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Prometheus' Legacy: Responsibility and Technology

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Abstract

A prominent view in contemporary philosophy of technology suggests that more technology implies more possibilities and, therefore, more responsibilities. Consequently, the question 'What technology?' is discussed primarily on the backdrop of assessing, assigning, and avoiding technology-borne culpability. The view is reminiscent of the Olympian gods' vengeful and harsh reaction to Prometheus' play with fire. However, the Olympian view leaves unexplained how technologies increase possibilities. Also, if Olympians are right, endorsing their view will at some point demand putting a halt to technological development, which is absurd. Hence, we defend an alternative perspective on the relationship between responsibility and technology: Our Promethean view recognises technology as the result of collective, forward-looking responsibility and not only as a cause thereof. Several examples illustrate that technologies are not always the right means to tackle human vulnerabilities. Together, these arguments prompt a change in focus from the question 'What technology?' to 'Why technology?'

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1   Introduction[1]

Prometheus played with fire, and thus enraged the gods. His punishment iseternal pain, soul-wrenching not only for its physical hardship but because he is bereft of any hope of betterment. His play with fire, which ushered humanity out of darkness and into civilisation, the first use of technology in Greek mythology, left him with a responsibility that even a titan is incapable of bearing. Technology creates responsibility, or so goes the moral of the myth. Of course, that is only when we side with the Olympians and see Prometheus as an ignoble one, who

shared with lesser beings what belongs exclusively to the gods. From this perspective, punishing Prometheus seems justified indeed.

Until today, the Olympian view attracts adherents. Many philosophers continue to stress that greater technology implies greater responsibility: We haven't held power to destroy the world before the emergence of nuclear weapons, and until the advent of air travel, we could not travel across the globe within short periods.[2] These technologies have changed what is possible and, for many people, they broadened the scope of action and misdeed, thereby creating new responsibilities, as we will explain in more detail in section 2.

We will present another view on Prometheus' plight, which prompts to shift the focus from the question 'What technology?' to 'Why technology?' The question 'What technology?' insinuates that technology is the *optima ratio* for a wide spectrum of grand challenges and societal problems: One must decide which technology to produce and how to design it. While the Olympian view is utterly incomplete as we will argue, it can be shown that 'technology no more' is what ultimately follows from their perspective. The reason is that technology features as the primary driver of increasing (moral) responsibilities, and the view prescribes that our primary obligation is to remain blameless vis-à-vis our backward-looking moral responsibility. But this, on the view's terms, cannot be fulfilled. We cannot shoulder responsibility (and, hence, technology) *ad infinitum*; eventually, blame lies ahead. 'What technology?' transforms to 'Why technology?', as we discuss in section 3.

We will then, in section 4, remediate the incomplete Olympian position with the 'Promethean view', which suggests that responsibility comes first and technology second: Prometheus embraced a forward-looking responsibility to increase human flourishing when sharing the power of fire. Instead of seeing responsibility as an implication of technological progress, technological progress must be seen, first and foremost, as a result of responsible acting. Once this relationship is more adequately characterised in this manner, we arrive again at

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[2] Maarten Franssen, Gert-Jan Lokhorst, Ibo van de Poel: *Philosophy of Technology,* in: Edward N. Zalta (Ed.): *Stanford Encyclopedia of Philosophy. Fall 2018 Edition* 2018.

the question 'Why technology?', this time from a different direction. The forward-looking responsibility that often motivates the quest for new technologies requires first to understand the problems to which technologies should respond properly and to then assess whether technologies are the right means to resolve them. Thus, we stress an important question, which is currently uncritically adopted by scholars who promote to innovate more responsible (responsible research and innovation: RRI) and by those who recommend embedding values in the design of new technologies (value-sensitive design: VSD): Both focus on the question 'What technologies?' instead of 'Why technologies?'

Considering Prometheus' legacy critically thus leads to a more comprehensive picture of the relationship between technology and responsibility. Only a view that puts responsibility first and technology second can adequately answer 'What technology?' by answering 'Why technology?' beforehand.

2   The Olympian View

The Olympian perspective is compelling at its surface. Thanks to technology, we seem able to do more things than ever. Focusing on technology-borne responsibility seems relevant, too. Failures to anticipate and consider the consequences of technological development frequently led to catastrophe, as epitomised by Oppenheimer's haunted face and his aghast realisation upon witnessing the detonation of the first nuclear bomb that he has "become death, the destroyer of worlds" (*The Decision to Drop the Bomb* 1965). Before we turn to our criticism of the Olympian view, we will introduce it in more detail.

Hans Jonas, probably the most prominent philosopher to champion the view that increasing technological possibilities imply increasing moral responsibilities and the need for new principles and duties to do justice to technologies' demands and human powers, writes:[3]

> Modern technology has introduced actions of such novel scale, objects, and consequences that the framework of former ethics can no longer contain them. […] The [sphere of human interaction] is overshadowed by a growing

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[3] Hans Jonas: *Technology and Responsibility. Reflections on the New Tasks of Ethics*, in: *Social Research,* 40 (1973), I. 1, p. 38.

realm of collective action where doer, deed, and effect, are no longer the same as they were in the proximate sphere, and which by the enormity of its powers forces upon ethics a new dimension of responsibility never dreamt of before.

The source of the "expanding relationship" between technology and responsibility lies in the "increased technological power" that comes "with various technical activities."[4] In the same year in which American philosopher of technology Carl Mitcham proposed this argument, Kurt Bayertz stated that the "expanding relationship" between technology and responsibility is a constant in human history. Growing power over nature and the subsequent growing responsibility is constitutive for human history and human nature:[5]

> Human history can, therefore, be seen as a process of constantly increasing responsibility. From its parochial beginnings, humanity today has reached a stage of nearly universal responsibility: by enabling us to manipulate not only some small and isolated parts but almost the totality of terrestrial nature, modern technology has incorporated the whole biosphere of our planet into what we are responsible for.

There is both observation and prescription in these statements; a claim about our *de facto* increased responsibility and a prescribed caution against mistreating our responsibility, a claim foreshadowed by the Olympian gods. Contemporary philosophy of technology still wags the warning finger of the gods. Peter-Paul Verbeek, for instance, uses the example of genetic diagnostic tests for hereditary forms of breast cancer, which can be employed to investigate the likelihood of someone developing a form of cancer, to stress the same point. He argues that the technology "organises a situation of choice" that has not existed before.[6] By inducing a new possibility, the technology produces a "moral dilemma" to cope with. It infiltrates, so to speak, peoples' former realm of responsibility and urges

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[4] Carl Mitcham: Responsibility and Technology. The Expanding Relationship, in: Paul T. Durbin (Ed.): *Technology and Responsibility*, Dordrecht 1987, p. 3.

[5] Kurt Bayertz: Increasing Responsibility as Technological Destiny? Human Reproductive Technology and the Problem of Meta-Responsibility, in: Paul T. Durbin (Ed.): *Technology and Responsibility*, Dordrecht 1987, p. 135.

[6] Peter-Paul Verbeek: *Moralizing Technology. Understanding and Designing the Morality of Things,* Chicago, IL 2011, p. 5.

them to choose whether to employ the test and how to deal with its results. Verbeek writes conclusively (our emphasis):[7]

> The very fact that this technology makes it possible to *know* that it is very likely that a person will become ill, added to the possibility of preventively removing organs, **makes this person responsible for his or her own disease**.

We consider this view – that technology predominantly raises questions about responsibility (whom to blame) and that the creation of technology *increases* our responsibility including the potential to be blamed, sanctioned or punished, if things go wrong – the Olympian view on technology. The gist is clear: technology increases possibility, which in turn increases responsibility. The thesis is substantive because there is no logical bind between novel possibilities and new responsibilities. So, why do the Olympians assume one to grow with the other?

First, Olympians are impressed by the idea that technology makes possible actions that were impossible before. In public discourse, emerging technologies are often eagerly expected, hailed, and feared precisely for this reason. The debate within the philosophy of technology is no different. Technology is discussed *because* it offers new possibilities. In a classic contribution, Bayertz considers in detail Fletcher's (1974) discussion of new reproductive possibilities, where he depicts how "the age-old mode of human reproduction via coital intercourse… ending in birth, today can be backed up by seven alternative modes of procreation," amongst them artificial gestation of a foetus in an artificial uterus and egg transfer from one woman to another.[8] Today, the expanding possibilities of reproductive technologies excite the passions and imagination of enthusiasts and critics alike.[9] Likewise, the prospect of future drone wars, to name another example, provokes contemporary scholarship.[10] Not only does technology seem worth to be considered

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[7] Verbeek, *Moralizing Technology,* p. 5.

[8] Bayertz, *Increasing Responsibility,* p. 136.

[9] Jennifer A. Doudna, Samuel H. Sternberg: *A Crack in Creation. Gene Editing and the Unthinkable Power to Control Evolution,* New York, NY 2017.

[10] Robert Sparrow: *Killer Robots*, in: *Journal of Applied Philosophy,* 24 (2007), I. 1, pp. 62-77.

and discussed because of the novel possibilities it creates: Technology's nature might *consist* of creating novel possibilities.[11]

Second, Olympians claim that increased possibilities imply increased responsibilities. We are, writes Bayertz, responsible for anything that we anticipate but do not control.[12] He seems to recount Prometheus' myth: with the increased possibility, "we have lost our innocence; there is, whether we like it or not, no way back to the paradise of irresponsibility"[13] (1987: 146) and indeed he predicts a "multiplication of responsibilities."[14]

Similarly, consider Jonas' argument: We must carefully consider nuclear weaponry *because* it entails the possibility to destroy our planet completely. The view's Kantian fundament is obvious: If it is impossible that we ought to do something if we cannot do something, one may be inclined to accept the Olympian view wonder whether the fact that we *can* do something implies that we ought to do it. Once something has been an option for us, the fact that we do not do it, has to be justified.

3   Olympic Problems

Below the compelling surface of the Olympian view lie treacherous depths that make for Olympian problems. A closer look reveals the vagueness of the Olympian thesis in two crucial ways. It is opaque regarding what kind of possibility technology creates. And, once clarified, it turns out that our responsibilities would increase with technological advancement to a point where we would be unable to satisfy them, leading to an absurd conclusion.

The thesis of increasing possibilities through technology is oblivious of the differences between (logical) possibilities and (human) capabilities and the fact that not everyone is a beneficiary of technological progress. The Olympians are in dire need of a more precise notion of technological possibility.

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[11] Franssen, Lokhorst, van de Poel, *Philosophy of Technology*.

[12] Bayertz, *Increasing Responsibility,* p. 146.

[13] Bayertz, *Increasing Responsibility,* p. 146.

[14] Bayertz, *Increasing Responsibility,* p. 140.

The common-sense notion of possibility refers to what might happen, what might exist, or be true. In practice, we constrain the generic notion of possibility to reflect narrower concerns. It is often pragmatically clear that the possibility of meeting a married bachelor is different from the possibility to driving down a one-way street the wrong way (conceptual vs legal possibility), which is yet different from the *technological* possibility to cross the Atlantic in less than eight hours.[15]

However, the ordinary meaning of the notion of technological possibility is futile: It refers to the things that technology enables us doing, and so new technology enables us to do new things, which is another way of saying that technology creates new possibilities for action. Currently, philosophers lack a precise notion of technological possibility that captures how new possibilities arise. To illustrate, consider physical and epistemic possibilities, which might, in contrast to logical possibilities, be alterable by technology. On David Lewis' widely accepted theory, which understands possibility in terms of possible worlds, technology realises pre-existing possibilities, possibilities that transcend human limits and technological capacities.[16] Thus, the existence of possibilities is independent of any particular place, person, or time of the actual world. While there is a sense in which it is impossible for us to destroy the world (and difficult even for the likes of Trump and Putin), the *physical* possibility is there, and it has been there all along – in a different, conceivable world. Technology did not create it.

Olympians might object that we misinterpreted the relationship between possibility and responsibility: It's not about *doing* new things, it's really about *thinking* them. Consider the opening lines of Robert Frost's *The Road Not Taken*: "Two roads diverged in a yellow wood / And sorry I could not travel both" (Frost 1920).[17] The crossroad forces a decision upon the raconteur that induces the responsibility to justify her choice. The decision remains up to her: Had the

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[15] Henry S. Richardson:*Practical Reasoning about Final Ends,* Cambridge 1997, p. 145.

[16] David Lewis: *On the Plurality of Worlds,* Oxford 1986.

[17] Robert Frost: *The Road Not Taken,* in: Robert Frost, *Mountain Interval*, New York, NY 1920.

raconteur faced two thousand paths, the existential nature of her choice, and culpability, would be the same.[18] Technology does not create new possibilities, but it enables us to re-describe acts in previously unavailable fashion.[19] We are inclined to approve this argument.

However, Olympians cannot endorse such view, because it suggests the mere *appearance* of increased possibility (and, hence, responsibility) and Olympians base their view on the *actual* expansion of possibility. Olympians might try to invoke the notion of 'real possibility' to capture the idea of branching possibilities in a metaphysical rather than epistemic sense. At any given moment, given *that* moment, real possibilities represent alternative ways for the future to unfold: each can be actualised, but none is actual yet. However, the analysis of real possibilities has just begun,[20] and, crucially, we lack an understanding of how real possibilities are created. Without such an account, the Olympian claim that technology creates possibility remains vague.

Moreover, novel technologies rarely create possibilities for all of us. Many people do not benefit from the aforementioned possibility of air travel, because they cannot afford it. Most technologies, including genetic testing, nuclear power and air travel enlarge the scope of action and the impact of a limited number of people. Others have to go without them. At best, technology creates possibilities for *us*, that is, at the collective level. In that case, the Olympians should be talking about *realising* rather than *creating* possibilities, and not on the individual, but on the collective level (for only then are general claims about novel possibilities generated by technology true). However, current philosophy of technology is focused on the individual level, dissecting individual responsibilities, and thus currently utterly inconclusive when it comes to determining for whom exactly and

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[18] Jean-Paul Sartre: *Being and Nothingness. An Essay in Phenomenological Ontology*. Edited by Hazel Estella Barnes, New York, NY 1993, p. 669.

[19] Donald Davidson: *Agency,* in: Donald Davidson, *Essays on Actions and Events*, Oxford 1980, pp. 43–61.

[20] Thomas Müller, Antje Rumberg, Verena Wagner: *An Introduction to Real Possibilities, Indeterminism, and Free Will. Three Contingencies of the Debate*, in: *Synthese* 196 (2019), I. 1, pp. 1-10.

how responsibility increases due to the growth of possibilities.[21] People whose mobility hasn't increased in the past decades aren't responsible for rectifying the environmental damage caused by it. What, then, really is the value of the Olympians' global thesis about the growth of responsibility, if employed so broadly and imprecisely?

These problems with possibility might be dismissed as mere technicalities. However, even if the notion of possibility could be made precise, there is a grave problem with the Olympians' view of responsibility as it eventually demands to put a halt on technological development. As the Olympians assert, since we can anticipate and control technological development, we have to bear the brunt for technological catastrophe and accidents. With technological progress, there are always new responsibilities, which require novel technological (or institutional) solutions to solve, which, in turn, create new responsibilities, *ad infinitum*. But only gods can bear this burden – our human capabilities appear to limited to deal with the ever-increasing responsibility implied by the Olympian view. To be consistent, the Olympian view must call a halt to technological development, a conclusion that we consider absurd.

The problem with satisfying our spiralling responsibilities originates from our limited human capacities. Consider, someone is planning to go out with friends on Saturday evening. The person promises some friends from high school, whom she has not seen in a while, to meet up for dinner. Accidently, another friend from college also calls her and asks to meet up, which she promises to do after dinner the other group. Chance has it that some further friends contact her on the same evening driven by the same motivation to meet up. Clearly, at some point, she must stop promising all of these parties to meet because she cannot possibly keep all of these promises. With each promise, as with each new technology, her responsibility grows.

In the same way, in which we expect her to end making promises, we must put a halt to the development of new technologies. Indeed, we have a responsibility

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[21] Martin Sand: *Futures, Visions, and Responsibility. An Ethics of Innovation,* Wiesbaden 2018.

to manage our responsibilities in such a way that we do not take on too many responsibilities, which are possible to satisfy individually, but impossible to satisfy collectively. Thus, there exists a meta-responsibility to keep manageable our responsibilities. We have seen that, on the Olympian view, responsibilities increase. Given the limits to what we, as individuals, can do, it is inevitable that a continued increase of responsibility in line with continuing technological progress will at some point surpass our capacity to live up to our responsibilities. Whether we know when this point is reached or not, in each case our meta-responsibility demands that we put a halt to technological progress at some point (and sooner rather than later, if the threshold is opaque).

At this point, Olympians might retreat to a more elaborate version of their view. 'True', they might say, 'responsibilities increase with possibilities created by technology, but that does not imply that our responsibilities must overwhelm us – technology might just help us to satisfy them, *ad infinitum*.' Resembling the worries about moral overload,22 technology tends to the problems it creates. We don't dispute that this is a logical possibility. However, epistemically, we are in foggy territory, and it is uncertain whether new technological possibilities will help us to satisfy what responsibility demands. The safest way to ensure keeping up with our responsibilities is, therefore, to put a halt to technology. Of course, Olympians might recant the claim that technology indeed creates novel responsibilities. But, they cannot recant completely, for that would mean to give up their core Olympian commitment. Alternatively, they have to defend a workable distinction between possibilities created by technology and a sense in which technology opens up courses of action without introducing novel responsibilities. In the absence of such a distinction, we must assume that one grows with the other, which yields the absurd consequence outlined above.

So, technology, wither now? Though this conclusion truly reflects the morale of the Greek fable, it is not what contemporary Olympians have in mind. These

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22 Jeroen van den Hoven, Gert-Jan Lokhorst, Ibo van de Poel: *Engineering and the Problem of Moral Overload*, in: *Science and Engineering Ethics*, 18 (2011), I. 1, pp. 143-155.

Olympian problems, hoisted from below the view's compelling surface, encourage the search for an alternative.

4   The Promethean View of Responsibility

In the previous section, we have argued that responsibility itself requires – metaphorically speaking – that Prometheus' torch shall be returned to the gods, to manage the ever-increasing demands of responsibility through growing technological power. The meta-responsibility from which this requirement follows puts a halt to a *regressus*, whose consequences eventually could not possibly by shouldered by finite beings like us. If the traditional emphasis on responsibility is right, the answer to the question 'What technology?' sooner or later has to be: 'None.'

But, we promised a more accurate picture of the relationship between responsibility and technology. Our view turns the traditional approach that says technologies first and responsibility second upside down: We assert that responsibility comes first and technologies second. With this in mind, the meaning of the question 'What technology?' turns out to be a *response to responsibility* and not at its beginning. Prometheus did not encumber humankind (and himself) with responsibility by sharing the powers of light; he first embraced his responsibility through his action.

Clearly, in this argument, we implicitly introduced a distinction between two different notions of responsibility. Prometheus was punished by the Olympians, which is a type of backward-looking responsibility. Backward-looking responsibility emerges as the interpersonal practice of holding someone liable or accountable by blaming or punishing her if harm occurred or a misdeed has allegedly been done.23 This most prominent form of responsibility discussed in philosophy is often broadly understood as the after the fact occurring request to provide one's reasons for action, to answer for what has been done, like Frost's raconteur. If certain necessary conditions are fulfilled (e.g. that the person has

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23 Ibo van de Poel: *The Relation between Forward-Looking and Backward-Looking Responsibility,* in: Nicole A. Vincent, Ibo van de Poel, Jeroen van den Hoven (Eds.): *Moral Responsibility. Beyond Free Will and Determinism*, Dordrecht 2011, pp. 37-52.

acted intentionally, has been uncoerced, and cannot be excused), she might be considered a suitable addressee for sanction or reward.[24] Forward-looking responsibility, in contrast, does not require another person to articulate a demand for action or dissatisfaction with some of its consequences: The demands of forward-looking responsibility equal the demands of morality. Morality demands, for instance, that one respects other people's dignity and keeps one's promises and, hence, one is responsible for doing these things (in the future). This forward-looking responsibility has a close resemblance with moral duties or obligations: In ordinary language, "X should ϕ" and "X is responsible for ϕ-ing" is often used interchangeably.[25]

How is this related to the Promethean myth and the question 'What technology?' It can be assumed on good reason that Prometheus was initially motivated by a forward-looking responsibility to share the benefits of fire with humans and he is not alone in this regard. More generally, technologies can be seen as a means to adequately respond to moral demands. The imperfections of human nature, our vulnerability, the existence of disease, hunger, death and natural catastrophes pose a constant threat to well-being. Technology is not only accompanied by responsibility and creates new moral dilemmas, as the Olympians suggest, but it is also first and foremost a response to these shortcomings and external threats. Innovators, scientists and engineers throughout the centuries embraced a forward-looking responsibility – a duty – to challenge those shortcomings and annihilate external threats by constructing new technologies. By opening new ways to solve moral dilemmas technologies help us to live up to our responsibilities and overcome certain limitations: *If* the person from the previous example promises to several different people to meet up on the same evening, advanced infrastructures and vehicles will make it possible, at least to a certain extent.

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[24] John Martin Fischer, Neal A. Tognazzini: *The Physiognomy of Responsibility*, in: *Philosophy and Phenomenological Research,* 82 (2011), I. 2, pp. 381–417.

[25] Michael J. Zimmermann: *Moral Luck. A Partial Map*, in: *Canadian Journal of Philosophy,* 36 (2006), I. 4, pp. 585–608.

Even the "Modern Prometheus", Viktor Frankenstein, protagonist of Mary Shelley's famous novel, begins his studies with the noble motivation to "banish disease from the human frame and render man invulnerable to any but a violent death,"[26] a motivation that later ceases as Viktor loses oversight and succumbs to his absorbed and egoistic temper. Nowadays, it is not unusual to hear entrepreneurs and innovators exclaim that "they're trying to 'make the world a better place' and that they're committed to wiping out some dread disease."[27] Such inclination has probably accompanied engineering endeavours since its beginnings.[28] Promethean aspirations are often intended to increase human flourishing. They can be seen as, and should be, a *result* of a call for responsibility and not only as their cause.

Of course, we are not suggesting that *all* technologies are *in fact* engineers' responses to moral calls. Too often, engineers have openly admitted following the call of market demands instead of morality. In 2008, the company *Kitchen Craft* advertised a rotating (battery-driven) ice cream cone. The device, sold in the UK, allegedly "helps avoid drips on hot days, as well as saving the tongue effort."[29] The value for human flourishing and welfare of such 'innovation' is nil, but the absurdity of the example only strengthens the normative side of the Promethean view.

Also, technologies are not always the best means to challenge human vulnerabilities and the threats of mother nature. Instead, they sometimes appear literally like the sledgehammer to crack a nut: In the debate about anti-ageing technologies, some authors, for instances, wittily objected to defenders of a moral responsibility to develop life-extension technologies,[30] that the average life expectancy can already be increased through non-technological means by

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[26] M. V. Shelley: *Frankenstein. Or: The Modern Prometheus,* London 1989, p. 47.

[27] Steven Shapin: *The Scientific Life. A Moral History of a Late Modern Vocation,* Chicago, IL 2008, p. 312.

[28] Samuel C. Florman: *The Existential Pleasures of Engineering,* St Martins, NY 1996.

[29] Andy Bloxham: *Rotating Ice-cream for Lazy Lickers*, in: *Telegraph* (2008).

[30] Nick Bostrom: *The Fable of the Dragon Tyrant*, in: *Journal of medical ethics* 31 (2005), I. 5, pp. 273-277.

distributing education, health care and wealth more equally, as these have a significant impact on life expectancy.[31] No matter how one stands regarding this issue, it is obvious that technologies are not always the best solution to a problem, and that not everything perceived as a problem by engineers and philosophers requires a (technological) solution. Other examples of this kind are space tourism and space colonisation, technological visions which are advocated latest since the 1970s.[32] Until today, these visions are critically discussed in terms of feasibility and desirability: Many opponents of these technologies suggest that there are more urgent problems to be solved than offering a solvent minority the opportunity to experience zero gravity. Also, critics assert that colonising other planets is too risky and costly to be considered an adequate response to threats such as climate change which can be managed more easily with the right mindset.[33] The controversies surrounding these technological visions underline the need to discuss the surplus-value of new and emerging technologies before they are produced, no matter how morally worthwhile the initial motivation to create them has been.

Having arrived at a more adequate and comprehensive picture of the relationship between technology and responsibility, we see why the question 'What technology?' is off the track. If responsibility comes first and technology second, then the question 'What technology?' has absorbed the moral impetus that early champions of technologies motivated to seek new inventions. The slogan "Responsibility first, technology second" is an expression of this early impetus. If this impetus should come to something, the previously discussed examples send a strong reminder to ask '*Why* technology?' before asking '*What* technology?' Before starting to build new artefacts and things and also before starting to produce these new technologies by embedding values in design and shaping innovation processes in a certain manner, we first have to analyse the shortcomings of humans and the

31 Martin Sand, Karin Jongsma, *Toward an Ageless Society,* in: E. Dominguez-Rue, L. Nierling (Eds.): *Ageing and Technology. Perspectives from the Social Sciences*, Bielefeld 2016, pp. 291-310.

32 W. Patrick McCray: *The Visioneers. How a Group of Elite Scientists Pursued Space Colonies, Nanotechnologies, and a Limitless Future,* Princeton, NJ 2013.

33 Kelly C. Smith, Keith Abney: *The Great Colonization Debate*, in: *Futures* (2019).

threats with which humans are confronted in-depth and evaluate and rank these problems according to their significance. A thorough analysis of these issues to which technology allegedly provides the solution should reveal whether this is actually the case and whether non-technological means have a more desirable. This is the crucial imperative of technological responsibility, a forward-looking responsibility to ensure the increase of human well-being. This Promethean view challenges the idea that new technologies are a silver bullet to fix everything, and it does so because the belief in the silver bullet will eventually, as argued before, lead to its demise: When we cannot shoulder these responsibilities infinitely, we have to put a strict halt to technological development: Responsibility demands that. The question 'Why technology?' gains its significance as current philosophers of technology advocate to embed relevant values into the design of new technologies (VSD) or recommend to make the process of innovating more inclusive, anticipatory, and transparent, an idea that resides prominently in debates about European Research Policies. Reciting the Olympians' dictum, Jeroen van den Hoven, who promotes value-sensitive design, argues that innovations "expand the set of relevant, feasible options regarding solving a set of moral problems."[34]

However, whether innovations are ever the right means to solve these moral problems is here uncritically endorsed: When aiming to improve the process of innovating and embedding values in design, the question 'Why technologies?' has already been answered in technologies' favour, thereby putting more weight on our shoulders which are already heavily burdened with technological responsibility. Becoming more aware of this is an essential aspect of our forward-looking moral responsibility.

5   Conclusion: Prometheus' legacy

Our answer to the question of 'What technology?' prompts a fundamental change of perspective on the relation between responsibility and technology. We must

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[34] Jeroen van den Hoven: *Value Sensitive Design and Responsible Innovation,* in: J. R. Bessant, Maggy Heintz, Richard J. Owen (Hg.): *Responsible innovation. Managing the Responsible Emergence of Science and Innovation in Society*, Chichester 2013, p. 82.

concentrate on (forward-looking) collective responsibilities to halt global warming, to fight poverty, and to end hunger and war, which suggests what technology one ought to create.

Who determines what our collective responsibilities are, and who should guide technological development? Prometheus legacy illuminates this question, too. Consider Stephen Fry's account of Zeus' desire to punish Prometheus:[35]

> A voice within [Zeus] seemed to whisper that one day, no matter what vengeance he took, mankind would reach ever upwards until they came level with the gods – or, perhaps more terribly, until they no longer *needed* the gods and felt free to abandon them. No more worship, no more prayers sent up to heavenly Olympus. The prospect was too blasphemous and absurd for Zeus to entertain, but the fact that such scandalous idea could even enter his mind served only to fuel his rage.

The gods' authoritarian way in deciding who is worthy of using technology stands in the way of a democratic approach to identify what our collective responsibilities are, which problems ought to be prioritized and whether, and what technologies are the right means to do so. Neither gods nor philosophers alone should have the last word on these issues – we do. 'We' are the engineers, the lawmakers, the philosophers, the citizens and we must determine what responsibilities what technology ought to fulfil.

In conclusion, Prometheus' legacy calls for a political philosophy of technology, one that helps us to ascertain our collective responsibilities, and the means for addressing them.

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[35] Stephen Fry: *Mythos. The Greek Myths Retold,* London 2018, p. 131.