

# Utopian Thinking in Contemporary Technology versus Responsible Technology for an Imperfect World

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## Abstract

In several contemporary technological developments, the expectations people have of the new technology is phrased in terms of the prospect of an ideal world. This utopian thinking features in at least three technological domains, namely medical nanotechnology, virtual realities and sustainable technologies. Some authors have ascribed this to Christian sources, but there are strong arguments against this claim. This kind of utopian thinking denies the influence of sin and its consequences on our human thinking and acting, notions that are significant in Christian thinking. A more balanced approach, in which we take in to account the non-ideal state of reality as it will be until the end of times, is needed.

## Introduction

In the rhetoric accompanying several contemporary technologies, we find clear traces of utopian thinking: namely, the idea that an ideal world can be realized by means of new technologies<sup>1</sup>. According to David Noble, the origin of this kind of thinking in technology is attributable to the Christian concept of Paradise. In Christian thinking, however, paradise cannot be restored by humans. It is God who will create a new heaven and earth in which the brokenness that characterizes our current world will no longer be present. Until then, responsible technology means having technology that operates in an imperfect world.

### 1. Christian Origins of Utopian Thinking?

The meaning of the word utopia stems from the Greek: it denotes non-place<sup>2</sup> (ou topos). The term was used by Thomas More as the title of his book of 1516 in which he described an ideal state. Since then the term is used for any ideal world one can imagine but that does not exist (hence the term: non-place). Francis Bacon in *The New Atlantis* (1627) promoted experimentation in natural sciences as this would bring about endless new opportunities for controlling nature in order to create an ideal world. One of the means through which humans have tried to bring about ideal worlds is technology<sup>3</sup>. The development of technologies has always been and still is driven by promises and expectations<sup>4</sup>. In his book *The Religion of Technology*, David Noble argues for the Christian concept of Paradise being the origin of utopian thinking in technology<sup>5</sup>. Christians, according to him, have learned from the Bible that there was an original ideal world in which there was no disease, no pain, no human death or any other form of suffering. But this Paradise was lost when humans sinned and ever since we live in a broken world. However, the ideal of restoring Paradise motivated people to create artifacts of various kinds in order to recapture this ideal world of Paradise. In the first part of his book, Noble takes his readers on a historical tour. He shows how utopian thinking in the Middle Ages raised the status of technology. Since then, the Paradise ideal has motivated people through

the ages to develop ever new technologies. In the second part of his book Noble uses a thematic approach to argue that in all the major domains of technology, we find this utopian thinking. It is striking that he also includes non-Christians as examples of people who were influenced by this thinking. In particular, the fact that he mentions Auguste Comte as such an example makes clear that the Paradise ideal can remain active in a secularized form even when people have turned their back on their Christian past.

Although at first sight, Noble's arguments seem plausible, there is one major aspect of Christian thought that he completely ignores. One can question if this was done on purpose, because in some cases his selection of persons to illustrate the Christian origin of utopian thinking in technology is quite peculiar. A case in point: one of the historical chapters is devoted to the Reformation era, but nowhere does Noble discuss the contribution of John Calvin in that chapter. Since Calvin wrote extensively about the value of culture for Christians and non-Christians, one would have expected that he would be featured in this chapter. But Calvin definitely does not fit in Noble's argumentation. Calvin always pointed out that sin has thoroughly pervaded all human thinking and acting, and makes it entirely impossible for us to restore Paradise by ourselves<sup>6</sup>. It is only through the work of Jesus Christ that restoration becomes possible and even then it is only fully realized when Christ returns at the end of history. Instead of Calvin, Noble refers to movements such as those by Anabaptists to support his argument. At that time the possibility of restoring Paradise and realizing the new Jerusalem on earth was quite real for them. But one doubts if they were in the mainstream of Reformation era thought.

Noble's attack on Christian thinking as the origin of an unlimited and relentless effort to realize Paradise on earth, at whatever cost, is similar to Lynn White's accusation that Christian thinking was the cause of the irresponsible exploitation of resources<sup>7</sup>. He, too, is selective in his references. He

suggests that mainstream Christian thought originates from the biblical notion that humans have been given the task of exploiting the earth and ruling over all living and non-living beings. White, however, fails to notice that throughout history, there have been theologians who have emphasized that the term 'rule over' in Hebrew has the meaning of 'taking care of someone else's goods' rather than exploiting these goods for one's own interests. In a way, White, like Noble, suggests that Christians still have Paradise (and the permission to exploit that place) in mind when developing culture in general and technology in particular. But, as with Noble, White has to be selective in calling for witnesses, since many mainstream Christian thinkers often do not comply with this image of the Christian attitude towards the concept of Paradise. Rather It is a secularized form of the Paradise ideal that moves people in a direction to assume that there are no limits to its motivating force and thereby causes people to develop technologies in often irresponsible ways.

An example of this can be found in the science fiction television series *Star Trek*. This series has many strong utopian references. Thanks to almost unlimited technological possibilities, humans can travel over unimaginable distances, heal the most life-threatening diseases and wounds by simply moving an electronic device over their body, communicate with other beings without any language barrier so that peace can be made between all species, and create any desirable meal by telling a replicator to produce it instantaneously. The series was conceptualized by Gene Roddenberry, who explicitly stated that he was driven by a humanistic approach to life<sup>8</sup>. Human beings are good in principle. If they releases their creative powers in technology, in the end everything will be good and all suffering and war will be done away with.

The value of Noble's and White's writings and Roddenberry's television series, however, is that they are right in identifying utopian thinking as a driving force behind technological developments. As I will show in the next sections, this kind of thinking today seems to be gaining in popularity, at least

when we consider the rhetoric that accompanies many contemporary technological developments. I will show the presence of this thinking in three important domains in current technology and then show what a Christian response could be. I will argue that the biblical foundation for such a response comprises the notions of human responsibility, but also the imperfection due to sin and the perfection coming only after Christ's return.

## 2. Utopian Thinking in Medical Technology

One of the emerging new technologies of our time is nanotechnology. This is a technology about which many moral issues have already been discussed<sup>9</sup>. Actually this is not one technology, but an umbrella term for many technologies, all of which in some way or another aim at manipulating particles at the nanolevel, that is the level of nanometers (1 nanometer is one billionth of a meter). Among existing applications are the production of materials with layers of particles that are only a few nanometers thick, like suntan lotion or toothpaste with a layer of nanoparticles that have special protective properties. The long-term aim of nanotechnology is the manipulation of individual atoms and the ability to build structures by connecting atoms one by one (molecular nanotechnology<sup>10</sup>). One of the most important application areas is in health care. Here we can find several examples of a striving for perfection or utopian thinking<sup>11</sup>. Current speculations suggest that one day engineers will be able to build or repair human tissue by manipulating individual atoms. It would then be possible to undo the damage done by the aging process. By repairing brain tissue at a sufficient speed one would be able to keep ahead of the point at which the dying process begins. Thus one could extend a person's lifespan in decades, possibly centuries, and perhaps as long as one chose to go to the nanodoctor. This would mean a sort of eternal life, although the term eternal dying would be more appropriate as brain tissue keeps degrading and will always need periodic repair. The promise or hope is that humans can eradicate death by means of technology. This hope was already expressed

before the coming of nanotechnology by transhumanists. Now they see nanotechnology as a possible means for realizing this ideal. Ray Kurzweil is a famous example of this 'school' of thinking<sup>12</sup>.

This hope differs fundamentally from a biblical view of human life and death. In a biblical perspective, human death<sup>13</sup> is part of the curse caused by sin and can only be removed through the work of Christ after his return to earth at the end of history. Until then death is the gateway to life in heaven for those who have committed themselves to the redemptive work of Christ. The road to the tree of life in Eden's garden is blocked by an angel with a sword. The claim of nanotechnology suggests that humans have found a way to get around that angel and reach the tree of life without God's intervention. In other words, Paradise will be regained by means of nanotechnology<sup>14</sup>. Many nanoscientists refuse to take this claim seriously as it is extremely speculative, but the rhetoric certainly is there and even plays a role in acquiring funding for nanotechnological research. In addition, in the biblical story of the building of the tower of Babel, we read that God Himself describes the possibilities of human endeavor by saying that "nothing will be restrained from them, which they have imagined to do" (KJV). This is confirmed by the many wrong predictions made of limits to what humans can accomplish (for instance, the assumed impossibility of air traffic or putting a human on the moon). The utopia of eternal life will be sought and we cannot be sure how far humans will be able to go on this road.

A similar utopian aim in medical nanotechnology is acquiring a continuous and complete knowledge of our health status, made possible by using 'lab-on-chip' technologies. These allow for a complete blood and DNA analysis using as little as a drop of blood and at a price that anyone can afford. These analyses would enable people to monitor not only their current condition, but also the chances of developing diseases in the future. Having this knowledge gives one at least a feeling of control, even though not all diseases can be avoided by changing one's lifestyle. But coupled with the expectation

that nanotechnologies can also be used to manipulate DNA, it holds the promise that hereditary diseases can be avoided by repairing the section of the DNA strand that contains the threat. This would mean the abolishment of all diseases, which again is a promise of a utopian character. In a biblical view, diseases are, like human death, the effect of the curse humans have brought upon themselves by sin. For this, too, humans now claim to have found an antidote that does not require redemption by Christ.

A third example of utopian thinking in nanotechnology is the creation of human-machine integrated beings, or 'cyborgs'. By creating seamless transitions from human tissue to artificial materials, the boundaries between humans and machines seem to blur. One cannot tell where the human part ends and where the artificial part begins, because the atoms in place do not reveal whether they are of natural or artificial origin. Geertsema has shown that this blurring only holds in a materialist view of reality and therefore cyborgs will remain a myth<sup>15</sup>. But even given the impossibility of creating a cyborg in the sense of a perfect human-machine integration, we already know that human bodies can be enhanced by technologies (prostheses, for example). Nanotechnologies could extend these possibilities enormously. Direct connections between brain tissue and computers could allow physicians to read the electrical signals in the brain much more immediately and precisely than we can do now with scans or EEGs. We can also stimulate the brain directly and thus bring in new signals from the outside. As neurosciences reveal more and more connections between the signals in the brain and mental activities, these signals will, no doubt, have an impact on the 'enhanced' human being's thinking. The concept of cyborgs almost by necessity contains the promise of a super-being that has capabilities beyond our imagination. Here, again, we see utopian promises being made by means of anticipated technological developments being.

### 3. Utopian Thinking in Virtual Worlds

A second domain<sup>16</sup> in which we find utopian ambitions in emerging technologies is that of virtual realities or virtual worlds. Probably, the best known example of this is Second Life, a virtual world that contains almost every aspect of real life. One can create one's own avatar, give it the properties one wants (male or female, desired moods, appearance, et cetera) and enter the virtual world to meet other avatars, shop, study, start a business, and many other activities. This virtual world has certain utopian features. For instance, the possibility of choosing one's own character is something impossible in 'First life'. We can only alter our character by great effort. But the avatar in Second Life can be changed at will which gives one a flexible identity<sup>17</sup>. This means that the natural 'laws' in the human psyche (studied in psychology) can be overcome in the virtual world, at least so it seems.

Another constraint in the real world is that our acts cannot be undone and we have to take responsibility for our deeds<sup>18</sup>. In a virtual world, however, once we have committed something we regret, it is a simple matter to remove our avatar and start all over again with a new one, walking away from the consequences of what we have done. One can also question if acts in the virtual world have any consequences in the real world. This was a matter of importance when the first rape was committed in Second Life<sup>19</sup>. The person behind the raped avatar really felt raped, but the person behind the avatar raping her claimed that no real rape had occurred because no physical act had taken place. The fact that the raped person (and not just her avatar) felt raped shows that it is an illusion to think that we can escape the real world by entering the virtual world. Behind our avatar is our own 'First life' mind that cannot but obey the 'First life' order that God has created. This was humorously illustrated by the makers of the television series CSI-NY, in an episode in which the crime investigators tried to solve a murder committed in real life by trying to find the avatar of the murdered in Second Life. Mac Taylor, the male detective tried to approach the murderer by using an attractively looking female avatar. Soon, however, his female colleague Stella Bonasera had to take over because as a male, Taylor simply was not able to make his avatar behave in a female manner. Trying to negate this fact is an attempt to break away from a protection that God build into the

created world. Clearly it is not healthy to keep shifting from one character to the other. In the first place, there is a danger that one becomes uncomfortable with one's 'First life' character but is still confronted with it each time one returns to the real world. In the second place, one can become confused about one's real identity after having changed identities so frequently<sup>20</sup>.

#### 4. Utopia Thinking Even in Sustainable Technologies

The term 'sustainability' was coined by the Brundtland committee<sup>21</sup> and was defined as follows: sustainable developments are those that "meet present needs without compromising the ability of future generations to meet their needs". This seems to be something that should always be strived for, given the ecological problems we are faced with today. It should definitely be advocated by Christians, as it relates directly to the biblical notion of stewardship. There seems to be, however, a utopian notion in this definition that is hardly ever noticed. The definition suggests that every next generation ought to have the same resources as the current generation. If this is taken literally, it contains a perspective of eternity, similar to the one we noted in nanomedicine. It would mean that all decay is compensated for technologically and no loss of resources ever takes place. One could perhaps say that this was never consciously included in the Brundlandt definition. However, in the Cradle-to-cradle approach to sustainability, developed by David McDonough and Michael Braungart<sup>22</sup>, it seems to be taken in that literal sense indeed. The Cradle-to-cradle slogan is: "waste is food". This means that waste from one process can always be used as the input ('food') for another process. In a television documentary (aired in 2006 by the Dutch broadcasting company VPRO) we can hear Braungart say literally that it is fine to produce waste, as it is a positive action because it provides food for a subsequent process. This seems to contradict not only all previous policies aimed at preventing waste, but also the second law in thermodynamics that tells us that there is always a loss of quality in energy conversion. When people would indeed produce waste in a careless way

expecting all waste to be re-usable, this would enhance the environmental problems substantially and the utopia would soon turn into a dystopia<sup>23</sup>. It also contradicts the biblical word that the earth “shall wax old like a garment” (Psalm 102). This wearing away and decay of the earth is a consequence of the curse we have brought about<sup>24</sup>. But again and again, we see technological claims that humans can overcome the effects of this curse.

## 5. The Utopias Appear to be Non-places

For each of the domains discussed in the previous sections, we can already see the first signs of the anticipated utopias actually being non-places. Karl Popper argued that the whole idea of utopias in society is flawed, and even though his argument may not be entirely correct, he still should be taken seriously given his importance as a philosopher<sup>25</sup>. For each of these domains utopian promises are disturbed by experiences of undesired effects caused by efforts to realize the utopia. We have already mentioned a few when we discussed the virtual worlds and the sustainability ideals<sup>26</sup>. Also in the domain of the application of health care, first concerns about dystopian effects have been expressed.

The idea of extending our lifespan indefinitely may sound attractive at first, but it raises fundamental questions about how we view human beings. It seems that much of what we do is driven by an awareness that we have only a limited time to accomplish our goals in life. Are we still motivated to take initiatives with the prospect that we have an endless time to do that.? Do we have the courage to start a study knowing that we still have hundreds of years to go? And if that endless life also is without diseases, what will that do to our character? It is known that physically we grow stronger by being engaged in a constant battle against viruses and bacteria and that we become vulnerable when we are constantly protected from these attacks on our health. But, also mentally and spiritually,

having to struggle with setbacks helps us to develop character. What will happen if we can find easy solutions for any problem we encounter? Furthermore, some of the technologies with utopian promises bring about threats to values of human integrity and human identity. Nanochips that are implanted with the utopian promise of enhancing our brain capacities will influence our thinking in ways that we do not as yet know. We already know that drugs can have a strong impact on our personality. How much more could this be the case with electronic devices that have been designed to do just that. How can we guarantee that we have control over these devices, not only before, but also after they have been implanted and begin to influence us?

The same value of human identity is at stake when we attempt to reproduce human life. Cloning may result in two human beings with identical memories. Will they, or we, be able to sort out who was the original and who is the clone? In the movie *The Fifth Day* this problem is played out in a fairly convincing way. So the utopia of creating human beings with enhanced capacities may turn into a dystopia of loss of identity. Similarly, a utopia of human enhancement may result in a dystopia of loss of integrity. Nanorobots invading our human bodies may seem an attractive way of repairing damage within the body that would otherwise require surgery, but when control over these devices is lost, they may do more harm than good. The same holds for nanocoated drugs that fall apart only where chemical substances are present which indicate tumors or infections. How can we know that the coatings once removed do not pervade other parts of the body and become a new asbestos problem, perhaps even more serious than the original one? These are some of the examples of how utopias can suddenly become dystopias.

Several authors have pointed out the dangers of utopias turning into dystopias. Already in 1943 the famous Christian apologist C.S. Lewis warned in his book *The Abolition of Man*<sup>27</sup> that the utopia of creating superhumans in Nazi ideology would mean the loss of human values. The next (genetically

manipulated) generation would in fact have less, rather than more control, as they would have no say in the manipulations that made them into what they would be. Similar warnings (but not from a Christian perspective) were uttered by Günther Anders, first in the 1940s and 1950s with respect to the atomic bomb and other applications of nuclear energy, and later with respect to mass production and television<sup>28</sup>. Bill McKibben, in his book *The End of Nature*<sup>29</sup> warned that utopian striving for improvement (through biotechnologies) will in the end lead to the destruction of human life.

However, even when a utopia does not turn into a dystopia, it can prove to be a non-place. It is known that women who have had cosmetic surgery soon find out that they need another body improvement to reach the happiness that desired when entering the world of cosmetic surgery. True happiness is always one cup size or face lift away. In the meantime, a lot of money is invested in pursuing an ideal that is often not reached.

## 6. A Christian Response: Responsibility in Brokenness

It is striking that the theme of utopian thinking in technology has already been featured in the history of philosophy of technology for a long time. In a recent survey of the history of philosophy of technology in the Netherlands, I was struck by the fact that several inaugural lectures of professors in philosophy of technology contained this theme in a prominent way. Dutch philosopher of technology Hans Achterhuis even made it a main theme in his whole philosophical oeuvre. He particularly points out the danger of pursuing utopias in that they make people forget to take into account constraints that safeguard the responsible development of technologies<sup>30</sup>. Or, as Van de Poel and Royakkers<sup>31</sup> formulate it: human technological enthusiasm has the inherent danger of easily overlooking possible negative effects of technology and the relevant social constraints. In fact, this is

what Noble accused Christians of in his book *The Religion of Technology*<sup>32</sup>. Earlier, I refuted Noble's claim by pointing out that particularly Christians are, or at least should be, aware of the fact that we fallen humans are unable to bring about a perfect world. But there is a second element in a Christian response to Achterhuis' concern that Noble also overlooked. In a biblical perspective there is an awareness of boundaries hold in reality and limit our human interventions. In part these are given with the natural order that God has imposed on reality. These boundaries cause of some of the 'cracks' in the surface of utopias such as virtual worlds.

As we saw, nature does not allow us to alter personality in an unlimited way, just as we cannot ignore the law of gravity and other regularities ('laws') that hold for the behavior of created reality. These laws do not require our obedience (gravity works anyway), but we are obliged to take them into account when developing new technologies. A second component of these boundaries limiting our human endeavors are laws that do require our obedience. Probably the best known examples of these are the Ten Commandments. In general, they are the expressions of God's will graciously offered to advance human flourishing. Among these expressions are those that relate to personal identity and integrity. Although we do not find these exact terms in the Bible, the way the creation of humans is described as well as many other statements about the nature of humans makes it clear that humans have a special position in reality and that human personality is something that we should not tamper with whether it be our own personality or that of others<sup>33</sup>.

Instead of trying to realize a utopia, a Christian perspective should be aimed at developing technologies for an imperfect world. In a way, this is what engineers normally do. In that respect, all this utopian rhetoric must often sound strange to engineers, since they know by experience that at the very heart of a problem in engineering design a designer must deal with conflicts in the list of requirements and make appropriate trade-offs. This is what engineers learn in their education and in

practice they find out the importance of these considerations. Here we see confirmation of what C.S. Lewis claimed in his book *Mere Christianity*<sup>34</sup>, namely, that the Christian approach is the most rational one. It is an illusion to believe that we can realize a utopia through technology. Rather we should learn to deal with the imperfection of reality<sup>35</sup>.

There are at least two types of imperfections that engineers (and users of technology) should consider rather than ignoring them in an utopian approach. First, the natural aspects of reality are imperfect, but so also are the human aspects. We have seen that utopias can turn into dystopias if we try to go against natural laws, such as the relative stability of our personality in 'First life' or the unforeseen effects of nanoparticles in our body. These natural laws at first sight may seem to hamper the engineers' work because they limit out freedom. But at the same time, these laws are necessary conditions for life and for engineering. We could not design any device if we could not be sure that the law of gravity or any other natural law would hold in the future. The ordered behavior of reality is what makes design possible, and indeed life in general. This order was created and is still maintained by God in order to make reality a place we can live in. Trying to abrogate these rules in order to claim autonomous freedom is likely to result in a loss of safety and control. Utopias based on this are not only places that do not exist ('non-places') but also places that were never meant to exist as long as God's curse pertains to this reality.

There is a second type of imperfection, namely the one that resides in our human nature. Humans are imperfect beings in a moral sense. In spite of high moral expectations assumed in a humanistic approach, reality shows time and time again that humans are bound to abuse technologies in some way or other. Even when we start out developing and using technologies with the best intentions, sooner or later our motives will form a hybrid: good and bad intentions mix, and the result is irresponsible behavior in greater or lesser degree. When designing, engineers normally take for

granted that users will deal with their products honoring the aims they were designed for. This is what we call a 'proper function'<sup>36</sup>. But the designers' control over the user's handling of the artifact is limited. There are also 'accidental functions'. A screwdriver is designed for getting screws into and out of a surface, but many do-it-yourself enthusiasts use it for opening tin cans. Although this example of an accidental function seems innocent, even in this simple case damage caused by the screwdriver or the tin can's lid can be a result.

Users can also hold ideas to employ accidental functions for an evil purpose. Airplanes were designed to transport people over large distances. The 9/11 terrorists, however, used an airplane as an extreme weapon against Americans. It is almost impossible for a designer to foresee all the possible abuses of his or her design. Yet, designers should at least make a serious effort to think about possible abuses, rather than to take for granted that we can create a utopia in which no evil user exists. Such a utopia was sketched by Gene Roddenberry when he conceived his Start Trek television series. In *The Original Series*, the first series of this television show, we can see this very clearly. The Enterprise crew was tempted to respond to evil with evil, but they always used their good intentions enabled by supportive technologies. But engineers do well not to assume this; rather they should work from the assumption that there will always be someone who will use the device in unintended and evil ways.

An important part of this second type of imperfection has to do with our limited knowledge of the possible effects of new technologies. Not only has sin pervaded our intentions, but it has also affected our knowledge. This contributes to the limitations we have because we are creators and do not have the Creator's knowledge. This latter limitation, or epistemic opacity<sup>37</sup> carries with it a moral obligation to be careful in our decision making. We can estimate the effects of a search for utopias only to a limited extent. Undesired side-effects cannot be predicted. The greater the distance between the current situation and the desired utopia, the more we will be confronted with the

Collingridge dilemma: namely, the earlier in the process, the more we can decide, but the less we know about possible effects, and the later in the process, the more we know but the less we can yet decide<sup>38</sup>. Many of the utopian ambitions we have discussed, are in a very early stage of realization. The tendency to give absolute priority to this realization can make people blind to possible undesired side-effects. Instead, we should bear in mind the limitations of our knowledge. In addition, we have to take into account that, in the context of our ambitions, sin influences our knowledge in such a way that what we may hold to be true is that which we desire to be true.

Thus we need to develop 'technologies for an imperfect world'. This is what God calls us to do. Before Adam and Eve fell into sin, God called them to take care of a perfect garden. Cultivating this garden would cost them no sweat, blood or tears, since it would have naturally flourished. After sin, God spreads a curse over the earth so that it brings forth thorns and thistles. Now cultivating the earth does cost sweat, blood and tears. But this cultivation is still what God calls humans to do. He wants us to take up the hoe and weed out the thorns and thistles, knowing full well that they will always come back. We need not sit still and be silent until God restores everything. Until He comes back, He wants us to develop technologies that enable us to find shelter, food, to travel and communicate, to heal the sick, to help the blind to see, and the lame to walk. But we have to keep in mind that in spite of all our efforts, what we accomplish is not His perfect world coming. For that, we await His coming in glory.<sup>23</sup> In the meantime, we set up imperfect and temporary signs of the eternal and perfect world that He will inaugurate at the end of history. The Bible begins with a perfect garden and ends with a perfect city. It is not the garden that will return, but rather a city which comes down from heaven. Granted this is an image that is used in the book of Revelation, but still it is an image that refers to technology and not just to nature. In this city nature and technology are in perfect harmony. Trees grow unhampered in the presence of golden paving bricks.

In conclusion, responsible technology is technology that takes into account the imperfection of our current reality, rather than our striving for a human-made utopia. Building utopias is like erecting new towers of Babel. As Schuurman<sup>39</sup> has pointed out, the intentions lying behind technological developments often are similar to those behind building this famous tower in the plain of Shinar. The motives for building these towers may seem morally good from a humanistic perspective. But from a biblical perspective, they do not do justice to the fact that God has given us only one way out of the impact of the curse that we have brought over this world, namely reconciliation through Christ. Sixteenth century church reformer John Calvin had a high appreciation for the culture developed by both Christians and non-Christians<sup>40</sup>. However, he emphasized that our culture does not restore a lost paradise. Only God can and will bring into being the new perfect city that will replace the old perfect garden. Until then, we must gratefully use our capabilities to develop responsible technologies which weed the imperfect garden and build imperfect cities.

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<sup>1</sup> There are, of course, also non-technological utopias. Thomas More's Utopia was largely a political utopia.

<sup>2</sup> Non-place is the literal translation of the Greek word. I have used it here only in that sense and not in the way it is used by Marc Augé in his 1995 book called *Non-places*. In that book it has the meaning of places that we occupy so briefly that they lack significance as 'places' for us.

<sup>3</sup> Hall 2009.

<sup>4</sup> Borup et al. 2006.

<sup>5</sup> Noble 1999.

<sup>6</sup> McGrath 1990.

<sup>7</sup> White 1967.

<sup>8</sup> Alexander 1995.

<sup>9</sup> Roco and Bainbridge 2002.

<sup>10</sup> Drexler 1986.

<sup>11</sup> Larrere 2010.

<sup>12</sup> See, for instance, Kurzweil and Grossman, 2004.

<sup>13</sup> Personally I am convinced that this refers both to the physical and spiritual death. In the context of evolutionary thinking, some theologians argue for physical death having been there from the beginning of human existence. The theological consequences of this in my view are yet insufficiently analyzed.

<sup>14</sup> The idea of using science to control nature by technology goes back to Francis Bacon and his *Nova Atlantis* (1627).

<sup>15</sup> Geertsema 2006.

<sup>16</sup> The first domain was medical technology.

<sup>17</sup> Turkle 1997.

<sup>18</sup> This holds, at least, for emotionally and spiritually healthy persons.

<sup>19</sup> Dibell 1993.

<sup>20</sup> This concern was expressed by Botella et al. (2009) in the context of psychotherapeutic use of virtual worlds and by Wang (2011) for educational use.

<sup>21</sup> UNWCED 1987.

<sup>22</sup> McDonough and Braungart 2002.

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<sup>23</sup> A dystopia is the opposite of a utopia.

<sup>24</sup> This raises the question if the second law of thermodynamics is also the result of sin because of its effect of decay. I do not want to discuss that question here, but only point out that the decay is more than the effect of this law. It also has to do with the fact the humans show careless behavior in dealing with this garment.

<sup>25</sup> Paden 2000.

<sup>26</sup> In the case of virtual worlds we mentioned the possibility of identity problems and in the case of sustainability we mentioned the possibility of people creating waste in a careless way assuming that all waste can be re-used.

<sup>27</sup> Lewis 1943.

<sup>28</sup> Anders 1956 and Anders 1980.

<sup>29</sup> McKibben 1989.

<sup>30</sup> Achterhuis 1998.

<sup>31</sup> Van de Poel and Royakkers 2011.

<sup>32</sup> Noble 1999.

<sup>33</sup> Although the use of psycho-active drugs for psychiatric patients can be defended in certain cases, the dignity of human personality should make us restrictive in this.

<sup>34</sup> Lewis 1952.

<sup>35</sup> De Vries 2010.

<sup>36</sup> De Vries 2005.

<sup>37</sup> Coeckelberg 2010.

<sup>38</sup> Collingridge 1980.

<sup>39</sup> Schuurman 2003.

<sup>40</sup> McGrath 1990.