechnology and Drexlerian nanofuturism had started in influential German media. We therefore had to find a way of dealing with the Drexlerian visions, in the midst of almost frantic 'boundary work' activities of the nanotechnology research and policy communities (for the concept of 'boundary work', see Gieryn, 1983). In 2002 we took notice of the NBIC initiative which, paradoxically at a first glance – since at the same time key persons of the initiative condemned Drexlerianism –, promoted transhumanist ideas and, in particular due to Bainbridge's influence, even directly the transhumanist movement.

TAB's director at that time, Herbert Paschen, decided that the report for the Bundestag would include a chapter dedicated to Drexlerian and transhumanist visions, in addition to a chapter on ethical and societal issues which to some extent also took into account the implications of transhumanist visions of the future. In all the other chapters, which dealt with the scientific and technological state of the art or with major potential applications

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areas, Drexlerian visions should play no role at all. By "isolating" nanofuturism in a separate section we thus performed a kind of 'boundary work' already in the design of our report, but at the same time gave quite a lot of room to Drexlerian and other transhumanist visions. When doing research on this visionary discourse, including the activities and the ideas propelled by the NBIC initiative, we realised that it played an important and to some extent new role in the governance of science and technology, also coming along with new challenges for TA. We realised, for example, the relevance of cultural aspects for assessing the NBIC initiative and nanofuturism. Since the project on nanotechnology, such cultural, including historical, aspects have played a relevant role in our research on new and emerging fields of research and development. In the TAB project and afterwards we would not only be concerned about potential irrational fears among the population or about Drexler's influence but would also take a close look at the visionary claims made by respected members of the academic community, such as scientists and research policy actors. In particular, we asked to what degree and in what sense the emerging mainstream discourse on nanotechnology was influenced by rather fantastic visions of the future. We used an approach developed in TA shortly before – in particular by Armin Grunwald, the new ITAS director – which is called 'vision assessment'. The further development of this approach was strongly influenced by the work on nanotechnology (see, for example, Grunwald, 2012). It was a great help and inspiration for us that philosophers and sociologists of science and technology, in Germany and elsewhere, had the same or similar goals (see, for example, Nordmann, 2007; Saage, 2011), and a rich cooperation followed from this. As regards the analysis and assessment of visions, our report (Paschen et al., 2004) argued that far-reaching, futuristic (aka transhumanist) visions of converging NBIC technologies fuel hopes for extensive changes to the human condition, and that futurism paints a picture of a future in which ancient human dreams (such as overcoming poverty, scarcity or even death) come true. We recommended that skepticism about the futurism of Drexler, Joy and others should not make one lose sight of the fact that very far-reaching optimistic visions had also been developed by the NBIC initiative and other, more "respectable" players. Still today the nanotechnology study is one of the "poster boys" of our office in Berlin. As regards the future prospects and rhetoric, all political parties in the Bundestag tended to be more enthusiastic about nanotechnology than the TAB study was, but they, as well as other political institutions, often also warned against nanofuturism in the same vein as we had done. We were pleasantly surprised in the months and years following the publication of our report that several renowned scientists sent us emails or even publicly commented that they found the study's discussion of futuristic visions very useful. The study on

nanotechnology and the discourse around it revealed to us a new dynamics of emerging technoscience, and in the process of dealing with nanotechnology and NBIC convergence, TA partly had to re-invent itself, as regards its role and its approaches.

As applied ethics is arguably the philosophical subfield most relevant for TA, or at least for TA in a policy advice context, the challenge transhumanism represents with regard to the role of applied ethics in TA is a well-suited case to exemplify the re-orientation of TA in the course of its dealing with the nano-convergence discourse. The latter played an important role in a process that has been termed the 'ethicisation' of TA and of the more general discourse on new and emerging science and technology (Bogner, 2010). In his reflection on the notion of 'nanoethics', which is often understood as a new subfield of applied ethics, Armin Grunwald has argued that most ethical issues discussed under the rubric of 'nanoethics' belong to established subfields of applied ethics but that there is one field that "is not properly covered by the existing subdisciplines of applied ethics" (Grunwald, 2012: 341), namely 'human enhancement'. Grunwald writes: "Medical ethics in the traditional sense is hardly responsible for the field because the objective of this enhancement is not healing. The ethics of technology only takes these issues into consideration to a small extent. Bioethics simply disregards the social aspects of technically enhanced humans. For these reasons, it is possible to follow the reasoning of those who now occasionally call for enhancement ethics becoming a field of its own. This field could feed on issues from anthropology, philosophy of technology, and the philosophy of the neurosciences [...]" (ibid.). In light of tendencies towards an 'enhancement society' ('Leistungssteigerungsgesellschaft'; Coenen, 2008) the debate about human enhancement may not only be "about ethical issues, which could be answered in the one or other direction, but also about the form of society in which we live and about its implications" (Grunwald, 2012: 301). As has been argued elsewhere (Ferrari et al., 2012), there are, properly speaking, no specific human enhancement technologies, since potentially any technology which can be useful for this goal and this vision is automatically a human enhancement technology. Human enhancement can be deemed, above all, "one specific perspective on developments in science, technology, medicine and society", and "does not constitute a real science and technology field" (Coenen, 2013a: 62). The discourse on human enhancement is thus less about a discrete set of closely interrelated technologies but about a vision concerning future societies, and this vision was largely shaped by transhumanism.

An important lesson I personally learnt from the these unlikely encounters of research and technology policies with a techno-eschatological ideology was that current discourses on new and emerging technoscience

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influenced by transhumanism suffer from an ideological imbalance (cf. Coenen, 2009): at one end of the spectrum of opinions, the one marked by radical criticism of technology and progress, a barrier is erected against unscientific beliefs and fundamentalist currents of thought. At the other end of the spectrum, however, the one strongly influenced by transhumanism, the boundaries separating these visions from salvation ideologies and mythical thought are permeable. In my view, visionary marketing contributes to the decomposition of scientific rationality under a technoscientific regime prone to irrational communication and dealing in supposed technological fixes for eschatological fears.

## Transhumanism as a Challenge for the Humanities

Transhumanism also represents discrete challenges for the humanities and in the following, closing paragraphs some of them will be briefly sketched, focusing on the transhumanist views of human corporeality, the future of the species, and the similarities and differences of this ideology to religious traditions of thought.

The renaissance of the transhumanist ideology since the late twentieth century – which was often seen as its original emergence because the tradition of transhumanist ideas, developed by Reade, Wells, Haldane, Bernal, Julian Huxley and others, had largely been forgotten – came as a surprise to many in our 'postmodern' times. Emphatically humanist at its core, transhumanism has always, almost religiously, aspired to dissolve the humanist individual, even long before the latter's theoretical decentering became widespread in academia. Deeply dualistic, its vision is that the mind-body dualism will be superseded by technological means in a trans/posthuman future. Glorifying the mind, it opens up the prospect of the complete malleability of the human body and mind as well as a conquest of the universe by newly embodied human intelligence. Iridescent between the heroic and the ridiculous, transhumanism aims to practically solve persistent problems of the Western history of ideas, while at the same time continuing to be deeply indebted to the frame of mind created by these very problems.

The transhumanist tradition of ideas has been shaped and maintained for a long time largely by "subterranean", extra-academic influences, but it displays numerous interconnections with major traditions of thought about science, technology, society, and the human condition. The very limited set of transhumanist visions of the future strongly shapes our techno-scientific imaginations, to an extent that has made some people argue that we urgently need to develop alternative, techno-utopian and social-utopian visions of the future.

Transhumanism closely links hopes for a satisfaction of utopian desires on Earth with far-reaching schemes of space colonisation, individual

immortality and other techno-eschatological visions. It develops a sort of cyborg and astronaut techno-anthropology. Human biology, except human brain activity, is seen as an obstacle to the human destiny, the cosmic mission of the species. As Julian Huxley had written: "Man is that part of reality in which and through which the cosmic process has become conscious and has begun to comprehend itself. His supreme task is to increase that conscious comprehension and to apply it as fully as possible to guide the course of events" (Huxley, 1959: 236). From Bernal to Kurzweil, transhumanists have tried to imagine how this cosmic process could be realised by means of science and technology.

Some of the most potent cultural reservoirs for criticisms of technoscientific enthusiasm, such as the dystopian tradition and Christian conservatism, often depend heavily on the transhumanist imagination. The visions developed by transhumanist thinkers also constitute an important element of popular socio-technical imaginations, mainly due to their lasting influence on science fiction. Furthermore, it appears that modern technoscience itself has been deeply influenced by core ideas of these ideologies. Today they can profit from irrational tendencies and the propensity to hype within the current regime of technoscience. Transhumanist ideology can also serve as a polemic tool in the conflicts of some technoscientists with their religious or ecologist critics.

Transhumanism offers a specific answer to a structural problem of modernity, namely the overstraining of modern progressive rationality by eschatological hopes as it was analysed by Hans Blumenberg. He argued that the idea of progress developed independently of eschatology (as a consequence of several steps of progress in various fields of human endeavour, particularly technology and science) and was only later "drawn into the function of consciousness that had been performed by the framework of the salvation story" (Blumenberg, 1983: 49). In Blumenberg's view, however, the 'authentic rationality' of the modern idea of progress was 'overextended' in this process. As "an assertion about the totality of history, including the future", the idea of progress was "removed from its empirical foundation" (Blumenberg, 1983: 66). The "idea of progress is driven to a level of generality that overextends its original, regionally circumscribed and objectively limited range as an assertion" (Blumenberg, 1983: 49). Transhumanist visions are only one element of a set of highly futurist visions concerning science, technology and the future of the species, providing answers to eschatological questions. The notion of an overstraining of modern progressive rationality involves analysing transhumanism to the point where a genuinely modern stance towards science, society and the future becomes one that is techno-eschatological and quasi-religious. Relying on Blumenberg's account also allows one to take seriously the self-perception

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and claims of the numerous atheist or explicitly irreligious transhumanists, and not to foreclose the analysis by starting with the premise that modern thought in general is merely derivative and often quasi-religious. Transhumanism is a techno-eschatological movement and ideology but a genuinely modern one, in a specific sense, to be explained below.

With the new rise of transhumanism we have witnessed the re-surfacing of a technocratic ideology which has no reservations when it comes to painting out grandiose and somewhat frightening images of science futures. On the other hand, we are confronted with a kind of historical short-sightedness in the debate on these visions which, with a few exceptions, also characterises the discourse on such visions in culture and media studies and related fields of research. In the debate on new developments in science and technology in the early and mid-2000s, it was mainly U.S. conservatives who sensed that much of the present confrontation between techno-visionaries and conservatives could be traced back to the 1920s and 1930s. This has changed in recent years (see, for example, Coenen, 2013b and 2014; Heil, 2010; McCray 2012; Saage, 2011; Tirosh-Samuelson, 2012).

Elsewhere I have argued that the attempt to establish a new form of the sublime by evoking a grandiose yet somewhat frightening future of humanity, science and technology (Coenen, 2014) may be deemed a crucial feature of transhumanism. This specific techno-scientific sublime, whose blend of awe and lust, anxiety and feelings of superiority is characteristically sublime, can be understood as an extension of the sublime of life, as developed by such authors as Erasmus Darwin and Percy Bysshe Shelley. It builds on and modernises the technological sublime which can already be found in Edmund Burke, a fact which is probably so often forgotten because the natural sublime became so popular in the course of the nineteenth century. Eventually, and above all in Bernal, visions of a merger of humanity with its machines became the main element of the transhumanist techno-scientific sublime. It is evoked in narratives which portray human destiny as a cosmic struggle in which the self-cyborgising species marches like an army into a heroic collective future. At the same time, in these visions healing is superseded by the gradual replacement of body parts and finally of human corporeality in its entirety. And the sublime of life that had been evoked by Erasmus Darwin, Shelley and others is narrowed in transhumanism, and already in Wells, to the sublime of the human mind which is to be preserved for eternity by means of its emancipation from human corporeality.

It must be emphasized that transhumanism is not an ideology alien to Western modernity (nor, for that matter, an offspring of U. S. optimism concerning science and technology). The transhumanist visions are seen as having some plausibility precisely because the views on science, technology, human corporeality and nature expressed by them are radicalised

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versions of ideas and beliefs which have strongly shaped Western intellectual history. While transhumanism departs from the mainstream of the modern history of ideas by turning progressive into techno-eschatological thinking, it is nevertheless modern in the sense that it aims to realise its goals in this world by help of practical, technological means. Transhumanism's extreme notion of human self-assertion merely radicalises similar notions which are parts of the Western ideological mainstream.

There is a structural similarity between transhumanist and some religious ideas, and its characterisation as a quasi-religious, techno-eschatological worldview is therefore justifiable. As Asprem (2013) has argued, transhumanism shares some key conceptual elements with esotericism, displaying a structural similarity and historical and actual proximity with scientistically minded forms of esotericism such as the 'New Age movement'. All this should, however, not let us overlook the differences between transhumanism and religion. It can be deemed a major *ersatzreligion* of a civilisation whose process of enlightenment has stopped halfway through.

With regard to Kurzweil's prognoses, the notion of a 'Singularity', and phenomena such as the *2045 Initiative*, transhumanism has been characterized as a millennialist or messianist movement. While elements of millennialism and messianism are in fact evident in it, the religious tradition of thought that structurally most strongly resembles transhumanism is Gnosticism. Another discrete challenge for the humanities is thus the reappearance of images such as the body and the world being prisons (or, as in Bernal, the Earth as a human zoo) in the discourse on emerging technoscience – images which are evoked in order to justify grandiose future visions of an extraterrestrial civilization. Here the transhumanists play with the triangle of world, humanity, and God, often in a decidedly anti-Christian way. It is thus no wonder that Christian and other religious authors have been much committed with transhumanism and radical visions of human enhancement, often at a very early stage (see Coenen, 2013a).

Above, it was already pointed out that in some sense the transhumanists are the Gnostics of our times. Why in some sense? We should refrain from seeing transhumanism merely as new Gnosticism and, even more so, from then using it as a bogeyman, as some Catholics have done. Again, we find a structural similarity but also a decidedly modern mindset in transhumanism. It clearly differs from Gnosticism by orienting its aspirations towards this world, by being practical and technological. On the other hand, one important similarity to Gnosticsm is in fact a feature of the technoscientific mindset in general, as shown, for example, by discussions about synthetic biology in which nature appears to be deficient and the world, including the human nature, is seen to be in need of fundamental improvement. As Jean-Pierre Dupuy (2011) wrote, it is the aim of transhumanism, as a distinctively

metaphysical technoscience research programme, "to place mankind in the position of being the divine maker of the world, the demiurge, while at the same time condemning human beings to see themselves as out of date" (Dupuy, 2011). The contingency of the genesis of the world is seen as unacceptable in both Gnosticism and transhumanism. In *A Vindication of Basilides the False*, Borges wrote about the Gnostic concept of the world being the product of a very minor demiurgic entity with malign intentions: "Admirable idea: the world imagined as a process essentially futile, like a sideways, lost glance of old celestial episodes. Creation as a chance act" (Borges, 2000: 66). Transhumanists think that we will have the chance, and ought to take it, to create everything, including us, anew, and that this time creation will take place in a purposeful and benign manner.

BIBLIOGRAPHY

Asprem, Egil (2013): The Magus of Silicon Valley: Ray Kurzweil's Transhumanism as Contemporary Esotericism. Paper given at ESSWE4, University of Gothenburg, Sweden, June 29, 2013. Ms. Available on: http://www.academia.edu/ 3853968/The_Magus_of_Silicon_Valley_Ray_Kurzweils_Transhumanism_as_ Contemporary_Esotericism. date of access 06.02.2014

Bainbridge, William Sims (2004): Progress toward Cyberimmortality. In: Immortality Institute (ed.): The Scientific Conquest of Death, 107–122. Buenos Aires: Libros en Red.

Bernal, John Desmond (1929): The World, the Flesh and the Devil. An Enquiry into the Future of the Three Enemies of the Rational Soul. London: Kegan Paul, Trench, Trubner and Company.

Blumenberg, Hans (1983): The Legitimacy of the Modern Age. Cambridge, MA: MIT Press.

Bogner, Alexander (2010): Let's Disagree! Talking Ethics in Technology Controversies. Science, Technology & Innovation Studies 6(2): 183–201. Available on: http://www.sti-studies.de/ojs/index.php/sti/article/view/39. date of access 18.07.2014

Borges, Jorge Luis (2000): A Defense of Basilides the False. In: Selected Non-Fictions (ed. by Eliot Weinberger), 65–68. New York: Penguin Books.

Brumlik, Micha (2001): Aufbruch ins Haus der Hörigkeit. In: Die Gazette, 07.12.2001, n. pag. Available on: http://www.gazette.de/Archiv/Gazette-Dezember2001/ Brumlik.html. date of access 01.06.2014

Cadwalladr, Carole (2014): Are the robots about to rise? Google's new director of engineering thinks so... The Observer (22 February 2014). Available on: http:// www.theguardian.com/technology/2014/feb/22/robots-google-ray-kurzweil-terminator-singularity-artificial-intelligence. date of access 26.03.2014

Coenen, Christopher (2008): Schöne neue Leistungssteigerungsgesellschaft? TAB-Brief 33: 21–27. Available on: http://www.itas.kit.edu/downloads/tab-brief/ tb033_coen08a.pdf. date of access 18.07.2014

Coenen, Christopher (2009): Zauberwort Konvergenz. Technikfolgenabschätzung

– Theorie und Praxis 18(2): 44–50. Available on: http://www.tatup-journal.de/tatup092_coen09a.php. date of access 18.07.2014

Coenen, Christopher (2010a): Zum mythischen Kontext der Debatte über Human Enhancement. In: Christopher Coenen, Stefan Gammel, Reinhard Heil and Andreas Woyke (eds.): Die Debatte über "Human Enhancement". Historische, philosophische und ethische Aspekte der technologischen Verbesserung des Menschen, 63–90. Bielefeld: transcript (Science Studies).

Coenen, Christopher (2010b): Deliberating visions: The case of human enhancement in the discourse on nanotechnology and convergence. In: Mario Kaiser, Monika Kurath, Sabine Maasen and Christoph Rehmann–Sutter (eds.): Governing future technologies. Nanotechnology and the rise of an assessment regime, 73–87. Dordrecht, Heidelberg, London, New York: Springer (Sociology of the Sciences Yearbook 27).

Coenen, Christopher (2010c): Immagini di società potenziate dalla nanotecnologia. In Simone Arnaldi and Andrea Lorenzet (eds.): Innovazione in corso. Il dibattito sulle nanotecnologie fra diritto, etica e società, 225–258. Bologna: Il Mulino.

Coenen, Christopher (2013a): Human enhancement. In Richard Fischer and Theo Boer (eds.): Human enhancement: Scientific, ethical and theological aspects from a European perspective, 57–79. Strasbourg: Church and Society Commission of the Conference of European Churches. Available on: http://www.ceceurope.org/fileadmin/filer/csc/Ethics_Biotechnology/Human_Enhancement/CEC-Bookonline.pdf. date of access: 18.07.2014

Coenen, Christopher (2013b): Nachdarwinsche Visionen einer technischen Transformation der Menschheit. In: Udo Ebert, Ortrun Riha and Lutz Zerling (eds.): Der Mensch der Zukunft. Hintergründe, Ziele und Probleme des Human Enhancement, 9–36. Stuttgart, Leipzig: Hirzel (Abhandlungen Saxonian Academy of Sciences and Humanities in Leipzig 82/3).

Coenen, Christopher (2014): Transhumanism and its Genesis: The Shaping of Human Enhancement Discourse by Visions of the Future. Humana Mente 26: 35–58. Available on http://www.humanamente.eu/PDF/Issue26_Paper_Coenen.pdf. date of access 18.06.2014

Coenen, Christopher, Mirjam Schuijff, Martijntje Smits, Pim Klaassen, Leonhard Hennen, Michael Rader, Gregor Wolbring (2009): Human enhancement (IP/A/STOA/FWC/2005-28/SC32 & 39). Brussels: European Parliament. Available on: http://www.itas.kit.edu/pub/v/2009/coua09a.pdf. date of access 20.01.2014

Dupuy, Jean-Pierre (2011): Cybernetics Is An Antihumanism: Advanced Technologies and the Rebellion Against the Human Condition. Available on: http://www.metanexus.net/essay/h-cybernetics-antihumanism-advanced-technologies-and-rebellion-against-human-condition. date of access 04.04.2014

Drexler, K. Eric (1986): Engines of Creation. The Coming Era of Nanotechnology. New York: Anchor Books.

Ferrari, Arianna, Christopher Coenen and Armin Grunwald (2012): Visions and ethics in current discourse on human enhancement. NanoEthics 6(3): 215–229.

Gieryn, Thomas F. (1983): Boundary-work and the demarcation of science from

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non-science: strains and interests in professional ideologies of scientists. American Sociological Review 48(6): 781–795.

Grunwald, Armin (2012): Responsible Nanotechnology. Philosophy and Ethics. Singapore: Pan Stanford Publishing.

Grunwald, Armin (2013): Techno-visionary sciences: Challenges to policy advice. Science, Technology and Innovation Studies 9(2): 21–38. Available on: http://www.sti-studies.de/ojs/index.php/sti/article/view/127/117 date of access 27. 5. 2014

Haldane, John Burdin Sanderson (1937; orig. 1932): The Inequality of Man. Harmondsworth: Pelican Books.

Heil, Reinhard (2010): Human Enhancement. Eine Motivsuche bei J. D. Bernal, J. B. S. Haldane und J. Huxley. In Christopher Coenen, Stefan Gammel, Reinhard Heil and Anderas Woyke (eds.): Die Debatte über "Human Enhancement". Historische, philosophische und ethische Aspekte der technologischen Verbesserung des Menschen, 41–62. Bielefeld: transcript (Science Studies).

Heil, Reinhard and Christopher Coenen (2013): Zukünfte menschlicher Natur: Biovisionäre Diskurse von der Eugenik bis zum Human Enhancement. Technikfolgenabschätzung – Theorie und Praxis 22(1): 23–31. Available on: http://www.tatup-journal.de/tatup131_heco13a.php. date of access 7. 6. 2014

Huxley, Julian (1959): Religion without Revelation. London: Max Parrish.

Joy, Bill (2000): Why the future doesn't need us. Wired, 8.04 (April). Available om: http://www.wired.com/wired/archive/8.04/joy.html. date of access 26. 2. 2014

Khosla, Vinod (2014): Fireside chat with Google co-founders, Larry Page and Sergey Brin. Available on: http://www.khoslaventures.com/fireside-chat-with-google-co-founders-larry-page-and-sergey-brin. date of access 7. 7. 2014

Kurzweil, Ray (2005): The Singularity is Near. New York: Viking Penguin.

Lanxon, Nate (2012): Practical transhumanism: five living cyborgs. Wired (4 September 2012). Available on: http://www.wired.co.uk/news/archive/2012-09/04/cyborgs. date of access 12. 3. 2014

Levy, Steven (2011): In The Plex: How Google Thinks, Works, and Shapes Our Lives. New York: Simon & Schuster.

Mali, Franc, Toni Pustovrh, Blanka Groboljsek and Christopher Coenen (2012): National ethics advisory bodies in the emerging landscape of responsible research and innovation. Nanoethics 6(3), 167–184.

McCracken, Harry and Lev Grossman (2013): Can Google Solve Death? Time (Europe, Middle East and Africa) 182(14) (30 September 2013), cover.

McCray, W. Patrick (2012): The Visioneers: How a Group of Elite Scientists Pursued Space Colonies, Nanotechnologies, and a Limitless Future. Princeton, Oxford: Princeton University Press.

Nordmann, Alfred (2007): If and Then: A Critique of Speculative NanoEthics. NanoEthics 1(1): 31–46.

Paschen, Herbert, Christopher Coenen, Torsten Fleischer, Reinhard Grünwald, Dagmar Oertel, Christoph Revermann (2004): Nanotechnologie. Forschung, Entwicklung, Anwendung, Berlin, Heidelberg: Springer.

Reade, W. Winwood (1910): The Martyrdom of Man. London: Kegan Paul, Trench, Trübner & Co.

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Regis, Ed (1990): Great Mambo Chicken and the Transhuman Condition: Science Slightly Over the Edge. Reading/MA: Addison-Wesley.

Roco, Mihail C. and William Sims Bainbridge (2002: Converging Technologies for Improving Human Performance. Available on: http://www.wtec.org/ConvergingTechnologies/Report/NBIC_report.pdf. Date of access 24. 3. 2014

Saage, Richard (2011): Philosophische Anthropologie und der technisch aufgerüstete Mensch. Annäherungen an Strukturprobleme des biologischen Zeitalters. Bochum: Winkler.

Schneider, Susan (2009): Future minds: transhumanism, cognitive enhancement, and the nature of persons. In Vardit Ravitsky, Autumn Fiester and Arthur L. Caplan (eds.), The Penn Center Guide to Bioethics, 95–100. New York: Springer.

Schummer, Joachim (2009): Nanotechnologie: Spiele mit Grenzen. Frankfurt: edition unseld (Suhrkamp).

Shanks, Pete (2013): Google vs. Death? Really? Huffington Post (10 October 2013). Available on: http://www.huffingtonpost.com/pete-shanks/google-vs-death-really_b_4020540.html. date of access 16. 3. 2014

Simakova, Elena and Christopher Coenen (2013): Visions, hype, and expectations: a place for responsibility. In Richard Owen, Maggy Heintz and John Bessant (eds.): Responsible innovation: Managing the responsible emergence of science and innovation in society, 241–266. Chichester: John Wiley.

Tirosh-Samuelson, Hava (2012): Science and the Betterment of Humanity. Three British Prophets of Transhumanism. In Hava Tirosh-Samuelson, Kenneth L. Mossman (eds.): Building Better Humans? Refocusing the Debate on Transhumanism, 55–82. Frankfurt am Main: Peter Lang.

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