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HUMAN CLONING AND THE MYTH OF DISENCHANTMENT

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Abstract: This study has a twofold objective: firstly, it aims to examine the main types of argument that have been formulated against human cloning, to identify their presuppositions and to evaluate their strength; secondly, it aims to argue that the most important objections against human cloning are philosophical and religious, in particular the objection that human cloning represents a radical form of disenchantment or an abuse of rationality. The birth of a cloned mammal, a sheep named Dolly, which was announced on 23 February 23 1997, began a wide public debate on the morality of human cloning. I shall try to show that this debate should not be limited only to ethical and legal considerations, since it has more profound ramifications. The science of cloning is rooted in a certain metaphysical background, which, discreetly, but firmly, accompanies its spectacular promises, and which has profound consequences on our metaphysical and religious beliefs. This background needs to be openly discussed and evaluated. Moreover, it warrants the special attention of philosophers and religious thinkers alike.

Key Words: cloning, ethics, human nature, God commandments, natural science, religion, scientific worldview, metaphysics, scientific ethics

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Introduction

On 23 February 1997, the attention of the international community was suddenly captured by an astonishing announcement:[1] the birth of the first cloned mammal, a lamb named Dolly.[2] The announcement provoked genuine hysteria in the mass media, the academic community, and even legislative forums around the world. Commentators were quick to speculate about the possibility of cloning a human. This startling and hasty interpretation was determined by the fact that cloning technology had appeared so unexpectedly, and the general public was taken by surprise. It was as if all of a sudden reality had been transformed into science fiction. Although any misunderstanding regarding the imminent possibility of creating human clones was quickly dispelled by the scientists from the Roslin Institute in Edinburgh who had made the spectacular breakthrough with Dolly, the idea has nevertheless stuck, prompting a wide debate concerning the morality of human cloning.

The debate about cloning is one of the most important scientific and ethical debates to have entered the public agenda in the last fifteen years and warrants special attention. The reason for this, as has been repeatedly remarked upon by participants in this debate, is that its outcomes could affect the entire future of our species. In what follows, I shall examine the main types of argument against human cloning, identify their presuppositions, and evaluate their strength. In addition, I shall argue that the most important objections formulated in the debate are religious and philosophical, in particular the objection that human cloning is a radical form of disenchantment, or an abuse of rationality. If my arguments are correct, it will follow that any decision regarding the morality of human cloning should be preceded by an open and serious debate about what modifications and changes in our worldviews we are willing to accept. Starting with modernity, natural science has brought about a dramatic enlargement of our knowledge of the world. But this extraordinary knowledge is not neutral from the metaphysical and religious point of view. On the contrary, it involves, particularly in the case of scientific revolutions and scientific breakthroughs (cloning technology included), fundamental transformations in our image of the world and our role and place as human beings therein. Such transformations should be evaluated using philosophical arguments, because their influence goes beyond the borders of natural science.

What is cloning?

Before discussing the possibility of creating human clones, and the objections that have been put forward against it over the last decade, it would be useful to look at what cloning is in fact. For, the hysteria

provoked in the mass media by the announcement of the birth of Dolly was partly provoked by an erroneous understanding of the technology involved and its possible applications. So, what is cloning? The elementary definition is as follows: cloning is a process whereby an identical genetic copy of a particular organism is created. As a result of this process, the DNA of the two organisms, the donor of the genetic material, and the clone, will be identical. We can find a more technical definition in Winnacker: "clones are genetically identical individuals which arise through asexual or vegetative reproduction."[3] Thus, cloning allows us to obtain a genetic copy of a particular organism. But it is from this point forward that the problems begin, since many of the objections formulated against cloning proceed from confusion between the following two statements:

Through cloning we can obtain a copy of a particular individual.

Through cloning we can obtain a genetic copy of a particular individual.

The first statement is false, since the assumption whereon it rests is false. The assumption in question is genetic determinism, according to which genes wholly determine the evolution of an individual, her course through life, and her personal history; the environment or contingent events of her life are irrelevant. It is important to note that genetic determinism is false on scientific grounds. In today's scientific community the broad consensus is that genetic material determines only a part of the total amount of the properties an organism possesses. This idea appears clearly in the *nurture versus nature* debate, which rests on the premise that the morphology of any living organism depends on both genetic makeup (nature) and interaction with the environment (nurture). Although scientists have made considerable efforts to determine the proportion of each type of factor in the composition of organisms, it seems that genetic and environmental factors are intertwined after birth, and the degree to which either of these factors influences the development of an organism cannot be determined precisely.[4] However, scientists have clearly established this aspect: genes are not the only factors that determine what an individual organism will become or how it will live.

Therefore, we cannot claim that through cloning we will be able to produce a copy of a particular individual. We will only be able to obtain a genetic copy. Cloning cannot reproduce the environment in which the donor of the genetic material grew and developed. And if the environment plays an important role in the evolution of any organism, then a clone can be expected to be significantly different from the organism whose genetic material it possesses.

As regards the actual technique that resulted in the birth of Dolly, the scientists from the Roslin Institute used a procedure known as nuclear

transfer. Using techniques similar to those used twenty years ago by another researcher, Sir John Bertrand Gurdon, from Oxford University, Ian Wilmut's team removed the nucleus from an oocyte harvested from a Scottish Blackface ewe[5]. Oocytes have a "shell" of proteins and fibres, and it was through this protective coating that the researchers injected a nucleus from a quiescent mammary cell into the enucleated oocyte. That cell nucleus was from a different breed of sheep, the Finn Dorset, which happens to be a pure white breed. The scientists then used a tiny pulse of electricity to cause the new nucleus to fuse with the enucleated oocyte's cytoplasm. The electrical pulse also helps "kick start" cells into activity, so that they are more likely to divide. The new, fused cell (containing the Finn Dorset mammary cell nucleus in the cytoplasm of a previously enucleated Blackface oocyte) was transferred into the reproductive "chamber" of a Blackface ewe. The researchers then repeated this process 276 times before they succeeded in obtaining a viable embryo. After 148 days, the normal length of time for a sheep, Dolly was born on 5 July 1996. As the general public learned only after the announcement of Dolly's birth, clones had previously been made at the Roslin Institute, but from the nucleus of embryo rather than adult cells.

Therefore, cloning is, to put it in less technical terms, a sophisticated process whereby a live embryo can be obtained artificially (i.e. not through sexual reproduction), a live embryo that will be a genetic copy of another organism. The embryo is subsequently implanted into the uterus of a surrogate mother and, if all goes well, it will be born in the normal way and have the same genetic profile as the donor organism. The entire process is experimental and requires very fine manipulation of the genetic material involved (witness the large number of tests that were needed to create Dolly: 276 trials!) but it is, in principle, a feasible technique.

In the years since Dolly's birth, scientists have successfully cloned more than a dozen other species. These include cows, goats, pigs, horses, mules, deer, mice, cats, dogs, and rare and endangered species including the mouflon, gaur, banteng, and African wildcat. These advances have been backed up by significant improvements in cloning techniques, which have also resulted in a decrease in specific health risks to animal clones. Decades of research and improvement in cloning techniques have resulted in the production of animal clones that are as healthy as conventional animals or those conceived through other forms of assisted reproductive technology. There are still risks associated with cloning technology, but these are constantly being eliminated, given the huge number of laboratories working in the field and competing with each other at the international level. Given all these developments, today more and more authors argue that making a human clone is only a matter of time. For this reason, in recent years the debate on human cloning has become increasingly intense and heated, with strong arguments on both sides.

Objections against human cloning

The debate on human cloning is not uniform or coherent, but rather takes place at several levels and is very eclectic, making it highly difficult to identify the arguments put forward and the theoretical positions that inspire them. Therefore, I shall first of all attempt to classify the types of objections raised against human cloning, taking into consideration the nature of these objections, rather than the context in which they have been made or their authors' profession and/or area of expertise.[6] Then I shall discuss each of these types separately.

The objections against human cloning can be divided into three main categories:

- Empirical or scientific objections
- Ethical and legal objections
- Philosophical (metaphysical) and religious objections

Empirical or scientific objections. As a rule, objections of this category draw attention to the high risks associated with cloning technology (the as yet low success rate of the experiments, the risks of genetic malformations or serious illnesses, the lack of adequate knowledge about all the stages of the experiments), and they argue that, given all these risks, cloning experiments with human genetic material should not be carried out at present. Such objections are sound, but weak. They are sound because they draw attention to real difficulties and risks, which have been observed during experiments with animals conducted hitherto. But they are nonetheless weak because, as Levine has observed, today "there is an almost universal consensus among mainstream scientists that cloning humans for reproductive purposes is too dangerous to attempt at the current time. [...] This consensus derives from concerns about the safety of cloning and the risks the technique might pose to the fetus and developing child. If experiences with animals are extrapolated directly to human cloning, it seems likely that many cloned embryos would develop abnormally and spontaneously abort. (Of course, this also occurs in normal sexual reproduction; an estimated 50 percent of developing embryos fail to implant and many more spontaneously abort following implantation.) More concerning, to many observers, is the risk that some substantial portion of cloned embryos might develop to term but be born with potentially serious developmental abnormalities."[7] In other words, since no one is currently trying to conduct experiments with human genetic material, it is somehow superfluous to say that we should not do so because it would be very risky. But the importance of these objections comes from elsewhere. It comes from the fact that the opponents of cloning use them to claim that experiments that might lead to an improvement of the technology in the future should also be banned. Even though many scientists believe that animal experiments will be sufficient to refine cloning technology to the point where it might be safe for

humans, there are still voices which claim that this method of refinement will nonetheless require, at a certain point in the future, tests using human genetic material. And since such experiments using human genetic material are immoral, given the risks, they should in turn be prohibited. In the United States, for example, an advisory committee tasked with providing bioethics advice to former President George Bush concluded that because human cloning is unsafe today and because experiments to make it less safe would also be unethical, "there seems to be no ethical way to try to discover whether cloning to produce children can become safe, now or in the future."[8] Such a conservative perspective, however, depends on the assumption mentioned before, namely that improvement of cloning technology will require the use of human genetic material. But this assumption is poorly supported. As many researchers have noted in the last few years, technologies with a similar degree of difficulty have been improved in recent decades without the use of human subjects or human genetic material. Therefore, the possibility of bringing about improvements in cloning technology without causing any moral harm to human beings remains open. The only way to block this process entirely would be to ban experiments on animals. But for such a drastic measure a very broad consensus would be required among ethical advisers and policy-makers, a consensus that is still far from being reached.

Ethical and legal objections. Objections of this category go even further and raise questions about the morality of human cloning even under conditions where the technology would be safe and not constitute any danger to the human subjects involved. Most of the authors who endorse such objections start by weighing up the advantages and disadvantages that might be obtained in future from reproductive cloning, and argue that the benefits would not be consistent enough to allow the future development of human clones. Or, in some cases, they argue that these benefits could be obtained in other ways. However, given the fact that no human clone has yet been made, all the arguments concerning reproductive cloning, whether pro or contra, are still hypothetical. They rely only on what experts in bioethics suppose would happen if such experiments were carried out: the impact they would have on society, parents, and cloned individuals; the question of the legal status of clones, given that they would be genetically identical to their donors; etc. But let us look at what benefits have been anticipated, and what objections have been raised against them. Levine identifies four classes of benefits that could be obtained from reproductive cloning:

The fight against infertility. For some couples, cloning might be the only way to have a child that is genetically related to one of the parents. As N. Gavriluță puts it, "through the cloning technology [...] the impossible would become possible, by the manipulation of the genetic material of at least one of the parents."[9]

Replacement of a child that has died. Some couples that have lost a child at an early age might want to replace him or her with a genetic copy.

Provision of genetic material to treat a sick child. In the case of a serious illness, for whose treatment genetic material similar to that of the patient is required, cloning could be the best chance.

Homosexual couples could choose cloning as a way to have a child that is genetically related to one of the partners.

Opponents of cloning say that none of these scenarios are consistent enough to give moral legitimacy to human cloning:

Infertility can be controlled by other means, not necessarily through cloning (*in vitro* fertilisation, the use of surrogate mothers). In addition, the desire of a couple to have a child with the same genetic material as one of the parents cannot justify the making of human clones.

The replacement of a child that has died with a genetic copy of the same child could lead to major psychological trauma for both parents, and also for the baby (who will always be compared with the donor). As Habermas puts it, "a human being who has been eugenically programmed has to live with the awareness that his hereditary features were manipulated in order to act purposefully on his phenotypic molding."[10]

The creation of a genetic copy to treat a sick child would be tantamount to *objectification* of the clone. For, the clone would be created with a well-defined purpose, and it is possible that she would be treated as an instrument.

Homosexual couples can have children by resorting to other means, not necessarily to cloning (again, *in vitro* fertilisation or surrogate mothers).

As regards the legal objections, some authors have argued that clones would not enjoy equal rights with other citizens, and therefore human cloning should be prohibited. The argument here (one that is quite tangled) is as follows: in many countries reproductive cloning has been prohibited by law. However, it is still possible that in the near future cloning technology will become reliable and affordable for the general public and human clones could appear, in countries where there is not yet any legislation on cloning, or where reproductive cloning has not been prohibited. These individuals will have the status of *illegal beings* in countries where cloning is prohibited, and therefore their freedom will be dramatically reduced. As Kerry Lynn Macintosh says, for example: "Thus, we face a realistic possibility that humans conceived with the aid of cloning technology will be born in our maternity wards, attend our public schools, become our friends, marry into our families, and work alongside us. But if cloning is a crime, these individuals will endure a society that has attempted through its democratic institutions to prevent their very existence."[11] The counterargument to this general concern regarding the legal status of clones is that the laws could be adjusted, even dramatically so, in accordance with the community's interests, and that it is

nonetheless highly unlikely that society will consider potential clones as sub-human creatures, whose existence should be prohibited by law.

As I believe is clear from this brief review of some of the most important ethical and legal objections, there can be no decisive objection to human cloning as long as it is only a hypothetical case. Whatever the scenario we might imagine, since it is merely hypothetical, it is always possible to imagine a counter-scenario, likewise hypothetical, which would allow us to argue the opposite thesis. This does not mean that ethical and legal objections are necessarily weak, but only that as long as we are not able to assess the real implications and consequences of the case in question they cannot have sufficient weight. A ban on reproductive cloning based only on hypothetical scenarios would be equivalent with an abuse, because it would mean making a decision on insufficient grounds, and this, in turn, could create a dangerous precedent for the freedom of scientific research and even for human freedom in general. As Levine says, talking about the right of the individuals to enjoy reproductive freedom through cloning: "in the absence of evidence of significant harm, decisions regarding its use should be left to individuals, not the government."[12]

Philosophical and religious objections. But more serious objections to the prospect of human cloning come from a different direction, namely metaphysics and religion. Here we encounter not only general objections, such as that cloning is a violation of the natural order or a radical form of disenchantment (an abuse of instrumental rationality), but also particular objections, from the perspective of religious doctrines, such as that cloning is tantamount to a violation of God's commandments. The doctrinarian religious objections are largely based on interpretations of sacred texts, as well as on explicit points of view expressed by representatives of religious institutions. In this respect, there are notable differences from one religion to another. For example, in Islam, human cloning would be tantamount to a violation of the special status granted to humans by the Creator Himself. As Reza Sheikholeslami says: "Man, as he is represented in the Koran, is a divine creation. God not only created him, but also thought that He created him well. As a creation of God, one can deduce that man is untouchable. His destruction is manifestly the destruction of the divine order, the work of God, an attack on the Deity himself."[13] Although in Islam, unlike in Christianity, man is not endowed with divine attributes, human nature is unalterable because it is the work of the Creator. Furthermore, man, as a creature, is living proof of the existence of the Creator. In other words, in Islam human dignity derives from the fact that man is God's creation: "Men have dignity, not because they are God's children or resemble him at all, but because men are created by God. Again the Koran returns to the theme of creation. If creation is set aside, man enjoys no other dignity."[14]

This interdiction on any violation of the order established by God through His Creation also appears in Christianity. Here, man is seen as a unique creature inasmuch as God created him in His own image. It was the Creator Who established human nature, and cloning is seen as a violation of the divine prerogatives. For many Christians, God represents the supreme wisdom, Whose will is the ultimate source of natural law. Man must not create life; God alone knows how we should be made. Man is not able to control himself well enough to avoid the temptation to misuse the technologies he creates. If God has established since the beginning of time that woman shall give birth to a child whose genetic makeup is determined by the sperm and the egg, then this is how it must remain forever.

In Judaism and Buddhism, on the other hand, cloning is not explicitly condemned as a violation of the divine order, but rather it is often interpreted as a beneficial act, as long as it is motivated by good intentions and for good ends. In Judaism, for example, the attitude to cloning and genetic research is generally very liberal[15]. As Manfred Oeming says: "The rational, pro-scientific world view of the Old Testament results in a large degree of religious openness towards research, also within the area of genetics. When human beings change the structure of genes in order to improve creation, this is not arrogance, but the consequence of our empowerment to co-develop creation (*imago dei*)."[16] The same permissive and more liberal attitude towards reproductive cloning can also be found in Buddhism, where, according to Jens Schlieter, "the biomedical procedure of an artificial, asexual reproduction does not offend religious feelings or basic value sets of Buddhists, if certain preconditions of the procedure of cloning are fulfilled."[17] With respect to therapeutic cloning[18], however, Buddhism has a more reserved attitude, given the Buddhist doctrine according to which life is good in itself and should not be sacrificed, no matter to what end.

It is obvious from this brief survey that the most fundamental of the differences between the main religious attitudes towards cloning technology and the prospect of creating human clones arise from differences in religious doctrine. And the important point to be noted here is that all these attitudes toward cloning are no more debatable than the religious doctrines that inspire them. In other words, if the individual's right to hold whatever religious convictions she chooses is an inalienable right of every human being, then the same right also entails the right to hold beliefs about cloning that are consistent with one's religion without thereby becoming subject to opprobrium from other individuals or society as a whole. Or, to put it more generally, if adherence to a certain worldview is a legitimate right of every individual, then we cannot pass judgement on convictions that follow from a worldview different than our own, provided, of course, that the convictions in question do not involve any harmful actions against those who do not hold them.

With regard to what I have called the *metaphysical* objections against human cloning, there are two arguments that warrant particular attention: the argument that cloning is a violation of the natural order, and the argument that cloning technology would be equivalent with a radical disenchantment of the world, namely a disenchantment of human being. The first of these objections can be dismissed relatively easily, but not the second, as I shall attempt to demonstrate below.

Let us start with the first of these. The objection that cloning, particularly human cloning, is a violation of the natural order is based on an assumption which is difficult to maintain today, namely that the natural order has been given once and for all and is wholly external to humans as knowing subjects. This is a presupposition that has been deeply rooted in Western philosophy ever since Antiquity. The belief in the existence of a given order present in Nature, an order that we are capable of discovering precisely as it is, is the foundation of every great philosophical system of the past. This, as Rorty puts it, was the great philosophical project of Modernity. But the project proved to be unachievable. Since Immanuel Kant, the idea that we do not discover the truth, but rather creatively construct it using our mind, has become widely accepted. The structures of our mind, the structures of our language, and also the social, political and cultural institutions of the society in which we live determine the meaning of such concepts as "truth", "justification", or even "nature" (human nature included). With regard to the latter, for example, Descartes believed that man is essentially a thinking subject, a rational being, who seeks to discover the truth about his own nature, and also the truth about the world. Later, Freud challenged this idea, arguing that man is essentially a being driven by sexual impulses, which are not exactly honourable from the perspective of current social or moral norms. Failure to satisfy these impulses leads to neurosis and alienates man, sometimes drastically. Which of the two is right? Both and neither, at the same time! We can never find out what essentially constitutes us as human beings, because we study ourselves using our own faculties and abilities and so we can never be objective. But, on the other hand, it is true that sometimes we behave rationally, and sometimes we do not, as we are dominated by our natural instincts and impulses, sexual or otherwise.

The moral of all this is that, once we have accepted that truth is something we ourselves construct using our mind, we can no longer believe in the possibility of discovering how things really are, out there. We can never discover what is the essence of our human nature, or the essence of reality as a whole. For, as Rorty puts it, "the world does not speak. Only we do. The world can, once we have programmed ourselves with a language, cause us to hold beliefs. But it cannot propose a language for us to speak. Only other human beings can do that. "[19] This does not mean, of course, that we have to accept any arbitrary opinions (about the

world or about ourselves) as being justified, but only that we should recognise that the justifications for our opinions, in this case our opinions about cloning, must appeal to what is humanly available and desirable, not to any alleged agreement with Reality as it is in itself. As long as we are unable to know how things really are in themselves, we cannot say that human cloning would be a violation of the natural order of things.

The second metaphysical objection against human cloning is, as I have suggested above, harder to reject, and requires separate discussion. The reason is that, as an objection, disenchantment is directed against not only cloning technology, but also a significant proportion of the science and technology we possess today.

Science as disenchantment

The term "disenchantment" acquired a well-defined meaning in the work of Max Weber, in particular in his essay "Science as a Vocation", which he first delivered as a public lecture at the University of Munich in 1918, two years before his death. In the essay, speaking about the history of Western civilisation and the impact of modern science on the Western mentality and culture, Weber argues that the progress of science, particularly since modernity, has been equivalent to or accompanied by a gradual disenchantment of the world, a scattering of the myths and narratives that were formerly employed to explain all natural phenomena. According to Weber, this process of gradual disenchantment of the world has been inspired or motivated by the idea that man "can, in principle, master all things by calculation."[20] The impulse to dominate and control nature is not limited only to science. Rather, it is a universal trait of human beings. However, what science[21] brings about, Weber believes, is an absolutely spectacular increase in efficiency with regard to our capacity to control nature. Magic was not a precise art; it was an art without rules, and largely inefficient. Science brought rigorous and precise rules and, above all, efficiency. In the enchanted or pre-scientific world people attempted to exert control over nature through magical tools, seeking to appease the gods, to obtain their benevolence. This was against the background of a specific fabric of metaphysical beliefs, which revolved around the idea—common to most pre-modern cultures and ages—that the world is a divine creation, and that God is the master of all things, both in Heaven and Earth. The world was seen as being magical precisely for that reason: it was considered to be a work of God, the Supreme Architect, created by divine means, and this creation was seen as a process that transcends, in essence, our capacity of understanding. The great chain of Being, the nature of all things and the nature of man were consequently considered immutable and established by divine wisdom. Any attempts to gain control over the events of our private or social life had to be

formulated as prayers or requests addressed to God and therefore had to be shaped in the form of rituals.

For Weber, this process of disenchantment, which commenced simultaneous with the development of science, is equivalent to a rationalisation or intellectualisation of the world, since he sees science (and technology) as a product of a rationalist programme of inquiry into the workings of nature, an inquiry based on the assumption that the world is merely a immense chain of natural causes and effects. Even if the parents of modern science saw the study of nature as motivated and inspired by the ideal of discovering the rational plan whereby God created the world, or the ideal of discovering, as Weber puts it, "the path to God"[22], at some point science began to proclaim its independence from any metaphysical and religious background. However, at the same time as it gradually moved away from its metaphysical and religious roots, science also started to separate itself from society, thereby losing its capacity to offer guidance, meaning, and purpose. It became an instrument. Thus, speaking about the status of science at the beginning of the twentieth century, Weber says: "Who—aside from certain big children who are indeed found in the natural sciences—still believes that the findings of astronomy, biology, physics, or chemistry could teach us anything about the meaning of the world?"[23]

Weber suggests that the development of modern science has, on the one hand, brought about a dramatic increase in the human capacity to control nature and, on the other hand, a gradual loss of confidence in the values and meanings traditionally projected onto the world. Moreover, science has been unable to fill the void left by the disappearance of these traditional values and meanings. Severed from metaphysics and religion (devoid of "presuppositions", as Weber puts it), science provides us with an extraordinary tool to control the natural phenomena through technology, but it cannot tell us how to live our lives or what might make us happy: "natural science gives us an answer to the question of what we must do if we wish to master life technically. It leaves quite aside, or assumes for its purposes, whether we should and do wish to master life technically and whether it ultimately makes sense to do so."[24]

This description of the status of natural science was essentially correct at the beginning of the twentieth century. Indeed, the ideal of a science without presuppositions was dominant in the Western world in the first decades of the century, when Weber gave his lecture on science at the University of Munich. But today this description is no longer valid. "Science without metaphysics", as the founders of logical positivism like Carnap and Schlick have proclaimed, has proven to be a utopian ideal. Science has always had metaphysical presuppositions, as Collingwood said,[25] but most of the time these presuppositions have not been made explicit and most scientists are not aware of them. But without such presuppositions, the whole institution of science is meaningless, and

irrational. For example, the belief that mathematics (or "calculation", as Weber puts it) is applicable to the study of all natural phenomena. This is not a scientific statement or judgment given that, taken as such, it is not verifiable: we cannot tell whether it is true or false. And we cannot do this for the simple reason that we are unable to examine all the natural phenomena to see whether they can be successfully studied using the tools of mathematics. However, this is a belief without which the whole foundation of modern natural science would be unthinkable. Another example is the belief that nature as a whole is dominated or governed by regularities and order. This is also a metaphysical belief and, moreover, one that is unverifiable through empirical or experimental methods. Assuming it is true, all we can say is that hitherto we have been successful in our investigations and experiments. Which means that when we have studied natural phenomena persistently enough and with a strong enough belief in the existence of an underlying natural order, we have indeed discovered such regularities. But this does not mean that we have validated the metaphysical belief that "there is order throughout the world". And such metaphysical beliefs are legion in natural science. They give structure and orientation to any scientific hypothesis. But in themselves they are not scientific.

In one sense, Weber observed very well this feature of natural science when he said that the gradual disenchantment of the world, brought about by scientific progress itself, is inspired by the belief that man is capable of controlling the whole of nature through calculation. It was merely that the historical moment did not offer him any opportunity to identify the precise nature of this belief. For, this too is a metaphysical belief, one that can be observed *at work*, so to speak, even today, in the debate on human cloning. Behind the arguments formulated by many of the enthusiastic supporters of human cloning lurks this very idea: that in the absence of serious risks, the expected utility of cloning technology should be sufficient to grant it full legitimacy. In other words, if we can control nature, in this case our biological nature, through calculation, and without any harm, then we ought to do precisely that. If we were still stubbornly to ask why, then we would probably get the following answer: "Because it is useful! Because with the help of this technology we can control such and such phenomena which are otherwise uncontrollable, and which might have negative effects on us." Which precisely proves the point: that controlling nature through technology and the benefits that this control offers us constitute the main elements of the metaphysical background that inspires most of the pleas and arguments in favour of human cloning.

The one question that nevertheless remains unanswered in all these scenarios and arguments in favour of cloning is the following: how can we justify, other than by appealing to its utility, our tendency to pursue at any cost the ideal of controlling nature? I say "other than by appealing to its utility" because, if this were the only thing we could put forward as a

foundation for the demiurgic worldview that inspires most of contemporary science, then we would have too little. Of course, it would be a conclusion that would delight James, the founder of the American pragmatism (and perhaps some of his more enthusiastic followers, such as Rorty), but not many others, and for good reason. For, if utility is the main metaphysical foundation for this ideal of controlling nature, then the whole scientific enterprise is transformed into a purely mercantile activity. Galileo saw the study of nature as inspired by the ideal of deciphering the divine plan of the Creation. This quest was supported by his belief that God wrote the book of nature in the language of mathematics, and that God has given us the light of reason precisely for the purpose of discovering His grand design. Are we prepared to say today, just a few hundred years later, that the study of nature is motivated and inspired only by a desire to provide ourselves with greater material comfort? I think not. Nonetheless, it is very hard to see what other metaphysical foundation we might put forward to support the unequivocal claims to more comprehensive control over nature, including our biological nature, which many scientists have made in recent decades.

Natural science evolved against a background of tacit, but strong metaphysical beliefs about our relationship with nature, our place in the world, our relationship with other species, etc. Science has always had an underlying metaphysics, which gave it direction and guidance, purpose and meaning. At the beginnings of modernity, this underlying metaphysics was dominated by the belief that through the power of reason and mathematical rigour man can decipher the plan whereby God created the world. Today, the underlying metaphysics of science is dominated by the belief that anything capable of bringing us additional material comfort is worth doing. The idea that science is motivated and inspired solely by man's desire to discover and understand the world is a naive utopia. Science has always been motivated by more than that. I insist on this point because I believe that this is precisely the reason why the objection of disenchantment or excessive rationalisation with regard to cloning, especially human cloning, is very important and powerful. The disenchantment of the world and the disenchantment of our biological nature through cloning can bring numerous benefits; it can bring much comfort and utility. But it also brings with it a certain worldview which is not shared by all of us, and, possibly, one that we are not willing to embrace. Or perhaps I am wrong, and perhaps most people would be willing to accept this utilitarian metaphysical worldview, one that does not place any limits on our actions in the world provided that they increase our material comfort and control over nature. But it would still be fair to discuss these issues openly, to discuss the metaphysical beliefs that inspire and motivate the science of cloning and, in general, contemporary science.

As I have already observed, science without metaphysics, as proclaimed by the logical empiricists of the early twentieth century, was an inspiring but utopian manifesto. Exceptional scientists such as Einstein, Bohr, Heisenberg, Dobzhansky and many others abundantly proved this in their outstanding philosophical reflections, written in the same period in which logical positivism conquered the world of philosophy. Today, even if philosophers themselves recognise the failure of the positivist programme, they still remain in its shadow. For they are still reluctant to violate one of the main commandments of logical positivism: do not speculate! (Which might be read mischievously as: do not use your imagination!). But scientists do not really care about this interdiction. One example is the brilliant British scientist Stephen Hawking, who, with great gusto, is constantly advancing metaphysical speculations. For example, in his latest book, *The Grand Design*, Hawking makes a series of statements that have been intensely debated in mass media, about the non-existence of God and the death of philosophy, which, he believes, is no longer able to answer the big questions that have always haunted us: why are we here, where do we come from, what is the meaning of life.[26] Hawking's judgements are, of course, metaphysical statements. They are not rigorously supported by the achievements of contemporary physics or even by Hawking's own scientific contributions. At most, they are speculations, which are merely inspired by those achievements. But this is not anything new. Hawking has been formulating such metaphysical speculations ever since his first book for laymen, *A Brief History of Time*, published in 1988, which has sold over nine million copies. Here is one example: "With the success of scientific theories in describing events, most people have come to believe that God allows the universe to evolve according to a set of laws and does not intervene in the universe to break these laws. However, the laws do not tell us what the universe should have looked like when it started—it would still be up to God to wind up the clockwork and choose how to start it off. So long as the universe had a beginning, we could suppose it had a creator. But if the universe is really completely self-contained, having no boundary or edge, it would have neither beginning nor end: it would simply be. What place, then, for a creator?"[27]

Even if metaphysical statements such as those formulated by Hawking are merely sweeping generalisations, ones that are naive and misleading, they are still motivated by a genuine need on the part of contemporary science, the need for guidance and direction. Science needs philosophy; it needs the metaphysical background whence it sprang. And perhaps it is time for philosophers and religious thinkers to understand this fact, and to meet this need in a more systematic manner. Otherwise, if they remain in their ivory tower of prudent reflections and pure conceptual analysis, then Hawking will be right: philosophy is dead.

Conclusions

In the present paper I have tried to show that the project of human cloning deserves special attention from philosophers and religious thinkers given its metaphysical background, a background it shares, as we have seen, with much of contemporary science. It is not enough to discuss cloning in general and the prospect of human cloning in particular only in ethical or legal terms. Ethical and legal arguments are important but they fail to shed light on the whole scaffolding of philosophical (in other words, unscientific) opinions and beliefs that shore up the science of cloning. For, cloning technology is not just an ordinary instrument to alleviate human suffering, as its defenders so often present it[28]. Cloning, and in particular human cloning, has a bearing on our profound metaphysical and religious beliefs. Much of contemporary science is based on a metaphysical background with radical utilitarian connotations. It is based on the belief that utility and control constitute the main criterion according to which we should guide the evolution and progress of our scientific endeavours. Perhaps this criterion is sufficient when it comes to technologies aimed at reducing environmental pollution or fossil fuel replacement, which is to say, technologies that try to eliminate problems created by science itself and its past technological applications. But I do not think that it is enough when it comes to human cloning, genetic manipulation, or other technologies that will bring about profound changes in our daily life and the belief systems we share.

In fact, I might say that this is the main element I have tried to clarify in the foregoing pages: the fact that the science and technology that will lead to the creation of human clones are inspired by a metaphysical vision that is perilously mercantile and impoverished, a vision that is not discernable as long as we talk about cloning only in terms of costs and benefits. It is a vision focused solely on utility and market value. I have no doubt that cloning will offer a number of benefits for certain individuals, groups or communities, benefits which could prove to be very significant. However, we should ask ourselves the following question: are the benefits sufficient to mean that we ought to proceed with this? For many of the enthusiastic supporters of the project of human cloning the answer to this question is a categorical yes. But I think this answer is determined not by the benefits that this technology promises, but rather by the fact that they share the tacit metaphysical background that inspires the project. Of course, this statement may seem unfair. One possible objection to it might go as follows: since the supporters of cloning do not profess to share the metaphysical vision you say lurks behind the technology of cloning, how can you justify the statement that they share that vision? My answer would be that the metaphysical and religious beliefs that someone holds can be discerned or deduced from what that person says, even if what he says is not necessarily metaphysical or religious in nature. But to avoid

such scholastic-sounding controversies, let us posit the question in the same quasi-economic terms accepted by most of those who support cloning for the sake of its alleged benefits. As I said earlier, I have no doubts that these benefits will be real and important to some people. But they will also come at a cost. The costs will, I think, include important changes to our worldviews, whether religious or secular. These changes will not be overt, but rather insidious, insinuating themselves along with the spectacular material benefits promised by the technology of cloning. If this is so, we should ask ourselves the same question as I put above: is it worth paying such a cost for the promised benefits? Or, more generally: is it worth changing our worldviews in order to benefit from cloning technology? Naturally, such a question can be answered only by each of us individually, using our own conscience. I do not intend to support one answer or another here; I merely wish to point out that we must ask ourselves this question *before* the technology of cloning and the cloning of human beings becomes a fact of life.

The science and technology of the last fifty years or so have developed at an astonishing rate and have been fuelled, pushed forward or held back only by economic, political, military and moral factors. Moral constraints have come last. It is only in the last few decades that scientific research has come to be regulated and restricted by ethical codes and institutions that monitor and sanction cases of immoral behaviour. The so-called "Tuskegee case", an experiment with human subjects that was conducted in the United States over several decades, ended only in 1972, when an American journalist disclosed the serious human rights and professional ethics violations committed by the scientists involved in the experiment[29]. Maybe it is time to talk about the implications that scientific research and new technologies have on our core beliefs, whether philosophical or religious. I do not see any reason why these beliefs should not be counted among the price that we have to pay for all the products of scientific progress, including cloning technology. After all, these beliefs are extremely important and precious to all of us, whether we are supporters or opponents of cloning. For, we live our lives and make our everyday choices according to them. I strongly believe that an open discussion about the fundamental and intimate beliefs of every human being and about the implications that human cloning might bring to bear on them is imperative today. Or, to end in the same utilitarian terms used by the proponents of cloning, I think that such a debate could be genuinely beneficial to our welfare, not only material, but also spiritual.

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[2] Named after famous country music star Dolly Parton. The genetic material from which Dolly was obtained came from the mammary glands of a sheep. The name "Dolly" is thus a jesting allusion to the anatomical source of the genetic material used in the experiments.

[3] Ernst-Ludwig Winnacker, "Human Cloning from a Scientific Perspective", in *Human Dignity and Human Cloning*, eds. Silja Vöneky and Rüdiger Wolfrum, (Leiden/Boston: Martinus Nijhoff Publishers, 2004), 55.

[4] See, for example, Jerome Kagan, *The Temperamental Thread: How Genes, Culture, Time and Luck Make Us Who We Are*, (New York: Dana Press, 2010). Kagan argues that everyone is born with a biologically-based temperamental bias that is evident in infancy and influences our future behaviour, but how it evolves as we grow up strongly depends on a range of environmental factors such as our ethnicity and gender, how our parents treat us, their/our social class, the size of our home town and whether or not we have older or younger siblings.

[5] Ewes are female sheep. The Scottish Blackface breed is a common breed of sheep in Great Britain, especially in Scotland, easily identified by its black face.

[6] Many of the objections formulated by philosophers draw attention to scientific difficulties and vice versa, and some objections formulated by scientists raise ethical or philosophical problems. This is why I believe it is more useful to classify the objections according to their intrinsic nature, not their source.

[7] Aaron D. Levine, *Cloning. A Beginner's Guide*, (Oxford: Oneworld Publications, 2007), 118.

[8] President's Council on Bioethics, *Human Cloning and Human Dignity: An Ethical Inquiry*, (Washington, DC: 2002), xxvii.

[9] Nicu Gavriluță, "Cloning: Blasphemy or Blessing? Mythical-Religious Structures, Ethical Controversies and Social Consequences", *Journal for the Study of Religions and Ideologies*, vol. 3 issue 8 (2004): 113.

[10] Jürgen Habermas, *The Future of Human Nature*, (Cambridge: Blackwell/Polity Press, 2003), 54.

[11] Kerry Lynn Macintosh, *Illegal Beings*, (New York: Cambridge University Press, 2005), 3-4.

[12] Levine, 121.

[13] Reza Sheikholeslami, "The Creation and the Dignity of Man in Islam", in *Human Dignity and Human Cloning*, eds. Silja Vöneky and Rüdiger Wolfrum, (Leiden/Boston: Martinus Nijhoff Publishers, 2004), 8.

[14] Sheikholeslami, 12.

[15] Although there are also authors who are more prudent in assessing the relationship between cloning and the Jewish tradition. See, for example, Michael J Broyde, "Cloning People and Jewish Law: A Preliminary Analysis", http://www.jlaw.com/Articles/cloning.html. According to Broyde, "in the case of cloning [...] the Jewish tradition is betwixt and between two obligations. On one side is the general Jewish obligation to help those who are in need, and particularly exemplified by the specific obligation to reproduce, thus inclining one to permit advances in reproductive technologies that allows those unable to reproduce, to, in fact, reproduce. On the other side is the general inherent moral conservatism associated with the Jewish tradition's insistence that there is an

objective God-given morality, and that not everything that humanity wants or can do is proper; this specifically is manifest in the areas of sexuality where the Jewish tradition recognizes a number of halachic doctrines which restrict sexual activity. In addition, the Jewish tradition advises one to pause before one permits that which can lead down a variety of slippery slopes whose consequences we do not fully understand, and whose results we cannot predict."

[16] Manfred Oeming, "The Jewish Perspective on Cloning", in *Human Dignity and Human Cloning*, eds. Silja Vöneky and Rüdiger Wolfrum, (Leiden/Boston: Martinus Nijhoff Publishers, 2004), 43.

[17] Jens Schlieter, "Some Aspects of the Buddhist Assessment of Human Cloning", in *Human Dignity and Human Cloning*, eds. Silja Vöneky and Rüdiger Wolfrum, (Leiden/Boston: Martinus Nijhoff Publishers 2004), 23.

[18] Therapeutic, or medical cloning, as it is more commonly known, is carried out not in order to produce another organism, but rather to harvest embryonic stem cells for use in various medical treatments. Embryonic stem cells are those cells found inside of developing embryos. They can be used to produce a number of different cells including tissue, muscle, and organ cells.

[19] Richard Rorty, *Contingency, irony, and solidarity*, (Cambridge: Cambridge University Press, 1989), 6.

[20] Max Weber, "Science as a Vocation", in From Max Weber: Essays in Sociology, eds. H.H. Gerth and C. Wright Mills, (Oxford: Oxford University Press, 1946), 139.

[21] Weber takes science and technology to be inseparable. This perspective has very strong repercussions on the cloning debate, because some defenders of cloning argue that we need to distinguish between the science of cloning and the technology of cloning. According to them, we can criticise and regulate only the latter. Science as fundamental research should be free from any limitations.

[22] Weber, 142.

[23] Weber, 141.

[24] Weber, 144.

[25] See, in particular, R. G. Collingwood, *An Essay on Metaphysics*, *Revised Edition*, (Oxford: Clarendon Press, 1998).

[26] Stephen Hawking and Leonard Mlodinow, *The Grand Design*, (New York: Bantam Books, 2010).

[27] Stephen Hawking, *A Brief History of Time,* (New York: Bantam Books, 1988), 71.

[28] See, for example, John Harris, *On Cloning*, (New York: Routledge, 2004).

[29] For a detailed discussion of this case, see Susan M. Reverby, *Tuskegee's Truths: Rethinking the Tuskegee Syphilis Study*, (Chapel Hill: University of North Carolina Press, 2000). For a brief description of some famous cases of immoral behavior in science, see David B. Resnik, *The Ethics of Science. An Introduction*, (New York: Routledge, 2005).

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