

Future Bodies. A Brief Overview

Heiko Stoff & Henriette Gunkel

If you ask ChatGPT in summer 2024 about "future bodies", it will tell you that it is a concept that explores the potential evolution, enhancement, and transformation of the human body through technology, science, and cultural shifts. Future bodies are always simultaneously the product of scientific and technological possibilities and fictional imaginings or speculations. Science and practices of 'fictioning' are encountered in an inter- and transdiscursive exchange.¹ Speculation continues to precede realization, and science fiction narratives and artistic practices find their way into research, just as (bio)technological innovations are incorporated into art, film, literature, and games.² Since the late 19th century, future bodies have been understood in transatlantic societies as visions of physical ideals that can be planned and shaped, as well as predictions of horror, which must be prevented. Both ideas of the future are tied to the present and are products of contemporary discourses, problematizations and power relations. In this way, the imagined future makes an intervention into the present, the 'real', in order to offer alternative models of being in the world in the here and now and, by doing so, shape the futures to come.³

- 1 Gunkel, Hameed and O'Sullivan in their edited volume *Futures and Fictions* argue that fiction is an important category beyond film and literature, especially in relation to the possibility of a different political imaginary, which is reflected in the term fictioning (2017:1).
- 2 This has been discussed intensively, especially around the year 2000. Among others: Angerer, Marie-Luise; Peters, Kathrin; Souflis, Zoe (2002; Eds.): *Future Bodies: Zur Visualisierung von Körpern in Science und Fiction*. Berlin: Springer. See also Hayles, N. K. (1999): *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago, IL: University of Chicago Press.
- 3 Niklas Luhmann coined the term of an imagined "present future" in contrast to unimaginable "future present". Luhmann, Niklas (1976): "The Future Cannot Begin: Temporal Structures in Modern Society". In: *Social Research* 43/1. 130–152. See amongst others Roßmann, Maximilian (2021): "Vision as make-believe: how narratives and models represent sociotechnical futures". In: *Journal of responsible innovation*, 8/1. 70-93.

What it means to be human

The question of what it means to be human is always at the centre of the debate around future bodies. In European historiography this query was intrinsically linked to ideas of development and progress in humanism and the Enlightenment, particularly in the work of Immanuel Kant.⁴ However, it was precisely the technological and scientific perfection of mankind that was met with opposition even then. To this day, the basic tenets of this improvement of the human being are subject to criticism that was already formulated in the 18th century in the face of Julien Offray de La Mettrie's machine metaphors for the human body (*l'homme machine*): hubris, unnaturalness, alienation, anti-humanism.⁵

Just how controversial the issue of what it is to be human is, can be seen from George W. Bush's establishment of the US President's Council on Bioethics in 2001, which, under the leadership of the physician Leon Kass, was tasked to explore the ethical limits of biotechnological advances. In the paper *Beyond Therapy: Biotechnology and the Pursuit of Happiness*, published by the Council in 2003, four presumed objectives of biomedical projects were identified: "better children", "superior performance", "ageless bodies", and "happy souls". A distinction was made between surgical, cognitive, technological, and, finally, genetic enhancement.⁶ Such diverse biomedical procedures – human genetic selection, eugenics, reproductive medicine, synthetic biology, bio-enhancement, gene editing, transplants, pharmaceuticals – are closely related to, but usually distinct from, the substitution and intensification of bodily functions through technical devices. Technical enhancements such as exoskeletons, prostheses, wearable technology, implants, avatars, brain-computer interfaces or augmented reality – all of which have been discussed as the 'cyberization of the human body' or as 'technobodies' – have intensified debates about overcoming, replacing or even realizing the human. While these can be discussed simply as medical-therapeutic achievements, the concept of human enhancement is explicitly intended to transcend boundaries that are understood as 'natural'. Men such as Nick Bostrom, Raymond Kurzweil, David Pearce, Kevin Warwick or Elon Musk have been living out fantasies

4 See f.e. Rüsen, Jörn: "Was ist der Mensch? – Die Antwort des Humanismus". In: Christoph auf der Horst (2014; Ed.): Die Welt, in der wir leben. Düsseldorf: dup. 31-46.

5 Sharon, Tamar (2013): Human nature in an age of biotechnology: The case for mediated posthumanism. Dordrecht: Springer.

6 Kass, Leon (2003): Beyond therapy: biotechnology and the pursuit of happiness. Washington, D.C: The President's Council on Bioethics.

of immortality and superintelligence since the 1990s.⁷ The transhumanist project, which corresponds to the Californian dream of the dissolution of boundaries and technical control of human destiny – the ‘further’-ideology of the Californian counterculture movement – appears to be a liberal-anarchist, techno-capitalist, and, above all, androcentric pipe dream.⁸ While philosophical lines to both the Enlightenment and Friedrich Nietzsche are also suggested, the genealogy of such transhumanism usually refers back to British and US-American biologists and cyberneticists of the 1950s, who assembled at the Macy Conferences on Cybernetics and the CIBA Foundation Symposium “The Future of Man” in London in 1962.⁹ But far more complex transnational networks of philosophical ideas, technical and medical developments, political imaginaries and cultural designs could be listed that refer to the concept of a ‘New Man’ in general and to future bodies in particular. We can speak of an ABC of future bodies – androids, biofacts, chimeras, designer babies, etc. – which populate the imaginations not only of science fiction literature, but also of (bio)technology developers.¹⁰ It thereby made a certain difference whether the improvements in physical abilities were expected immediately, for example through cognitive improvements or technological enhancements, or were understood as processes projected into the future, for example through human genetic, but also socio-political, if not educational measures.

There seem to be four dominant positions associated with future bodies; these can be interpreted as 1. the result of a future technical and scientific medicine which can be used preventively and therapeutically, but also as an extension and performance enhancer, and must therefore also be discussed as 2. a fundamental ethical problem that affects basic social values and revolves around the central question of what it means to be human. In the transatlantic and East Asian debate, the focus is on 3. the transhumanist project of unlimited augmentation and enhancement of all

7 Sorgner, Stefan Lorenz (2020): On transhumanism. University Park, Pennsylvania: Penn State Press; Huberman, Jennifer (2020): Transhumanism: From ancestors to avatars. Cambridge: Cambridge University Press.

8 Barbrook, Richard; Cameron, Andy (1996): "The californian ideology". In: Science as culture, 6/1. 44-72.

9 Coenen, Christopher (2006): Der posthumanistische Technofuturismus in den Debatten über Nanotechnologie und converging technologies. Berlin: Akademische Verlagsgesellschaft; Pias, Claus: "Zeit der Kybernetik – eine Einstimmung". In: Pias, Claus (1946; Ed.): Cybernetics/Kybernetik. Die Macy-Konferenzen 1946-1953, Band 2: Essays und Dokumente. Zürich: Diaphanes. 9-41. On the importance of Friedrich Nietzsche for transhumanist thinking, see among many others Pearson, Keith Ansell (1997): Viroid life: Perspectives on Nietzsche and the transhuman condition. London: Routledge.

10 Stoff, Heiko: "Alraune, Biofakt, Cyborg. Ein körpergeschichtliches ABC des 20. und 21. Jahrhunderts". In: Simone Ehm; Silke Schicktanz (2006; Eds.): Körper als Maß?. Stuttgart: Hirzel. 35-50.

abilities, which in turn fits into neoliberal and libertarian ideas of a market and competitive society. In queer and postcolonial discourses, the options for new and diverse modes of subjectivation were ultimately emphasized. This meant 4. the post-humanist dissolution of the binary structured criteria of natural/artificial, mind/machine, male/female or human/nonhuman, was understood as a technological option to break away from androcentrism, racism, heteronormativity, and speciesism.

Although the terms are often used interchangeably, a distinction is made in the literature between transhumanism and critical posthumanism. The latter, which was initially also referred to as cyberfeminism, follows on from queer-feminist theories such as those formulated by Sadie Plant, Donna Haraway and Rosi Braidotti.¹¹ After a long period in which a fundamental and philosophically saturated critique of technology dominated feminism, the 1980s saw an increasing focus on the possibilities and opportunities of technological appropriation.¹² Haraway's proposition not to leave cyberization to patriarchal war research, but to use it to interfere and recode, and ultimately to abolish the binary and (hetero)normative order, was a wake-up call and established a new field of identities and interventions.

In her *Cyborg Manifesto*, Haraway explicitly referred to the repertoire of feminist science fiction literature, which had inventively spelled out options for hybrid and gender-diverse life forms, rather than to actual biotechnological research. Haraway was more concerned with narrative invention or 'alternative narratives' in relation to present and future bodily possibilities.¹³ The queer-feminist combination of science, technology, art and media should itself – as the artist Jill Scott put it in the 1990s –

11 Loh, Janina (2019): *Trans-und Posthumanismus*. Hamburg: Junius Verlag; Hayles, How We Became Posthuman.

12 Braidotti, Rosi (2013): *The posthuman*. Oxford: John Wiley & Sons; Plant, Sadie: "The virtual complexity of culture". In: Bird, John et al. (1996; Eds.): *Futurenatural*. New York: Routledge. 215-228; Åsberg, Cecilia; Rosi Braidotti: "Feminist posthumanities: An introduction". In: Åsberg, Cecilia; Braidotti, Rosi (2018; Eds.): *A feminist companion to the posthumanities*. Dordrecht: Springer. 1-22; Weber, Jutta (2001): "Ironie, Erotik und Techno-Politik: Cyberfeminismus als Virus in der neuen Weltunordnung? Eine Einführung". In: *Die Philosophin: Forum für feministische Theorie und Philosophie*, 12/24.

13 Haraway, Donna (1985): "Manifesto for cyborgs: Science, technology, and socialist feminism in the 1980s". In: *Socialist review*, 80. 65; Michael, Katina, et al.: "Cyborgs and human-machine communication configurations". In: Guzman, Andrea L.; Jones, Steven; McEwen, Rhonda (2023, Eds.): *The SAGE handbook of human-machine communication*. London: Sage Publications Ltd. 32; Guzman, Andrea L.; Jones, Steven; McEwen, Rhonda (2023, Eds.): *The SAGE handbook of human-machine communication*. London: Sage Publications Ltd.; Obourn, Megan (2013): "Octavia Butler's disabled futures". In: *Contemporary Literature*, 54/1. 109-138.

imagine future bodies.¹⁴ The enthusiasm that gripped not only the research community at this time, but also the cultural scene, is particularly evident in the two-volume edition of the German-language art magazine *Kunstforum* published by Florian Rötzer in 1996. This brought together almost everyone who had commented on the possibilities of biotechnological innovations in the life sciences, media studies and art. The title of the issue was indeed “Die Zukunft des Körpers” (“the future of the body”).¹⁵ An important question remains as to which similarities are involved, which qualities are mixed, which (reproductive) techniques are used and for what purpose, for example how the closeness of the human species to other animals is imagined, concretely understood or created. Pascal Eitler shows this in his contribution to this special issue.

Haraway, in an unusual correspondence with the sociologist of science Bruno Latour, emphasized the blending, the fluidity, the connections (also as overcoming the singular and the species), the hybrid, the chimera, the non-binary shifts, as expressed by the prefixes ‘trans’ or ‘inter’. While transhumanist male fantasies are primarily about ‘hyper-ability’, queer ideas also negotiated the possibilities of a future ‘dis-ability’ in an optimistic and self-empowering sense, an acknowledgement of body positivity, diversity, difference, lack and variability.¹⁶ In her contribution to this issue, Astrid Deuber-Mankowsky shows that it is as much about life (reproduction) as it is about death, not about their abolition, but about the in-between spaces of human existence. On the one hand, this could refer to the discursive processes that are inextricably linked to materiality, as in the area of New Materialism, but on the other hand, it could also mean the substantial shaping of the physical, its appropriation and transformation.¹⁷ Such positioning, which increasingly united forms of posthumanism, was in turn in conflict with approaches critical of technology and science, which feared a subjugation of the phenomenologically understood ‘*Leib*’ to technological abstractions, but also to neoliberal modes of flexible subjectivation.¹⁸

14 Sophia, Zoë (1992): “Virtual corporeality: A feminist view”. In: Australian Feminist Studies, 7/15. 11-24.

15 Kunstforum 132; 133 (1996).

16 Lundblad, Michael (2020): “Animality/posthumanism/disability: An introduction”. In: New Literary History, 51/4. v-xxi; Campagna, Diego; Sahinol, Melike (2022): “Enhancement Technologies and the Politics of Life”. In: Nanoethics, 16/1. 15-20.

17 Preciado, P. B. (2013): Testo junkie sex, drugs, and biopolitics in the pharmacopornographic era. New York: The Feminist Press at the City Univ. of New York.

18 Tripathi, Arun Kumar (2015): “Postphenomenological investigations of technological experience”. In: AI & SOCIETY, 30/2. 199-205; Vandenberghe, Frédéric (2004): “Posthumanism, or the cultural logic of global neo-capitalism”. In: Complexités du posthumanisme: Pour une critique de la bio-économiquepolitique, 24/25. 55-132.

This brief and perhaps somewhat crude overview is intended to provide a framework that connects the contributions collected in this special issue. When we, a media scholar and a historian, started to conceptualize an issue for *Body Politics* in 2020 that would bring together past and present ideas about future bodies, we also wanted to provide an interim summary of these positionings since the late 20th century. To this end, we planned a workshop that would explicitly combine historical, media and cultural studies approaches to bring 'present future' and 'future present' into conversation with each other.¹⁹ After issuing a call for proposals for such a workshop, attempts to gather in person repeatedly failed due to the necessary restrictions on physical contact imposed by the COVID-19 pandemic. In the end, we had no choice but to organise an online event in October 2021, which brought together German studies scholar Britta Herrmann, historian of science Barbara Orland, historian Pascal Eitler, media scholar Sasha Shestakova, political scientist Christopher Coenen, philosopher and media theorist Astrid Deuber-Mankowsky, media and cultural studies scholar Sarah Horn and sociologist Elina Oinas. The different specialist disciplines and research orientations represented by the participants were balanced in highly stimulating discussions. A selected overview of the contributions is presented in this special issue.

Who gets to make Future Bodies?

To think about future bodies, we first need concepts of imagined futures and of volatile corporeality, an idea of certain techniques of bodily transformation or even transgression. The future, as a singular, coherent concept, a product of secular temporalization and continuous time sequences, is necessarily predicted from present conditions, often extrapolated into an either utopian or dystopian future.²⁰ It can thus be planned, shaped, or prevented, but also foreseen, prophesied, and speculated on. In this respect, the future holds desirable and undesirable bodies – depending on different (bio)political aesthetic regimes – ready to either overcome current limitations, fulfil present demands, or develop into dangerous and unwanted consequences. At the same time, the imagined

19 Luhmann, Niklas (1976): "The future cannot begin: Temporal structures in modern society". In: *Social Research*, 43/1. 130-152.

20 Hölscher, Lucian (2016): *Die Entdeckung der Zukunft*. Göttingen: Wallstein Verlag; Adam, Barbara; Groves, Chris (2007): "Future matters: Action, knowledge, ethics." *Future Matters*. Leiden: Brill; Adam, Barbara (2010): "History of the future: Paradoxes and challenges". In: *Rethinking History*, 14/3. 361-378.

existence of future bodies has an impact on the present and shapes debates about human physical identity.

While future bodies may have emerged from the dreams of the Enlightenment, they are always tied to the material and productive conditions of societies. The fact that the scientific-technical concept of the body was from the outset based on mechanics and regulatory processes, made ideas and practices of physical transformation and development possible in the first place. Human physiologies were not mechanised by cybernetics in the middle of the 20th century; they had already been mechanised since the 18th century: the main model of future bodies is the automaton. As Georges Canguilhem has lucidly shown, the history of the concept of regulation in the 18th century combined the applied mechanics of machine control functions with a theological discourse on the preformed mechanism of the organism.²¹ At the heart of this was the dispute about Gottfried Wilhelm Leibniz's equilibrium, the pre-stabilised harmony established by God, the idea that the world was completely regulated from the beginning. Leibniz's point of reference were the impressive automata invented by Jacques de Vaucanson in the 1730s. These were not only human replicas of a preformed mechanism, but also proved that it was possible to regulate processes without the constant intervention of a regulator or governor.²² In his writing about the 'machine man' (*l'homme machine*) from 1748, Julien Offray de La Mettrie understood physical functions as mechanical processes that had to be technically treated accordingly. The dispute over the 'soullessness' of this 'machine man' united theological and science-critical discourses. The idea of the artificial human existed before the 19th century, but at that time it was not future-orientated, not dedicated to the idea of development and improvement.²³ It

21 Canguilhem, Georges: "La formation du concept de régulation biologique aux XVIIIe et XIXe siècles". In: Canguilhem, Georges (1977): *Idéologie et rationalité dans l'histoire des sciences de la vie*. Paris: Vrin. 81-99. See also Agiriano, Arantza Etxeberria: "Regulation, milieu, and norms: Georges Canguilhem's individual organisms as relations". In: Méthot, Pierre-Olivier (2020; Ed.): *Vital Norms: Canguilhem's The Normal and the Pathological in the Twenty-First Century*. Paris: Hermann. 295-332.

22 Canguilhem, Georges: "Die Herausbildung des Konzeptes der biologischen Regulation im 18. und 19. Jahrhundert". In: Canguilhem, Georges (1997): *Wissenschaftsgeschichte und Epistemologie. Gesammelte Aufsätze*. Frankfurt a. M.: Suhrkamp. 91f; Westermann, Bianca: "Vom Flötenspieler zum Hochleistungssprinter—Kulturelle Austauschprozesse zwischen Körper- und Maschinenphantasien". In: Leistert, Oliver; Bierwirth, Maik; Wieser, Renate (2010; Eds.): *Ungeplante Strukturen*. Leiden: Brill Fink. 111-131; Jones-Imhotep, Edward (2020): "The ghost factories: histories of automata and artificial life". In: *History and Technology*, 36/1. 3-29.

23 Campbell, Mary Baine (2010): "Artificial men: Alchemy, transubstantiation, and the homunculus". In: *Republics of Letters: A Journal for the Study of Knowledge, Politics, and the Arts*, 1/2. 4-15.

was only with the revolutionary practices of the late 18th century and the evolutionary concepts of the 19th century that the link between mechanics and organisms took on a futuristic dynamic.²⁴

Human improvement and bodily perfection were inextricably linked as aspects of development, education and the revolution itself, which was intended to have rejuvenating effects. A central slogan of the French Revolution was that “regenerated” man would not “degenerate”.²⁵ (R)Evolutionary thinking established the right to have a future body, that is, to live with(in) one’s body, to live one’s corporeal reality, or to live in a transformed body, a new body, which corresponds to the right to identity and health, happiness and perfection. In fantastic novels of the 19th century such as Edward Bulwer-Lytton’s *The Coming Race* (1871), the future was already populated by physically perfected human beings. This also affected the equalization of the strengths of men and women.²⁶ The revolutionary formation of new people in a new society then also guided the revolutionary projects of the 19th and 20th centuries. In the 1920s, Leo Trotsky proclaimed that this ‘new man’ – which in Soviet discourse was characterised as proletarian, but which was always also about the universalisation of perfected humanity – would have completely different physical features.²⁷ But the Enlightenment idea of progressive human development was in tension with the elaborately explained otherness of human beings and their variability – an experience of colonialism and outlined, for example, by Johann Friedrich Blumenbach – which was seen as threatening and gave rise to racism and the comparative and discriminating sciences of anthropology as well as ethnology.²⁸ The biological order of species and ‘races’ also had such a guiding and violent effect because its statics always seemed in danger of ‘degeneration’ and the dynamics of hybridity appeared so powerful. In 19th century evolutionism, the human being was the protagonist of a natural history that functioned according to the laws of nature, with a lineage and development linked by the mechanism of heredity, embodying both hope and anxiety, the potential for selective higher development and the all-too-frequent stated ‘contraselective degeneration’. In the discursive field of tension between genetic access and environmental improvement, various eugenic projects produced

24 Walsh, Denis M. (2015): *Organisms, agency, and evolution*. Cambridge: Cambridge University Press.

25 Ozouf, Mona (1989): *L'homme régénéré: essais sur la Révolution française*. Paris: Gallimard.

26 Bulwer-Lytton, E. (1871): *The coming race*. Edinburgh: William Blackwood & Sons.

27 Saage, Richard (2006): “Socio-political Utopianism and the Demands of the 21st Century” In: *Spaces of Utopia: An Electronic Journal*, 2. 150-164.

28 Rupke, Nicolaas, and Gerhard Lauer (2018; Eds.): *Johann Friedrich Blumenbach: race and natural history, 1750–1850*. New York: Routledge.

the utopia of a perfect future whose inhabitants would be a new human being. The eugenics programmes of the late 19th century combined purifying selection with the development or breeding of specific characteristics or qualities. In this field, racial cleansing was just as conceivable as the future happiness of a society freed from disease, hatred and villainess.²⁹

By linking the history of future bodies to a causal chain that combines biotechnology and enlightenment to form a developmental dynamic, those bodies are also excluded that are located outside this geographically well-defined space, namely the transatlantic realm, and that are also understood, even needed, as the Other of the perfecting development of human enhancement. The fact that the transatlantic body – cis-male, white, heteronormative – has been designed by comparison with the rejected female and racialized bodies, as well as with those who have eluded this binary order, is now very well researched.³⁰ But alternative narratives are also part of the modern project of disciplined and regulated human beings capable of development. In the transatlantic discourse itself, there was a tension between white supremacy and segregation and ideas of mixing, which were nevertheless difficult to separate from the idea of universalised whiteness. This included ‘assimilation’, the idea of the ‘good savage’ or even notions of ‘miscegenation’, as Thomas Jefferson, not only president of the United States of America but also a slave owner, put it to the Mohican scholar Hendrick Aupaumut in 1808: “(...) we shall all be Americans, you will mix with us by marriage, your blood will run in our veins, & will spread with us over this great island.”³¹ En passant, however, this also expressed what was to become a leitmotif of the 19th century: the new body to be created had to be a national one! New nations produced future bodies. This undoubtedly required adaptation to modern norms. The means to this end were not only institutional, linguistic and

29 Amongst many others Hasian, Marouf Arif (1996): *The rhetoric of eugenics in Anglo-American thought*. Athens: University of Georgia Press; Richards, Martin: "Future bodies: some history and future prospects for human genetic selection". In: Bainham, Andrew; Sclater, Shelley D.; Richards, Martin (2002; Eds.): *Body Lore and Laws*. Oxford-Portland: Hart Publishing. 289-307.

30 Vartija, Devin J. (2021): *The color of equality: race and common humanity in enlightenment thought*. Philadelphia: University of Pennsylvania Press; Farr, Arnold: "Whiteness visible: Enlightenment racism and the structure of racialized consciousness". In: Yancy, George (2004; Ed.): *What white looks like*. New York: Routledge. 159-174. This is also the reason why Paul Gilroy's "Black Atlantic" (1993) was such an important book.

31 Malcomson, Scott (2000): *One drop of blood: The American misadventure of race*. New York: Farrar, Straus and Giroux. 62.

cultural homogenization, but above all demographic policy.³² Three possibilities were postulated in this teleological development discourse: that everyone should become white, that everyone should remain different but be considered equal, and that everyone should remain different but be unequal. In terms of population policy, this meant either mixing or segregation. As the Jewish body did not seem to fit into this order, since it seemed to combine mixing and segregation, it had to be persecuted all the more mercilessly, unmasked and ultimately destroyed according to anti-Semitic logic, in particular in the German context.³³ An important post-humanist idea to move beyond this formative discourse of the 19th century is in this sense that a movement towards blackness must be inherent in the process of becoming human.³⁴

The ideal body, which in late 19th century Germany was shaped according to ancient models of beauty, was at the centre of new national creations. Medicine, public health, and physical culture worked on concepts to make this corporeality understandable, manageable and changeable. Central concepts were those of strengthening, cleansing, and purification.³⁵ These, in turn, were gained by comparison with those rejected or abjected bodies – the hybrid, the chimera – that were understood to be outside the national creation of the body. It is therefore of particular interest that the physiological experimental systems which, since the last third of the 19th century, have reorganised the notion of the corporeal as an inner milieu regulated and controlled by specific agents, were explicitly based on the experimental production of malformations or ‘monstrosities’, on experimental teratology.³⁶ Medicine and the life sciences appropriated the bodies and body parts of those vulnerable people who had fewer rights and who therefore appeared to be available for research. In Germany, the medical-ethical debate on informed consent began around 1900 with the experiments on underage females selling their bodies for

32 Tröhler, Daniel (2017): "Shaping the national body: Physical education and the transformation of German nationalism in the long nineteenth century". In: *Nordic Journal of Educational History*, 4/2. 31-45.

33 Gilman, Sander (1991): *The Jew's Body*. New York: Routledge.

34 Jackson, Zakiyyah Iman (2020): *Becoming human: Matter and meaning in an antiblack world*. New York: New York University Press.

35 Möhring, Maren (2004): *Marmorleiber. Körperbildung in der deutschen Nacktkultur (1890-1930)*. Köln: Böhlau Verlag.

36 Sharpe, Christina (2010): *Monstrous Intimacies: making post-slavery subjects*. Durham: Duke University Press; Malatino, Hilary (2019): *Queer Embodiment: Monstrosity, Medical Violence, and Intersex Experience*. Lincoln: University of Nebraska Press; Halberstam, Jack (1995): *Skin Shows: Gothic Horror and the Technology of Monsters*. Durham: Duke University Press.

sex carried out by the highly respected dermatologist Albert Neisser.³⁷ In the USA, the long life of Henrietta Lacks' cells (or HeLa cells) up until today is evidence of the (ongoing) dehumanization.³⁸

This body politics culminated in the lethal human experiments that combined objectification and the 'völkisch'-selective order, and in the industrial practice of extermination under National Socialism.³⁹ For the political movements of the 1950s and 60s – anti-colonial liberation movements as well as the women's and gay and lesbian movements – the exclusion of their bodies from future history could be experienced, felt, increasingly analysed and rewritten. In the second half of the 20th century, the right of the excluded to their past, present and future became a central political demand. This included to finally speak for oneself, discarding or subversively appropriating the names that had been created in the transatlantic discourse, and reinventing oneself. After all, this was a key aspect of Frantz Fanon's writings.⁴⁰ Afrofuturist imageries and narratives, in turn, amplify the experience of alienation and race as technology and reconceptualize the history of slavery in a futuristic scenario. The science fiction stories of black writers from Samuel R. Delany and Octavia Butler to Nnedi Okorafor (who prefers the term Africanfuturism) are all about bodily transformations and technological enhancement that elude the biotechnological master narratives. The theme of space travel, of being an alien or as Lee Scratch Perry puts it, a visitor on Earth, suggests that the terrestrial space for future bodies has already been occupied by the biopolitical discourse of transatlantic science and politics.⁴¹

37 Sabisch, Katja (2007): *Das Weib als Versuchsperson: Medizinische Menschenexperimente im 19. Jahrhundert am Beispiel der Syphilisforschung*. Bielefeld: transcript Verlag.

38 Mojisola Adebayo's play *Family Tree* (2023) turns to the history of Henrietta Lacks and brings it together with other, less attended medical narratives. See also Skloot, Rebecca (2010): *The Immortal Life of Henrietta Lacks*. New York: Crown Publishers.

39 Still an important analysis: Mosse, George L. (1964): *The crisis of German ideology: Intellectual origins of the 3 Reich*. New York: Grosset & Dunlap.

40 Agathangelou, Anna M. (2016): "Fanon on decolonization and revolution: Bodies and dialectics". In: *Globalizations*, 13/1. 110-128.

41 Henriette Gunkel and kara lynch (2019, Ed.): *We Travel the Space Ways. Black Imagination, Fragments, and Diffractions*. Bielefeld: transcript; Barber, Tiffany E., et al. (2015): *Afrofuturism 2.0: The rise of astro-blackness*. London: Lexington Books; Rollefson, J. Griffith (2008): "The 'Robot Voodoo Power' Thesis: Afrofuturism and Anti-Anti-Essentialism from Sun Ra to Kool Keith". In: *Black Music Research Journal*, 28/1. 83-109.

To Produce New Bodies

The futuristic production of human beings requires mechanics and dynamics, a scientific-technical concept of the body and the idea of development: biotechnology and (r)evolution. That bodies cannot only be described but also transformed or even created, that they are plastic, has been experimentally established since the last third of the 19th century. Claude Bernard's *Introduction à l'étude de la médecine expérimentale* of 1865 referred to the practical shaping of phenomena.⁴² The molecular biologist and historian of science François Jacob called it “une science active”, “où l'expérimentateur intervient directement, prélève un organe, le fait fonctionner, change les conditions, analyse les variables”.⁴³ At the end of the 19th century, it was the embryological formulation of ‘Entwicklungsmechanik’ (‘developmental mechanics’) under the influence of Ernst Haeckel that demanded the successful disassembly and reassembly of organic parts as an experimental technique in animal experiments. In this context, physiologists, zoologists and biologists established a pioneering link between biology and technology, between biological and mechanical systems. If the development of living organisms can be described as a mechanical process, then it must also be possible to establish what the physiologist Jacques Loeb called “Technik der lebenden Wesen”.⁴⁴ This ‘biotechnology’ established two fundamental principles: living organisms can be described as causal, mechanical processes, and they can be arbitrarily and purposefully altered by experimental intervention in these processes.⁴⁵ In short, physiology also became an art of engineering. The developmental physiology of the last third of the 19th century formulated a corresponding experimental programme, combining design and effect as an exact causal research method. The technically modelled body, the human machine, functions economically, and the economy, the regulated body of society, is based on medical concepts. Importantly, these are not mere discourses, but models with a strong application orientation. Since then, the animal body has not only been explained in terms of the

42 Claude Bernard (1865): *Introduction à l'étude de la médecine expérimentale*. Paris: Éditions Garnier.

43 Jacob François (1970): *La Logique du vivant. Une histoire de l'hérédité*. Paris: Editions Gallimard. 199; Latour, Bruno: “The Costly, Ghastly Kitchen”. In: Cunningham, Andrew; Williams, Perry (1992; Eds.): *The laboratory revolution in medicine*. Cambridge: Cambridge University Press. 299.

44 Pauly, Philip J. (1994): *Controlling life. Jacques Loeb and the engineering ideal in biology*. New York, Oxford: Oxford University Press.

45 Bud, Robert (1994): *The uses of life: a history of biotechnology*. Cambridge: Cambridge University Press; Fangerau, Heiner (2014): *Spinning the scientific web: Jacques Loeb (1859-1924) und sein Programm einer internationalen biomedizinischen Grundlagenforschung*. Berlin: Walter de Gruyter.

binary key concepts of deficiency and performance – without which for example hormone research would have been unthinkable – but have also been made specifically functional, adaptable and augmentable in corresponding experimental systems.⁴⁶

In experimental practice, it was the variations and deformities that first allowed conclusions to be drawn about the factors interpreted as ‘normal’. According to the anatomist and biologist Wilhelm Roux, this also made it possible to tackle the goal of developmental mechanics, namely “die Bildung der Lebewesen experimentell nach unserem Willen zu leiten.”⁴⁷ The physiologist Eugen Steinach conducted experiments at the Biological Experimental Station in Vienna, known as the Vivarium, in which he claimed to be able to produce effects of feminisation, masculinisation or hermaphroditisation in rodents by transplanting ovaries and testicles. As these were based on the hormonal effects of an internal secretion, Steinach had a decisive influence on endocrinological research into sex development. If the option of surgical or hormone-therapeutic normalisation of sex always existed, an experiment could also, as the sexual reformer Magnus Hirschfeld interpreted it, be proof of a sex-gender continuum that dissolved into sexual intermediate stages. Steinach, however, became world famous above all for his hormonal rejuvenation experiments, which fit into the new social order of youthfulness and flexibility.⁴⁸ The futuristic combination of technology, biology and chemistry in the process – held together by the concepts of development and regulation – was impressively demonstrated by the Czech writer Karel Čapek. The ‘robots’ he invented in his play *R.U.R.* as mechanical as they appeared, were based on a biochemical functional system of enzymes and hormones.⁴⁹ As Louis Chude-Sokei has pointed out, Čapek’s portrayal of the robot revolt “grew directly out of the 19th-century anxieties about slave reprisals, fears of colonial resistance, and 19th- and 20th century terror of labor insurrections”. Chude-Sokei argues that the primary way to understand robots is through the lens of race, gender, labor, and immigration,

46 Stoff, Heiko (2012): *Wirkstoffe. Eine Wissenschaftsgeschichte der Hormone, Vitamine und Enzyme*, 1920-1970. Stuttgart: Steiner.

47 To experimentally guide the formation of living beings according to our will. Wilhelm Roux (1918): „Ankündigung.“ In: *Archiv für Entwicklungsmechanik der Organismen*, 44/1. 1-4, here 1-2.

48 Stoff, Heiko (2004): *Ewige Jugend. Konzepte der Verjüngung vom späten 19. Jahrhundert bis ins Dritte Reich*. Köln/Weimar: Böhlau; Sengoopta, Chandak (2006): *The Most Secret Quintessence of Life: Sex, Glands, and Hormones, 1850-1950*. Chicago: University of Chicago Press; Walch, Sonja (2016): *Triebe, Reize und Signale: Eugen Steinachs Physiologie der Sexualhormone. Vom biologischen Konzept zum Pharmapräparat, 1894-1938*. Wien: Böhlau Verlag.

49 Čapek, Karel; Jitka Čejková (Ed.) (2024): *R.U.R. and the Vision of Artificial Life*. Cambridge: MIT Press.

emphasizing the connection between machines and slaves that has been also instrumental in Afrofuturism: “that very drive to manufacturing a future, one that depends on bodies and labor while promising escape from bodies and labor, ensnares technology in the problems of our past, and is why metaphors of race, sex and *reproduction* entangle us in the material problems of imagining and inventing a future”.⁵⁰ This can also be said of the concept of the Japanese robot, which has been developed since the 1920s and is based on ideas of nation, gender, family structures and labour.⁵¹

The early 20th century, when the plasticity of the body became a significant aspect of developmental physiology research, can therefore also be seen as the first main phase in the production of future bodies. Expectations of the future and moral panics created a field of tension that still exists today, especially in transatlantic societies. A key point of contention was whether bodies should be ‘artificial’ or ‘natural’. The programme of research on animals in the laboratory – the arbitrary modification and transformation of bodies and sexes – was in a certain opposition to the body techniques of proper nutrition, body culture and systematic exercise, which were at the same time described as ‘natural’. Biotechnological procedures – at the Vivarium, Walter Finkler attempted to transplant insect heads; in the Soviet Union, Sergei S. Bryukhonenko connected a severed dog's head to a kind of heart-lung machine in the 1920s – were among the major surgical and physiological promises of the 20th century, and yet they were associated not only with the transgression of ethical principles, but also with the presumption of being able to create life itself.⁵²

The arbitrary design of living beings, the experimental compulsion to create something new and to make it appear, which then takes on a life of its own, creates a possibility of the monstrous that combines science and horror, fact and fiction.⁵³ From the very beginning, the history of biotechnology has found a commentary in the genre of the horror story. The fact that the production of new bodies is associated with terror was, of course,

50 Chude-Sokei, Louis: “Race and Robotics”. In: Heffernan, T. (2019; Eds.): *Cyborg Futures. Social and Cultural Studies of Robots and AI*. New York: Palgrave Macmillan. 159-171; Chude-Sokei, Louis (2019): “Machines and the Ethics of Miscegenation”. In: *Glass Bead. Site 2. Dark Room: Somatic Reason And Synthetic Eros*.

51 Robertson, Jennifer (2018): *Robo sapiens japonicus: robots, gender, family, and the Japanese nation*. Oakland: University of California Press.

52 Kremontsov, Nikolai (2009): “Off with your heads: Isolated organs in early Soviet science and fiction”. In: *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences* 40/2. 87-100.

53 Stoff, Heiko: „I dub thee vampiris’. Zur kurzen Form der wissenschaftlichen Erklärung im Horrorfilm der 1950er Jahre“. In: Mayer, Ruth; Gamper, Michael (2017, Eds.): *Kurz & knapp: Erzählen und Wissen in kurzen Formen*. Bielefeld: transcript. 269-288.

formulated by no one more precisely than by Mary Shelley in her novel *Frankenstein or the Modern Prometheus* (1818). The book testifies to a long history of future bodies, combining scientific techniques, bodily practices, dreams and fiction(ing)s. Even though the Ingolstadt doctor's experiment failed because he did not want to take responsibility for his creation, this monster story nevertheless points to the practical possibilities of moving from the human to the post-human. But the narrative that future bodies are the product of 'mad scientists' was not so much Mary Shelley's Frankenstein motif; it was established mainly in the first half of the 20th century and then manifested in the horror films of the 1950s.⁵⁴ At the beginning of the 20th century, the experimental and substitutive approach to the living body was just as much a promise of improving the deficient human being as it was a source of disturbing speculations about the production of horror figures. In the 20th century, the experimental approach to life in general and to humans in particular is most often told in a utopian-dystopian interplay. Will there be new people in the future who are eternally young, if not immortal, who do not have to worry about diseases and who are endowed with hitherto unknown psycho-physical powers? Or will monstrosities be created as the horrific results of experiments gone wrong or malicious experiments, as desecrated, technically modified creatures alienated from humanity? This speculative and urgent discourse determines the demarcation between natural and artificial humans, which is itself a historical event.⁵⁵

The Present Futures of Bodies

The history of the biomedical and biotechnological creation of new bodies has been described and analysed in detail.⁵⁶ Since the second half of the 20th century, it could be summarised as follows: the future of bodies is far more than an experimental exception or a fictional promise, but a possibility of life in those infrastructures that guarantee a relatively long

54 Haynes, Roslynn D. (1994): *From Faust to Strangelove. Representations of the Scientist in Western Literature*. Baltimore; Maryland: Johns Hopkins University Press; Skal, David J. (1998): *Screams of Reason: Mad Science and Modern Culture*. New York: W.W. Norton & Company; Frayling, Christopher (2013): *Mad, Bad and Dangerous? The Scientist and the Cinema*. London: Reaktion books.

55 Hasselmann, Kristiane; Schmidt, Sandra; Zumbusch, Cornelia (2004; Eds.): *Utopische Körper. Visionen künftiger Körper in Geschichte, Kunst und Gesellschaft*. München: Fink; Riskin, Jessica (2003): "The defecating duck, or, the ambiguous origins of artificial life". In: *Critical inquiry* 29/4. 599-633.

56 See for an overview f.e. Clarke, Adele E. et al. (2003): "Biomedicalization: Technoscientific transformations of health, illness, and US biomedicine". In: *American sociological review*, 68/2. 161-194.

lifespan. Conversely, this means that some people and entire communities are not included in certain future scenarios or are envisaged to have no future at all.⁵⁷ This future is shaped by everything that is excluded. This can involve undesirable practices such as smoking, alcohol or sugar consumption, as well as undesirable characteristics such as loss of control and lack of drive. However, if the aim of shaping the future is not to overcome its own foundations, then it is to perpetuate current conditions in the interests of those who benefit most from them. The future can be produced and consumed depending on the respective social formation. It is oriented in a specific way through its mode of production in mostly transatlantic discourses and practices. This also means that this future can only be understood as an extended reflection of today's economic order and power relations. Kodwo Eshun calls this a "future industry that dreams of the prediction and control of tomorrow". Mark Fisher, on the other hand, spoke of "SF capital", sarcastically emphasising how it induces "auto-zombification in the master class". Future bodies will take the form of commodities, or they will not exist.⁵⁸

Since the late 19th century, utopian-dystopian conceptions of the evolutionary creation of future bodies through breeding and eugenics, but also through surgery and hormonal experimentation, have combined political fantasies, media narratives and experimental practices.⁵⁹ It required fictions of the factual, science fiction. Such dreams of human perfection were fuelled by fears of undesirable developments: a regression into the past as 'atavism', or a development in the wrong direction as 'degeneration'. This, in turn, was countered by the body culture and lifestyle reform movements that (re)introduced self-technologies of human perfection into transatlantic societies. While technologies of the self were part of the biopolitical project of the early 20th century in Europe, they were also linked to emerging consumer societies. Working on oneself, as well as hormone therapies and cosmetic surgery, promised the preservation of youthfulness and performance, in short, fitness, but always also referred to the possibility of transcending the limits of what it means to

57 Gunkel, Henriette (2019): "Alienation and Queer Discontent". In: Gunkel, Lynch (2019, Ed.): *We Travel the Space Ways. Black Imagination, Fragments, and Diffractions*. Bielefeld: transcript. 387-404.

58 Eshun, Kodwo (2003): "Further considerations on Afrofuturism". In: *The New Centennial Review*, 3/2. 287-302, here 291; Dubey, Madhu: "Afrofuturism and the Speculative Turn". In: Goyal, Yogita (2023; Ed.): *The Cambridge Companion to Contemporary African American Literature*. Cambridge: Cambridge University Press. 81-95.

59 Linett, Maren (2023): "Making Us New: From Eugenics to Transhumanism in Modernist Culture". In: *Modernism/modernity*, 30/1. 177-200.

be human.⁶⁰ Past and present ideas and practices of future bodies both explicated and challenged notions of race, class, sex/gender, as well as certain qualities of modernity such as self-control, rationality, strength, efficiency, and beauty.

Following (and in fact centering) Michel Foucault, numerous historical studies have shown that working on oneself – technologies of the self – is a central mode of subjectivation at the turn of the millennium.⁶¹ While the possibility of increasing physical abilities has reached certain limits, it is the technological expansions and interfaces that give rise to the expectation of options for overcoming and at the same time dissolving human boundaries. Connecting the inner system to technological devices as in human-computer or human-machine interaction requires equally customised knowledge.⁶² This gives rise to fundamental questions, the practical answers to which will have serious consequences: Whether it is a matter of supporting or improving interventions, there is a fluid transition between therapy and performance enhancement. Immortality emerges as a recurring reference point.⁶³ As Christopher Coenen points out in the conversation with us in this issue, whether this can lead to human life – the deficient human being, “das Mängelwesen” (Arnold Gehlen) – being understood as fundamentally disabled if it has not been subjected to all the procedures of augmentation, or whether dis-ability can be understood as a possible future way of life that rather accepts the limits of life's possibilities, may become an important question in the debate about future bodies.⁶⁴ But there is not much doubt that the combination of a cybernetically understood organism with cybernetic technology will become the norm. Whether this will take the form of algorithmic conditioning, systematic adaptation or self-determined, perhaps even artistic design, remains to be seen. At best, non-technical physicality may take the form of conscious resistance and refusal.⁶⁵ The hybridization of

60 Martschukat, Jürgen (2021): *The age of fitness: How the body came to symbolize success and achievement*. Oxford: John Wiley & Sons.

61 See amongst others Maasen, Sabine et al. (2011; Eds): *Das beratene Selbst: Zur Genealogie der Therapeutisierung in den 'langen' Siebzigern*. Bielefeld: transcript Verlag.

62 Grunwald, Armin (2021): *Living technology: philosophy and ethics at the crossroads between life and technology*. New York: Jenny Stanford Publishing.

63 Botelho, Teresa: "Remaking ourselves: Age, death and techno-bodies in the fiction of transhumanist immortality". In: Oró-Piqueras, Maricel; Falcus, Sarah (2023, Eds.): *Age and Ageing in Contemporary Speculative and Science Fiction*. London: Bloomsbury Publishing. 9; Hurtado Hurtado, Joshua (2023): "Exploited in immortality: techno-capitalism and immortality imaginaries in the twenty-first century". In: *Mortality*. 1-18.

64 Murray, Stuart Fletcher (2023): *Disability and the posthuman: Bodies, technology, and cultural futures*. Liverpool: Liverpool University Press.

65 Fortunati, Leopoldina: "Real people, artificial bodies". In: Fortunati, Leopoldina; Katz, James E.; Riccini, Raimonda (2003; Eds.): *Mediating the Human Body*. New York:

technological artefacts with biological matter has been at the centre of the debate about cyborgs and the biotechnological transformation of humans over the last three decades. Whether future bodies will uncannily resemble automata and robots, whether androids and gynoids will be eerily similar to (gendered) humans, is the subject of intense debate in the relevant fields of technology development.⁶⁶ At the beginning of the 1930s, the philosopher Karl Jaspers astutely analysed that this also created a compulsion to be young in modern performance and consumer societies: “Jugend als das Dasein der höchsten vitalen Leistungsfähigkeit und des erotischen Lebensjúbels ist der erwünschte Typus des Lebens überhaupt. Wo der Mensch nur als Funktion gilt, muß er jung sein; wenn er es nicht mehr ist, wird er den Schein der Jugend herstellen.”⁶⁷

Today, these ideas are an integral part of science fiction, films, games, popular magazines, social media, and advertising. The current debate circulates between liberal capitalist planning and critical self-invention, adaptation and enhancement, technological feasibility and ethical concerns, trans- and posthumanism, dystopian fears and utopian euphoria, and finally the interplay between materialization and performance. However, the media focus on spectacular transhumanist ideas obscures the everyday practices of assisted reproductive technologies and liberal-individualist bio-economies that are literally transforming societies.⁶⁸ Even if the central transhumanist goals are likely to remain a fantasy for the time being, other aspects of future bodies are already being realised in thoroughly pragmatic ways: reproductive technologies, synthetic biology, re-assignment surgeries, and body modifications. Sex/gender self-determination in particular has become a highly meaningful form of bodily self-design. It is an important insight that research itself, in the process of knowledge production – Elina Oinas and Katriina Huttunen show this in this special issue – (statistically) constitutes and needs future bodies.

We can only speculate on what future bodies will look like. We simply do not have access to the ‘future present’; in the end, we are left with

Routledge. 81-92; Farnell, Ross (1999): “In Dialogue with ‘Posthuman’ Bodies: Interview with Stelarc”. In: *Body & Society* 5/2-3. 129-147.

66 Fukuda, Toshio, et al. (2001): “How far away is ‘artificial man’”. In: *IEEE Robotics & Automation Magazine*, 8/1. 66-73.

67 Youth as the existence of the highest vital performance and the erotic exultation of life is the desired type of life in general. Where man is only a function, he must be young; when he is no longer young, he will produce the appearance of youth. Jaspers, Karl (1931): *Die geistige Situation der Zeit*. Berlin: Göschen. 46-47.

68 Schurr, Carolin (2017): “From biopolitics to bioeconomies: The ART of (re-) producing white futures in Mexico's surrogacy market”. In: *Environment and Planning D: Society and Space*, 35/2. 241-262.

'retro futurism'. The results could be as sobering, if not ridiculous, as the visions of the future envisioned in 1900. Far more important is the question of who will be involved in creating new bodies. Will it be the state authority, or will private companies produce the body of the future? In Japan, the government is currently providing substantial financial support for research and development in this area through the Moonshot programme, whose first goal is "to overcome limitations of body, brain, space and time".⁶⁹ These issues are still at the heart of the debate on artificial intelligence and biotechnological productivity. How will the possibilities of molecular biology, such as the CRISPR/Cas gene scissors, be used? Who will pay for this research, who has an interest in it? What is the real role of some outrageously rich men in the development of the future? While we consider these questions to be crucial, we also want to put attention to counter-narratives and (grassroots) activism that attend to acts of future bodies, to a revisionary engagement, fights for the right to a liveable future, maybe even a future at all, a future beyond all binaries, threats, systematic forces of oppression. So it is always also about designs for alternative future bodies, even if the future industry appropriates and simultaneously counteracts this with all its resources.⁷⁰ This particularly means that the biotechnological causality taken for granted in the transatlantic discourse, the orientation towards a very male, very white, very heteronormative and very wealthy 'success model' is called into question.

Future bodies are part of biopolitics, but this is entangled with thanatopolitics.⁷¹ It is not even clear whether there is a future for certain or all living bodies, or whether there is no future at all. Death and decomposition remain the future of all bodies. And it seems obscene to think about the futures of bodies when so many people cannot even have a present, are not allowed to live, are killed and violated. In her contribution, Sarah Horn deals exactly with the question of the future presence of living bodies materialized by technical means, which seems much more precise than any transhumanist speculation. Dichotomies produce a logic of 'either or' instead of 'and', of differences and demarcations instead of similarities, connections, and entanglements. We tend to dissolve these boundaries, to find new names for complexities, to understand that a future shouldn't be built on dichotomies or competitive and exploitative

69 Council of Science, Technology and Innovation (2024): „Moonshoot Research and Development Program“. In: Cabinet Office, Government of Japan. <https://www8.cao.go.jp/cstp/english/moonshot/top.html> (17.09.2024).

70 Fernandes, Sanjay (2011): "Detroit Techno: (A)history of Counter-Futures". *AntiTHE-SIS*, 21.

71 Prozorov, Sergei (2013): "Powers of life and death: Biopolitics beyond Foucault". In: *Alternatives*, 38/3. 191-193.

relations, but on multiplicities and working on the conditions of a good life for all.

*Prof. Dr. **Heiko Stoff**, contact: stoff.heiko@mh-hannover.de, Institute for Ethics, History and Philosophy of Medicine, Medical School Hannover, <https://www.mhh.de/institute-zentren-forschungseinrichtungen/institut-fuer-geschichte-ethik-und-philosophie-der-medizin/das-team/pd-dr-heiko-stoff>.*

*Prof. Dr. **Henriette Gunkel**, contact: henriette.gunkel@rub.de, Institut für Medienwissenschaft, Ruhr-Universität Bochum, <https://ifm.rub.de/institut/personen/gunkel>.*