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## **Can we give up the origin of humanity from a primal couple without giving up the teaching of original sin and atonement?**

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*Recent genetic studies have strengthened the hypothesis that humans did not originate from a single couple of the species *Homo sapiens*. Different models have been proposed to harmonise this with Christian belief on original sin and atonement. In this article I discuss these models and propose a new explanation derived from Thomas Aquinas *Summa Theologica* I, 98-100 and Romans 5:19;11:32. I argue that generations may have passed before the appearance of sin, and hence belief in 'original sin' does not require that it was committed by a pair of persons who are biologically the common ancestors of all human persons. In the light of this analysis I consider moral responsibility as the distinctive sign of human personhood, and assume that the creation of the first human persons happened during the Neolithic period. The article concludes that views of the biological origin of humanity from a primeval *Homo sapiens* population (polygenism) or a single couple (monogenism) are both compatible with Christian belief, and therefore deciding between these two hypotheses should be better left to science.*

Keywords: human evolution, genetic diversity, '*Homo divinus*', 'relational damage', God's intervention, first human persons, Adam and Eve, Romans 11:32, moral responsibility, original sin, atonement, Darwinian principles, monogenism, polygenism.

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*Four appendices are available as online supplementary material.*

### **I Introduction**

The hypothesis that humans did not originate from a single couple of the species *Homo sapiens* is receiving increasing support from current research on individual whole-genome sequences.<sup>1</sup> It is therefore important to interpret the Genesis narrative of the origins of mankind to account for these emerging scientific observations.

In the search for truth, observation is the highest authority. All human knowledge is based on sense or mental data and grows through logical

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<sup>1</sup> Li, H. & Durbin, R. 'Inference of human population history from individual whole-genome sequences', *Nature* (2011) 475, 493–496.

inference from our observations. The fact that we agree about the reality we observe allows us to speak about it and to infer truths that we have not yet observed. In theology the basis for inference is enlarged by revelation; that is Scripture acknowledged as the Word of God. Theology therefore includes the 'data of revelation'. Both science and theology are human activities and share the same dependence on data, the same requirement for human commitment and the same growing grasp of a reality which cannot be reduced to the creation of the human mind. Nonetheless Scripture requires interpretation, which should concur with other observations that also have prime importance in matters of religious belief. This principle is particularly important in apparent conflicts between science and Christian belief. These cannot be due to 'any intrinsic disagreement between these two approaches to truth' but rather to a conflict between emerging observations with 'entrenched interpretations of Scripture',<sup>2</sup> or because of false inferences from incomplete sets of data (fallacies).

No one today doubts that the Copernican model is perfectly compatible with the Scripture and Christian faith, and that astrophysical data can help us to interpret the sense of many passages of the Bible correctly. Similarly, today's genetics is allowing us to reconstruct the history of humanity with increasing accuracy, as cosmological observations allow us to reconstruct the history of the universe back to near the Big Bang. When interpreting the narrative of Genesis about the origins of humanity, it is therefore vital for the self-consistency of the Christian faith, to take account of emerging scientific observations. As Allan Day states:

This approach should be made, not as an attempt to conform science to the Bible or the Bible to science, but rather as one in which science serves along with history, culture and language as one of many inputs into the interpretative exercise.<sup>3</sup>

Because of the lack of sufficient data, many scientific conclusions are presently at the level of conjecture. Nonetheless, it would not be wise to ignore the direction in which they are pointing. This essay aims to explore whether the emerging scientific data on human origins challenge Christians to give up the origin of humanity from a primal couple and how this coheres with belief in original sin.

Since there are different Christian views about 'original sin' it is important to define what is meant by the term. My main assumption is the characterisation given by St Paul in Romans 5: 12, 14, 17-19, and the principle stated in Romans 11: 32. I therefore accept that original sin is a state which proceeds from the first sin, and is 'transmitted by propagation and

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2 Day, A.J. 'Adam, anthropology and the Genesis record –taking Genesis seriously in the light of contemporary science', *Science & Christian Belief* (1998) 10, 115-143.

3 Day, A.J. *op. cit.*, (2).

not by imitation' to all human persons since the first trespass, so that 'the state of original sin is in everyone as his own'.<sup>4</sup> I also accept Augustine of Hippo's tenet that original sin cannot be reduced to a bad example set by the first man (Adam), which then is imitated generation after generation.<sup>5</sup> However, I do not share the view that original sin is transmitted *only* through 'carnal generation' (biological reproduction). The perspective I take is not that of deducing how original sin is transmitted from 'Adam and Eve' but how creation of the first human persons happened, starting from original sin, redemption and other available observations.<sup>6</sup>

The main result of this discussion will be that original sin, although caused by human persons, can be considered a state that makes it possible for mankind to be redeemed by God, and in this sense is also the work of divine mercy. The state of original sin is provoked through the first sin, which is the personal misdeed of one person, even if it is subsequently committed by several persons (couple or community) acting as 'if they were but one person'. The option that the *first sin* was the trespass of a community seems to find support in the teaching of Jesus Christ himself.<sup>7</sup> In any case Christian faith does not require that the first sin (which induced the state of original sin) was the misdeed of a single man and woman from whom all mankind is genetically descended.

## II The data on human genetic diversity and population history

Analysis of individual whole-genome sequences demonstrates the existence of severe bottlenecks in human population history. For the humans living out of Africa, the effective population size fell from about 13,500 (150,000 years ago) to about 1,200 individuals between 20,000 and 40,000 years ago.<sup>8</sup> This result depends on the assumed 'human mutation rate' from the common ancestor to the present. If one assumes a slower mutation rate (as direct observation of mutations in present-day individuals may suggest) these results would change.<sup>9</sup> Since 'the true value of the hu-

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4 These assumptions are based on the teaching in *Catechism of the Catholic Church*, Nr 404 and The Council of Trent, 5th Session, *Decree concerning Original Sin* (17 June 1546). [http://www.vatican.va/archive/ENG0015/\\_P1C.HTM](http://www.vatican.va/archive/ENG0015/_P1C.HTM) cited 3 April 2014.

5 Augustine, *St On Merit and the Forgiveness of Sins, and the Baptism of Infants* (Book I, IX-X) <http://www.newadvent.org/fathers/15011.htm> cited 23 May 2014.

6 Recent research seems to support the thesis that St Augustine deduced the theology of original sin from the theology of redemption, and not the other way around, as it is often assumed (see: O'Callaghan, P. 'Una lectura cristológica de la doctrina del pecado original', *Scripta Theologica* (2014) 46.1, 161-180).

7 See online supplementary material, Appendix 3.

8 Li, H. & Durbin, R. *op. cit.*, (1).

9 Scally, A. & Durbin, R. 'Revising the human mutation rate: implications for understanding human evolution', *Nature Reviews Genetics*, (2012) 13, 745-753.

man mutation rate is an open question',<sup>10</sup> one cannot in principle exclude a more severe recent bottleneck, provided one assumes that after such an event the 'human mutation rate' increased to values much higher than those observed today. However, current studies on human genetic diversity, using many different measures with various assumptions, strongly suggest that the human population never went through a bottleneck as small as two individuals.<sup>11</sup>

In the light of today's genomics the hypothesis that all humans originated from a single pair would require *a miraculous* divine intervention. Such a 'miracle' would require an 'ancestral couple' carrying multiple germ cells and prevented from inbreeding depression among their incestuously generated descendants. A primal couple with such genetic diversity would have been biologically equivalent to thousands of couples: 'That would be against all the genomic evidence that we've assembled over the last 20 years, so not likely at all.'<sup>12</sup> Such an event cannot be explained on the basis of the usual regularities observed in evolution.

According to the geneticist Richard Durbin the data from individual DNA loci may locate the origin of humanity to a single couple who lived several millions of years ago, before the branching that led to the separation of the predecessors of humans from the predecessors of great apes.<sup>13</sup> A similar conclusion was suggested by Francisco Ayala and Ananias Sca-lante on the basis of polymorphisms in the DRB1 gene.<sup>14</sup> By contrast, the wealth of evidence accumulated by Graeme Finlay demonstrates that our genomes are related to other primates and other mammals, but this is not used by the author as an argument excluding dependence from a single couple.<sup>15</sup> One could object that, by applying equivalent methodologies, the time to the most recent common ancestor of the Y chromosome ('Y-chromosome Adam') has been estimated to be 120 to 156 thousand years, and that of the mitochondrial genome ('mitochondrial Eve') to be 99 to 148 thousand

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10 Callaway, E. 'Studies slow the human DNA clock', *Nature* (2012) 489, 343-344.

11 Venema, D. & Falk, D. 'Does genetics point to a single primal couple?', *The BioLogos forum*, 5 April 2010, <http://biologos.org/blog/does-genetics-point-to-a-single-primal-couple> cited 17 February 2013; Venema, D. 'Historical Adam: wearing the genes', *Think Christian*, 8 February 2013, <http://thinkchristian.net/historical-adam-wearing-the-genes> cited 17 February 2013.

12 Dennis Venema interviewed at <http://www.npr.org/2011/08/09/138957812/evangelicals-question-the-existence-of-adam-and-eve> cited 17 February 2013.

13 Durbin, R. 'On the polygenic origin of humanity', presentation at the conference 'How did it all start?', Netherhall House, 3 January 2014. <http://www.nh.netherhall.org.uk/wp-content/uploads/2014/06/Durbin-140103.Netherhall.pdf>

14 Ayala, F.J. 'The myth of Eve: molecular biology and human origins', *Science* (1995) 270, 1930-1936; Ayala, F.J. & Escalante, A.A. 'The evolution of human populations: a molecular perspective', *Molecular Phylogenetics and Evolution* (1996) 5, 188-201.

15 Finlay, G. *Human Evolution: Genes, Genealogies and Phylogenies*, Cambridge University Press: New York (2013).

years.<sup>16</sup> This result could suggest that all living humans are descended from a single couple who lived about 150,000 years ago, in contrast to the claim that at this time the effective out-of-Africa population size was about 13,500. This objection can be answered by arguing that there is potentially a different genealogical tree connecting all living human beings to a common ancestor at each place in the genome – ‘place’ being either the Y chromosome, or the mitochondrial genome, each of which acts as a single locus or short contiguous run of base pairs. So there are millions of different trees, and potentially millions of different last common ancestors for a particular fragment of DNA, depending on where one looks in the genome. The statement that 150,000 years ago the effective population size was about 13,500 does not preclude one of those from being the last common ancestor of all present Y chromosomes.<sup>17</sup> In other words, the same methods that lead to one single common ancestor of the Y-chromosome, lead to a different common ancestor of an autosome or locus in it, and to a census population of more than 13,500 individuals. Therefore one cannot invoke the results of sequencing the Y chromosome and the mitochondrial genome in order to support the single couple origin.

In what follows the term ‘*monogenism*’ denotes the assumption that all *Homo sapiens* are descended from a single primal couple of this species and ‘*polygenism*’ the alternative assumption that they are descended from an original population. Accordingly we speak about ‘monogenist’ or ‘polygenist’ views or hypotheses.

An important aspect of the question is also that the concepts of gene and species cannot biologically be sharply defined. The human species as it is today allows us clearly to distinguish humans from other living species. However, the definitions of extinct species have to be based on fossil data and the further we go back in the tree of evolution the more difficult it is to use the concept of species to distinguish between types of hominids, or between the predecessors of modern humans and those of modern apes, and to establish a sharp beginning of *Homo sapiens*. A clear sign of this difficulty is the debate about whether Neanderthals, Hobbits (*Homo floresiensis*), Denisovans and Modern humans, are different species of the genus *Homo*, or sub-species of the species *Homo sapiens*.

### III Attempts to harmonise ‘original sin’ and today’s scientific data

The different hypotheses for reconciling human evolution with the narratives of Genesis 2 and 3, acknowledge that humans cannot have biologically originated from a single couple, when the species *Homo sapiens* was already well established about 150,000 years ago (in accord with the sci-

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16 Poznik, G.D. et al., ‘Sequencing Y chromosomes resolves discrepancy in time to common ancestor of males versus females’, *Science* (2013) 341, 562–565.

17 Richard Durbin, private communication, Email 28 August 2013.

entific data presented in section II above). Here five models are discussed, which differ from each other in the way they answer the following three questions:

At which moment in evolution did the first human persons appear?

Was the original fall the trespass of a single couple or of a community?

How did original sin spread from the first sinners to other human persons?

### **Personal hominids**

This model supports the monogenetic origin of humanity by assuming that the primal couple appeared more than 2 million years ago, at the beginnings of *Homo habilis*.<sup>18</sup> The authors proposing this are aware of the difficulty of using biological tenets to define a sharp beginning of the species *Homo sapiens*. However, they do not rely on a historical moment when individuals can be said to belong to *Homo sapiens*. Instead they claim that the different types of hominids (i.e. modern humans, Neanderthals, Denisovians, Floresians and all their predecessors: *Homo erectus*, *Homo ergaster*, *Homo habilis*) belong to the same species, are all spiritually animated and should all be considered human persons. The authors supporting this model do not claim that *monogenism* is necessary for the doctrine of original sin. They are primarily motivated by the observation that the earliest stone toolmaking developed at least 2.6 million years ago, a feature that they consider reveals the presence of a spiritual human soul.<sup>19</sup> This leads them to conclude that, if human persons existed 3 million years ago, then a monogenist origin of humanity is possible, and this may help to explain original sin.

By contrast, the philosopher Leonardo Polo distinguishes between ‘hominization’ and ‘humanization’, and argues that ‘manipulation of instruments’ is not necessarily a sign of ‘spiritual activity’ (‘humanization’) but rather of ‘imagination’, a faculty that apes also share. Accordingly he concludes that *Homo habilis* and *Homo erectus* should be considered animals, and in this sense two stages of ‘hominization’.<sup>20</sup> In support of Polo’s view recent research shows that even certain animals are capable of using tools for hunting.<sup>21</sup>

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18 Herce, R. ‘Monogenismo y poligenismo. Status Quaestionis’, *Scripta Theologica*, (2014) 46.1, 105-120; López-Moratalla, N., ‘Origen monogenista y unidad del género humano: reconocimiento mutuo y aislamiento procreador’, *Scripta Theologica*, (2000/1) 32, 205-241; Jordana, R. ‘El origen del hombre. Estado actual de la investigación paleoantropológica’, *Scripta Theologica* (1988) 20, 65-99.

19 Jordana, R. ‘El origen del hombre. Estado actual de la investigación paleoantropológica’, *Scripta Theologica* (1988/1) 20, 91 & 97.

20 Polo, L. *Ética. Hacia una versión moderna de los clásicos*, 2.<sup>a</sup> edición, Aedos: Madrid 1997, pp. 48-54.

21 Dinets, V., Brueggen, J.C. & J.D. Brueggen, Crocodilians use tools for hunting, *Ethology Ecology & Evolution* (2013), DOI:10.1080/03949370.2013.858276.

The ‘personal hominids’ model has to face several difficulties. First, it is not compatible with the data suggesting that a primal couple should be postulated long before the lineages of *Hominids* and *Chimps* separated (6-5 million years ago). However, human-as-homo can only have lived after the separation with chimps. If today’s chimps were descended from such a primal couple, and this couple were persons, then chimps should be considered persons as well.<sup>22</sup> Secondly, the model deviates from the historical, social, cultural and technological context described in Genesis after Chapter 4. In particular it dismisses the Old Testament genealogies (Genesis 5: 3-32; 11: 10-29; 1 Chronicles 1) and the New Testament genealogy that traces the lineage of Christ back to Adam (Luke 3: 23-38). According to these narratives the number of generations between Adam and Abraham is 20 (including Adam and Abraham), and between Abraham and Jesus is 56. The way of life of the people appearing in the Bible (Cain, Abel, Seth, etc.) is that of farmers and shepherds, founding villages and towns and sharing a sense of rights and of divine worship. Thus the biblical tales suggest that Adam and Eve should rather be considered as living during the Neolithic Revolution.

Finally, as Pope Leo XIII points out ‘it is a great error not to see, what is manifest, that men, as they are not a nomad race, have been created, without their own free will, for a natural community of life’.<sup>23</sup> If the hominids were human persons, then (independently of original sin) they would have been naturally prompted to engage in social life. Thus, it appears strange that they needed millions of years before building communities and settlements. If, to escape this oddity, one invokes that the first humans living 3 million years ago shared a cognitive developmental stage comparable to that of human fetus, then one has to explain how such a human being was capable of sinning.

### **Theological species**

Kenneth Kemp has developed a theory that is biologically polygenist, but ‘theologically’ monogenist. Its tenet (first proposed by Andrew Alexander) is that ‘while it is true that all men are descended from Adam, the race nevertheless had a broad origin’. At the beginning the biological species *Homo sapiens* differed from the ‘theological species’ of individuals endowed with a rational soul. Kemp starts with a pre-existing population of about 5,000 hominids:

Out of this population God selects two and endows them with intellects

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<sup>22</sup> See above, section II.

<sup>23</sup> Leo XIII, encyclical letter *Diuturnum Nr. 12* (29 June 1881). [http://www.vatican.va/holy\\_father/leo\\_xiii/encyclicals/documents/hf\\_l-xiii\\_enc\\_29061881\\_diuturnum\\_en.html](http://www.vatican.va/holy_father/leo_xiii/encyclicals/documents/hf_l-xiii_enc_29061881_diuturnum_en.html) cited 2 February 2014; see also: Suarez, A. ‘The social question is radically an anthropological question: the perspective of *caritas in veritate*’, *Journal of Markets & Morality* (2013) 16, 85-99.

by creating for them rational souls, giving them at the same time those preternatural gifts the possession of which constitutes original justice. The first two theologically human beings misuse their free will, however, by choosing to commit a (the original) sin, thereby losing the preternatural gifts, though not the offer of divine friendship by virtue of which they remain theologically (not just philosophically) distinct from their merely biologically human ancestors and cousins. These first true human beings also have descendants, which continue, to some extent, to interbreed with the non-intellectual hominids among whom they live.

According to Kemp any offspring resulting from a human being with a rational soul must be endowed with a rational soul, no matter whether the other partner shares a rational soul or not. Additionally, Kemp postulates that rational ensoulment led to a selective advantage and replaced the non-intellectual hominid population with a 'theologically' human population within a few centuries.<sup>24</sup> In this sense the 'theological species' consisting of individuals endowed with a rational soul is descended at any moment in history from a single couple Adam and Eve, but genetically from a population of thousands of individuals.

Like the 'personal hominids' model, Kemp's model of the 'theological species' maintains that Adam and Eve are historical persons who existed sometime in humanity's past, but it fits better with the genetic data. However, the 'theological species' model deviates from the genealogical, cultural and technological context described in the Old and the New Testament, although in less severe ways than the 'personal hominids'.

### **Retelling**

The model is described by Denis Alexander:

as anatomically modern humans evolved in Africa from 200,000 years ... there was a gradual growing awareness of God's presence and calling upon their lives to which they responded in obedience and worship. In this model, the early chapters of Genesis represent a re-telling of this early episode, or series of episodes, in our human history in a form that could be understood within the Middle Eastern culture of the Jewish people of that time. ... then the Fall is interpreted as the conscious rejection by humankind of the awareness of God's presence and calling upon their lives in favour of choosing their own way rather than God's way. The Fall then becomes a long historical process happening over a prolonged period of time, leading to spiritual death.<sup>25</sup>

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24 Kemp, K.W. 'Science, theology, and monogenesis', *American Catholic Philosophical Quarterly*, (2011) 85, 217-236.

25 Alexander, D. *Creation or Evolution. Do we have to choose?*, Oxford: Monarch (2008), chap. 10, BioLogos Foundation [http://biologos.org/uploads/projects/alexander\\_white\\_paper.pdf](http://biologos.org/uploads/projects/alexander_white_paper.pdf) cited 2 February 2014.

In common with the preceding ‘theological species’ this model is biologically polygenist, and so takes account of the genetic data. By contrast ‘retelling’ is ‘theologically’ polygenist. This infers that there was not a primal couple but a primal population of persons. The narrative of Adam and Eve is considered a myth or parable, ‘albeit one that refers to real events that took place over a prolonged period of time during the early history of humanity in Africa’. The Genesis account of the Fall becomes a dramatised retelling of an ancient process ‘through the personalised Adam and Eve narrative placed within a Near Eastern cultural context’. Nonetheless, the events described could have occurred during the Neolithic age and so the earliest genealogies and cultural descriptions of the Bible (Genesis 5: 3-32; 11: 10-29; 1 Chronicles, Luke 3: 23-38) may be part of this story.

A clear advantage of ‘retelling’ is that it accords with Paul’s teaching in Romans 2: 14-15. The model provides an explanation for the content of God’s primeval commandment even in the context of a large primal population dispersed over the Earth. The main problem is that original sin is not a state that results from a first sin that is transmitted by propagation to all persons existing thereafter, but reduces to an actual sin each human person commits under the bad influence of a sinful environment, together with some traits inherited from evolution, which predispose them toward selfish behaviour.<sup>26</sup>

### ***Homo divinus***

The essential features of this model have been formulated as follows:

God in his grace chose a couple of Neolithic farmers in the Near East, or maybe a community of farmers, to whom he chose to reveal himself in a special way, calling them into fellowship with himself – so that they might know Him as the one true personal God. ... Adam and Eve, in this view, were real people, living in a particular historical era and geographical location, chosen by God to be the representatives of his new humanity on earth, not by virtue of anything that they had done, but simply by God’s grace. ... in this model it was these two farmers out of all those millions to whom God chose to reveal himself. ... the Fall then becomes the disobedience of Adam and Eve to the expressed revealed will of God, bringing spiritual death in its wake.<sup>27</sup>

The main tenet of ‘*Homo divinus*’ is that Adam and Eve were not necessarily the progenitors of all humankind, but were the first two human per-

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26 This is also the core of the explanation proposed by Murphy, G.L. ‘Roads to paradise and perdition: Christ, evolution, and original sin’, *Perspectives on Science and Christian Faith* (2006) 58, 109-118.

27 Alexander, D. *op. cit.*, (25), chaps. 8 & 10.

sons who disobeyed a categorical commandment of God.<sup>28</sup> It has a number of advantages over the three preceding models. It is biologically polygenist and in this sense consistent with the evolutionary data. The model takes very seriously the idea that Adam and Eve were historical figures as indicated by the biblical texts, and locates this couple and their immediate descendants within the culture and geography of the Genesis text. It also sees the fall as a historical event involving the disobedience of a single couple, Adam and Eve, to God's express commands. However, the model is also compatible with the assumption that it was a primal population who fell. 'It is simpler to assume that God created a single individual as *Homo divinus* than to assume that he created *Homo divinus* in a group of individuals, although that is not a reason for preferring it.'<sup>29</sup>

The model assumes that a couple or community of *Homo sapiens* was transformed to *Homo divinus* and spread 'laterally' to all members of *Homo sapiens* alive at the time, either instantaneously or shortly afterwards, by a divine act, not a Mendelian expansion. Similarly the consequences of the primal disobedience (the breaking of the relationship with God) spread 'laterally', first to all the contemporaries of those who sinned, and thereafter to all their descendants, without invoking marriage between persons and non-persons.<sup>30</sup>

Against this model one could object that the transmission of sin by 'spiritual contamination' leads to the presumption that any personal sin can be transmitted to all other persons. The explanation that 'Adam' (the first *Homo divinus* or human person) was the 'representative or federal head of the whole of humanity' and for this reason his sin bore the state of original sin, does not fit the case that 'Adam' had not sinned and generations had passed before the first sinner arrived. For then 'the first sinner' would no longer have shared the investiture 'representative' of humanity.<sup>31</sup>

On the other hand, the terminology may suggest a false dichotomy. The origin of the species *Homo sapiens* is seen to be natural, but the transformation into *Homo divinus* is in some sense supernatural: 'This investiture would have been a unique divine intervention, a miracle, but not one in the sense of requiring normal scientific laws to be suspended, like nature or healing miracles.'<sup>32</sup> This description seems to perpetuate the confusion that God does not act in non-miraculous natural processes. It would

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28 Finlay, G. '*Homo divinus*: The ape that bears God's image', *Science & Christian Belief* (2003) 15, 17–40.

29 Berry, R.J. 'Adam or Adamah?' *Science & Christian Belief* (2011) 23, 23-48.

30 *ibid.*

31 This objection seems to apply also to Paul O'Callaghan's explanation that Adam was 'the first human being and head of humanity' and was therefore chosen by God as the representative of the whole humanity (Una lectura cristológica de la doctrina del pecado original, *Scripta Theologica* (2014) 46.1, 161-180.

32 Berry, R.J. *op. cit.*, (29).

be clearer to say that God intervenes naturally in both the evolutionary emergence of *Homo sapiens* and the divine investiture of *Homo divinus*, although in different natural ways (see section V below).

### **Relational damage**

This explanation has been proposed by Cardinal Joseph Ratzinger and is an attempt to reformulate Catholic teaching on this matter. His main tenet is that original sin consists in a relational damage affecting every person at the moment he or she begins human existence.<sup>33</sup> In the German original Ratzinger questions the term 'Ersünde', which means a sin transmitted by 'biological reproduction or generation'. By stressing the 'relational' nature of 'original sin' he suggests another more general form of transmission, although he doesn't state how this happens. In any case Ratzinger does not question that sin damages the very essence of the human soul. However, a problem with this 'relational damage' model is that, since all sins are essentially 'damage of relationality', each person's sin should add some damage to everybody (unless one assumes that the 'first damage' was absolute), and therefore becomes transmitted to all other human persons in the same way as the original sin. In this sense the explanation does not seem to be very different from that of '*Homo divinus*' discussed above.

The five explanations presented here acknowledge that humankind does not originate from a single couple of the species *Homo sapiens*, and therefore more or less explicitly separate the appearance of individuals of this biological species from the appearance of the first human persons (the moment of 'spiritual animation' or 'divine investiture'). 'Personal hominids' assumes that to be a member of *Homo sapiens* was a sufficient but not a necessary condition to be a human person (a rationally animated human), while the other four models assume that belonging to *Homo sapiens* was a necessary but not a sufficient condition to be a human person or a '*Homo divinus*'.

Regarding the first sinners, 'retelling' advocates that the original sin was the trespass of a community, while the other four models are compatible with a 'single pair'. Regarding the transmission of original sin, 'retelling' suggests that there is no actual transmission: the original sin is the situation resulting from the fact that all human persons sin; '*Homo divinus*' advocates 'lateral transmission' among existing persons (as a consequence of the 'representative' status of 'Adam', the first human person), and afterward from generation to generation; 'relational damage' suggests that the transmission initially resulted from damage in the relational structure of mankind, and afterward from being born in damaged relationships.

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33 Ratzinger, Card., J. *In the Beginning...: A Catholic Understanding of the Story of Creation and the Fall*, Grand Rapids: Eerdmans (1995), pp. 72-73.

‘Personal hominids’ and ‘theological species’ seem to support transmission exclusively at the moment of biological reproduction. Regarding redemption, all five explanations agree that humans are in need of the atonement offered through Jesus Christ to be redeemed from their sins.

#### **IV The origin of humanity and the original sin in the light of Thomas Aquinas’ *Summa theologica* I and St Paul’s *Romans* 11: 32**

In the *Summa Theologica* Thomas discusses some questions that are relevant for our topic.

First, Thomas states that in the state of original innocence or righteousness, there would have been generation, and this would have happened through coition just as now. Adam and Eve would have generated children even if they had not sinned and kept the state of innocence.<sup>34</sup> Secondly, Thomas states that in the state of innocence Adam and Eve’s children would have been born without original sin, since ‘the children would have been assimilated to their parents as regards original righteousness’.<sup>35</sup> Thirdly, Thomas states that, although born without original sin, such children would have been capable of sinning, or in other words, ‘they would not have been born confirmed in righteousness’.<sup>36</sup>

This analysis has an important implication. Even if humanity is descended from a single couple (Adam and Eve), generations may have passed before the appearance of sin, and hence there is no requirement that the ‘originating original sin’ (*peccatum originale originans*) was committed by a single pair from which every human person is biologically descended. In other words, whether the first sinners were or were not the genetically common ancestors of all human persons is irrelevant for belief in the original sin.

This means that Thomas considers it possible that, in the beginning, humanity could have consisted of two groups: one of people in the state of innocence and one of people who fell and lost this state. However, Thomas does not address (at least not in the *Summa* and to my knowledge nowhere else) the question of how such a population evolved in the following course of history. In my view the question deserves to be discussed for it may help to illuminate the mystery of the ‘originated original sin’ (‘Erbsünde’). The main tenet of the Christian faith is that people who are in a state of

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34 Aquinas, T. *Summa theologica* I, q.98, a.1. <http://www.newadvent.org/summa/1098.htm> cited 1 January 2014.

35 Aquinas, *op. cit.*, (34), I q.100, a.1. <http://www.newadvent.org/summa/1100.htm> cited 1 January 2014.

36 Aquinas, *op. cit.*, (34), I q.100, a.2. <http://www.newadvent.org/summa/1100.htm> cited 1 January 2014.

sin, and in particular original sin, need redemption to receive eternal life. By contrast, people in the state of original righteousness would not need such redemption. Hence, maintaining people in a state of righteousness together with people in a state of sin would not be fitting.

Although the question deserves to be studied in depth, for the sake of the present investigation it is enough to invoke the principle St Paul articulates in Romans 11: 32: 'For God has bound everyone over to disobedience so that he may have mercy on them all.' Accordingly we accept the following principle:

*Principle I*

Since maintaining people in the state of original innocence together with sinners would not be fitting to atonement, after the first humans sinned, God's plan for redemption requires that human persons are created in the state of non-innocence.

Principle I also fits well with the Easter liturgy calling the original sin '*felix culpa*'. *Felix* does not refer to the actual misdeed of the first human sinners but to the decision of God to create their descendants without the state of innocence, in order to make it possible to redeem sinners of all times. In order to avoid misunderstandings in this context, it is worth clarifying that God was entirely free to create humankind or not, and after the Fall God remained entirely free to redeem human beings or not. However, once God decided for redemption He was no longer free to maintain people in the state of original righteousness along with people who had lost this state. This seems to be what St Paul declares in Romans 11: 32.

In this perspective the 'fall' entered the state of original sin because it was the first sin in the history of humanity and not because it was the sin of the primeval human persons. If the primeval persons sinned, their sin entered the state of original sin; if generations passed before the first sin arrived, then this first sin was the 'fall' and entered the state of original sin even if it was not committed by the primeval human persons. The state of original sin is a product of both the pride of the first sinners and God's will to redeem sinners. Thus 'Adam' is the symbol of the first sinner, who transgressed as if all people were subsumed into him. As soon as the first sin happened, in order to make it possible to redeem the sinners, God acted as if all humanity was in the state of sin and needed redemption. This conclusion fits with St Paul's claim in Romans (5: 19) that 'through the disobedience of the one man the many were made sinners'. Thus the 'fall' is both a historical event involving a couple or community, and the common experience of all humanity (Rom. 3: 23; 5: 12; 11: 32). In this respect I concur with George Murphy's appraisal: 'if we take the idea of inspiration of Scripture seriously, it is not hard to believe that Paul could have been led to a deeper understanding than that of the earlier biblical

author'.<sup>37</sup> Note however that the expression 'because all sinned' (Romans 5: 12) should not be interpreted in the sense that each (past, present and future) human person actually sins, and only at that moment enters the state of sin and has need of redemption, because that would amount to the claim that human persons cannot freely decide to sin or not to sin.<sup>38</sup> Accordingly, Romans 5: 12 and 11: 32 seem to support the idea that original sin is a state which is transmitted as a consequence of the first sin.<sup>39</sup>

This explanation fits well with other claims by Thomas Aquinas, as for instance that the seat of original sin is not the flesh but the soul – and not only in respect to the soul's power (will, intellect) for it infects the very essence of the soul; 'the soul is the subject of original sin chiefly in respect of its essence'.<sup>40</sup> (Note that the concept of 'soul' does not necessarily imply a 'dualistic' view of human nature).<sup>41</sup>

Can we then say that God is the cause of the original sin? Any act requires God as a cause; otherwise the act could not take place (every action of a creature is brought into existence and sustained by God). God cannot withdraw his cooperation because that would contradict his decision to create man free. Nonetheless 'He [God] is not the cause of sin, because he does not cause the act to have a defect'.<sup>42</sup> One could say that God acts like a pianist playing the melodies he wants; however, at intervals, God accepts to play what a human person wants. It is God who works in us, both to will and to work, but He does not cause the sin in us. Similarly, mankind's first fall 'bounds' God (because of His mercy) to create human persons in the state of original sin, that is, lacking the state of innocence. But the reason that God has acted this way is not His will, but that of the humans who fell.

The very malice of sin is that the sinner leads God to do something against His will, in the same way that the 'prodigal son' (Lk. 15: 11-32) 'obliges' his father to give him his share of the estate because the father respects the son's freedom. On the one hand this malice was uppermost in the case of the first sin: God was bound to create human persons in a state of non-innocence, and thus act against His first will, not only as the cause

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37 Murphy, G.L. *op. cit.*, (26).

38 This objection is not discussed in the interpretation of Romans 5:12 proposed by Hays, C.M. & Herring, S.L. 'Adam and the fall', in: Hays, C.M. & Ansberry, C.B. (eds.) *Evangelical Faith and the Challenge of Historical Criticism*, Grand Rapids: Baker Academic (2013), pp. 37-41.

39 It seems to me that this view is also supported by the analysis provided in Caballero, J.L. 'Rm 5,12 y el pecado original en la exégesis católica reciente', *Scripta Theologica* (2014) 46.1, 121-140.

40 Aquinas, *op. cit.*, (34) I,IIae, q.83, a.2. <http://www.newadvent.org/summa/2083.htm#article2> cited 27 January 2014.

41 See online supplementary material Appendix 1.

42 Aquinas *op. cit.*, (34), I,IIae, q.79, a.2. <http://www.newadvent.org/summa/2079.htm#article2> cited 27 January 2014.

of a singular sinful act, but every time He creates a new human person. Nonetheless in creating human persons in the state of non-innocence God makes it possible for them to be redeemed, and in this sense the state of original sin is a consequence of God's mercy and love: 'where sin abounded, grace abounded much more' (Romans 5: 20).

Christopher Hays and Stephen Herring ask the question 'whether or not one could theoretically adduce a doctrine of sin that is plausibly faithful to reason, experience, Scripture and Christian tradition, while lacking the elements of originating sin and original guilt'.<sup>43</sup> They answer in the affirmative, mainly because they think that this is possible without jeopardising the 'idea of concupiscence'. I will discuss this later (see section VII). Here I will only use Hays and Herring's question to illustrate how my theory works. Since 'originating original sin' means nothing other than the first personal sin committed in the history of mankind, to deny the 'originating original sin' is the same as saying that there was no sin at all in history, and then any 'doctrine of sin' would be nonsensical. Can we accept the 'originating original sin' but deny its consequence, the 'originated original sin', that is, the state of original sin and guilt? As we have seen this state is the result of both the first trespass and God's will to redeem human sinners. Therefore the negation of the 'original originated sin' would amount to a denial of God's redemptive plan. This would then question God's love, unless one assumes that God's redemption implies a violation of the sinner's free will.

It is therefore clear that the original sin affects the whole of human nature, not like some genetic illness, but as a deficiency in the soul with relation to its unity with the flesh. Since this state belongs to the soul's essence (for it is created with the aim of building a human body), the insubordination of concupiscence against reason happens at the very moment of each soul's creation (*i.e.* the conception of each human person) and induces the contradictory urge to search temporal contentment, despising eternal joy, the inclination to reach happiness by oneself without God's grace (the question of concupiscence is discussed further in section VII).

In summary, according to Principle I after the Fall only people without the state of innocence and necessitating redemption remained in this world.

## V Primeval human persons, science, and moral responsibility

If the original sin was not necessarily the sin of two persons who are biologically the common ancestors of all human persons (as stated in Section IV), then one can assume, in accord with some of the models presented

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<sup>43</sup> Hays, C.M. & Herring, S.L. *op. cit.*, (38), p. 34.

in Section III, that God created the first human persons after the species *Homo sapiens* was biologically established.

A possible scenario is that at a certain moment God transformed all existing *Homo sapiens* into human persons sharing the original 'state of innocence'. That is, He bestowed them with spiritual powers (intellect and free will) strong enough to perfectly master their selfish Darwinian tendencies and even to overcome pain and illness. One or more of these persons then trespassed the primeval commandment and lost the 'state of innocence'. God subsequently treated those who didn't sin in the same way as those who had sinned, and all lost the state of innocence. That is similar to what the 'retelling', '*Homo divinus*' and the 'relational damage' models claim: the original sin of one or more persons spread laterally to all humans who lived at that time.

However it seems to me that this scenario is at variance with God's justice. Since it was God's original wisdom to create souls sharing the gifts of the 'state of innocence' (whatever they were), it would have been unjust to withdraw these gifts from someone who had not trespassed God's commandment.

An alternative, and in my view better, explanation is that God selected one couple among all the individuals of the species *Homo sapiens* and transformed them into persons in the 'state of innocence'. The original sin was the disobedience of these primal persons to God's commandment. God then continued to transform all the other living *Homo sapiens*, and from this moment bestowed each newly conceived individual with personhood. The species continued to exist in this way until the present day. However, according to Principle I, God's plan for redemption implied that people created after the Fall could not be in the state of innocence, and so the consequences of the Fall of primal human persons became transmitted to all humans at all times.

In accord with this hypothesis we accept the following principle:

*Principle II*

At a certain moment in the history of humanity God selected a primal couple among all living members of the species *Homo sapiens* and transformed them into morally responsible persons.

Notice that an awareness of 'moral responsibility' is crucial in order to be able to sin. Hence, according to our picture, at the moment of the fall only one couple (or eventually one group) of members of *Homo sapiens* were persons in this respect. This is the main difference between this explanation and '*Homo divinus*' or 'relational damage'. Therefore it is not correct to say that original sin was transmitted 'laterally' or because it damaged the network of interpersonal relationships. Instead, after the fall each new human person is begotten sharing the state of original sin. In this

sense there was transmission of original sin immediately after the fall, first through transformation of already existing non-personal individuals of the species into persons, and then onward to newly born individuals. Notice that ‘transformation of non-personal individuals into persons’ can be considered a form of generation of persons, and in this sense it is fitting to state that the ‘original sin’ becomes transmitted through propagation or generation.

For Christian theology, all that is ‘natural’ is ordained and sustained by God. Therefore the proposal that God ‘infused’ or ‘invested’ ‘the spiritual capabilities’, or ‘intervened’ to grant them, should not be understood in the sense that ‘natural’ is distinct from ‘what God does’. Thus the ‘divine intervention’ transforming an individual of the species *Homo sapiens* into a human person means that God assigned part of the government of the brain to a new person different from a pure spirit.<sup>44</sup>

In this sense one can say that ‘true (personal) humanness’ is developed through natural (God-given) processes, so that each new personal member of *Homo sapiens* was biologically identical to his non-personal precursor. The discontinuity happened at the spiritual level. At the appearance of the first human persons, God intervened naturally but differently from what He did at the creation of non-personal animals. In the former case personal living beings appeared that in principle were morally responsible for their actions, whereas in the latter case living beings appeared without any moral responsibility.

In terms of the philosophy of Aristotle and Thomas Aquinas, Principle II states that each of these modern humans underwent a substantial transformation from a non-personal to a personal human being.<sup>45</sup> In other words, God replaced the ‘animal soul’ of these individuals with a ‘human spiritual, rational soul’. However, Principle II excludes a dualistic reading of the tenet that ‘the spiritual soul is the form of the human body’. The human person is not a composite of soul and body; the soul forms the body by animating the organic stuff: the body is not the receptacle of the soul but is the soul itself appearing in space-time.

Would it have been possible for personal modern humans to have met non-personal ones and lived with them (as assumed by ‘theological species’ in Section III)? I think the answer is no. The reason is that ‘spiritual capabilities’ (consciousness, free will) are not directly accessible to the senses

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44 See online supplementary material, Appendix 1.

45 Aristotle and Thomas Aquinas assume a similar transition from an animal to a personal human being when they explain the ensoulment of the embryo by means of delayed hominisation (Aquinas *op. cit.*, (34), I, q.76, a.3; q.118, a.2). It has been shown that successive animation is untenable in the context of the human fetus, but nothing speaks against using successive animation to explain the origin of personal humanness; see Suarez, A. & Huarte, J. *Is This Cell a Human Being?*, Heidelberg: Springer (2011).

and can be ascertained only through the directly observable human body. The neurophysiological discovery of mirror neurons shows that ‘I experience directly only my own consciousness and free will’, and access these capabilities in other humans ‘through first-person knowledge’. I conclude that the human being in front of me also shares these valuable capabilities because: (a) they have the same specific body as me, and (b) this body exhibits the same movements that I make when expressing my thoughts, emotions and claims for rights (so called ‘spontaneous movements’).<sup>46</sup> This means that ‘the capacity of relatedness is ... intimately dependent upon our biology’,<sup>47</sup> and also that the observable basis of any consistent moral and legal order is the ‘spontaneous movements’ exhibited by the animals of the species *Homo sapiens*.

Therefore we accept the following crucial principle:

*Principle III*

After the appearance of the primal human persons by God’s intervention, the basis of any consistent moral and legal order is that every animal of *Homo sapiens* is recognised as a person worthy of respect.

Principle III therefore excludes the coexistence of personal and non-personal individuals of *Homo sapiens*, and implies that the mere presence of a personal modern human would have transformed a non-personal human (an animal) into a person. Our ‘personal species’ can be considered equivalent to Kemp’s ‘theological species’ in Section III, and accordingly we also distinguish between a ‘biological’ and a ‘personal’ (‘theological’) species of *Homo sapiens*. However, individuals of these ‘two species’ did not live together and reproduce with each other at any time.

To some extent the history of revelation can be described as God’s effort to convince human persons that it is worth living according to Principle III, that is, in accord with the foundation of rights. And, since the first sin, any sin is ultimately reduced to a trespass against Principle III.<sup>48</sup>

A variant of the hypothesis formulated in Principle II is that God selected several couples among the living animals of *Homo sapiens* and transformed them into persons. Some of these first persons sinned, while God took those who kept the state of innocence away to heaven (in a similar

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46 Fogassi, L. & Rizzolatti, G. ‘The mirror mechanism as neurophysiological basis for action and intention understanding’, Adams, P. & Suarez, A. ‘Exploring free will and consciousness in the light of quantum physics and neuroscience’, in Suarez, A. & Adams, P. (eds.) *Is Science compatible with Free Will?*, New York: Springer (2013), pp. 117, 283.

47 Jeeves, M. ‘The emergence of human distinctiveness’, in Jeeves, M. (ed.) *Rethinking Human Nature*, Grand Rapids: Eerdmans (2011), p. 199.

48 The first sin, and any subsequent sin, breaks the solidarity of humanity, and the redemption by Jesus Christ is a work to restore the lost unity; see in this sense O’Callaghan, P. ‘Una lectura cristológica de la doctrina del pecado original’, *Scripta Theologica* (2014) 46.1, 161-180.

way to the Patriarch Enoch and the Prophet Elijah). God then transformed all other *Homo sapiens* into persons in a 'state of original sin' (*peccatum originale originatum*).<sup>49</sup> This hypothesis (that the first sinners were several couples instead of only one) has some interesting implications that are discussed in Appendix 3 (online Supplementary Material).

## VI When did God create the primeval human persons and when did the first sin happen?

The main events in the colonisation of the world by modern humans have been the Out-of-Africa migration between 100,000 and 50,000 years ago, with multiple waves of migration to the New World and possibly to Asia and Oceania;<sup>50</sup> a severe bottleneck in non-African populations<sup>51</sup> and a milder one in African ones; gene flow from African to non-African population after the first Out-of-Africa migration;<sup>52</sup> migrations back to Africa from the Middle East.<sup>53</sup> During the period 50,000-10,000 years ago modern humans and other 'hominin' species (Neanderthals, Denisovans, Floresiensis) formed the genus 'homo' and may have interbred with each other in some places. Neanderthals probably became extinct at about 30,000 bc, and could only have interacted with humans before this time. Hominin populations existing in Europe were replaced by 'Neolithic farmers coming from the Middle East'.<sup>54</sup> By 10,000 years ago all the other 'hominins' were extinct and the genus 'homo' had been reduced to modern humans.<sup>55</sup> According to historical guesstimates the *Homo sapiens* population increased from 4 to about 10 million individuals during the Neolithic period with an estimate of 7 million at 4000 BC.<sup>56</sup>

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49 Even if this scenario is speculative, it is supported by Aquinas's argument in Aquinas *op. cit.*, (34), I, 97. To reach immortality, even in the state of innocence, it would have been necessary to leave the corporal world and reach the 'spiritual state', that is, the state of 'beatitude given by the clear vision of God'. At this moment the need for food and also for generating children ceased.

50 Curry, A. 'Coming to America', *Nature* (2012) 485, 30-32.

51 Li, H. & Durbin, R. 'Inference of human population history from individual whole-genome sequences', *Nature* (2011) 475, 493-496.

52 Scally, S. & Durbin, R. 'Revising the human mutation rate: implications for understanding human evolution', *Nature Reviews Genetics* (2012) 13, 745-753.

53 Olivieri, A. et al. 'The mtDNA Legacy of the Levantine Early Upper Palaeolithic in Africa', *Science* (2006) 314,1767-1770; Henn, B.M. et al. 'Genomic Ancestry of North Africans Supports Back-to-Africa Migrations', *PLoS Genetics* (2012) 8, e1002397.

54 Stoneking, M. & Krause, J. 'Learning about human population history from ancient and modern genomes', *Nature Reviews Genetics* (2011) 12, 603-614.

55 Reich, D. et al., 'Genetic history of an archaic hominin group from Denisova Cave in Siberia', *Nature* 468 (2010), 1053-1060; Baab, K.L., 'Homo floresiensis: making sense of the small-bodied hominin fossils from Flores', *Nature Education Knowledge* (2012) 3, 9:4; Orr, C.M. 'New wrist bones of *Homo floresiensis* From Liang Ba (Flores, Indonesia)', *Journal of Human Evolution* (2013) 64,109-129.

56 [http://www.census.gov/population/international/data/worldpop/table\\_history.php](http://www.census.gov/population/international/data/worldpop/table_history.php) cited 10 September 2014.

In my opinion, the key idea allowing us to establish when God's intervention occurred to create the first human persons is the tenet that these were aware of their moral and legal responsibility; first, because they would not have been able to sin if they had not been conscious of the own responsibility. Interestingly, the phrase 'good and evil' used in (Genesis 2: 9) to describe God's commandment, was also used in legal contexts to describe 'legal responsibility'.<sup>57</sup> Secondly, although other qualities may also be relevant (imagination, creativity, reverence, empathy, aesthetic appreciation, abstract thought, problem solving etc.) we cannot exclude that God acted through natural processes in order to prepare the 'living *nefesh*' of *Homo sapiens* to become a person, in the same way that God acted through evolution to bring about this 'living *nefesh*' from 'the dust of the ground' (Genesis 2: 7), that is, *Homo erectus*, *Homo habilis* and so on.

Therefore, to conclude that individuals of a certain population in the past shared personal status (were 'animated by a spiritual soul') it is necessary that the population displayed a sense for law. In other words, Principle III has a second noteworthy implication that human personhood ('true humanness') is unambiguously attested by the fact that a population takes the body of the species *Homo sapiens* as the basis for founding mutual respect. In this sense, the Talion law, the Golden rule, the code of Hammurabi, and the earlier ancient Egyptian and Sumer laws attest human personhood ('spiritual animation') without any ambiguity.

I therefore assume that sometime after 10,000 bc, just at the culmination of the Neolithic Revolution, with the dawn of the first civilisations and legal history, God selected a single couple (or several) among all the modern humans, and transformed them into persons, as discussed in Section V. In accordance with Christian belief I now further assume that these primal personal humans sinned, as the Bible says Adam and Eve did, and each person in this selection shared in a collective trespass of a firm commandment of God.

After this first sin, God extended personhood to all existing individuals of the species *Homo sapiens*, and thereafter to all their descendants, although creating persons ('souls') in the state of non-innocence. That is, there was a first transmission of the sin that happened through propagation (to persons who did not biologically descend from the first sinners), and then the transmission continued through biological generation or reproduction.

In the first three chapters of Genesis the term 'Adam' is used in the sense of 'humanity', and only after Genesis 4: 1 and 4: 25 does it clearly

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57 Clark, W.M. 'A legal background to the Yahwist's use of "Good" and "Evil" in Gen 2-3', *Journal of Biblical Literature* (1969) 88, 266-278, quoted in Wenham, G.J. *Word Biblical Commentary I, Genesis 1-15*, Waco Texas: Word books (1987), p. 64.

acquire the character of a proper name.<sup>58</sup> In the context of this model one could interpret ‘Adam’ and ‘Eve’ in Genesis 1-3 as referring to the first single couple (or little community) of persons who sinned, and not to a single ancestor-pair from whom all human persons are descended. In Genesis 4: 25 and thereafter they denote the parents of Seth, that is, the man and the woman among the primal human persons who became the ancestors of Christ (and who may have been the first two sinners).

Genesis 4 presents the primeval human persons (like Cain and Abel) as shepherds and farmers (rather than hunter-gatherers or foragers) with working patterns characteristic of the Neolithic. According to Genesis (4-6), immediately after the fall of Adam and Eve the world was populated by far more people than those who could normally be descended from a single couple, and even by extraneous people (sons of God, Nephilim, heroes of days gone) who don’t seem to be descended from Adam (Genesis 6: 4).

On the one hand, belief in original sin does not require that the first sinners were the biological ancestors of all human persons (as shown in Section IV). On the other hand original sin implies that the first human persons had a sense of morality and law. Thus it is fitting to assume that their creation happened during the Neolithic, at a time in which it seems well established (even without need of genome-wide data) that the *Homo sapiens* population was several million.

## VII Original sin, Darwinian evolution, and concupiscence

Daryl Domning has suggested a perspective in which original sin is set in relationship to the Darwinian behavioural patterns responsible for evolution: the animal world is full of intra-specific aggression, deceit, theft, exploitation, infanticide and cannibalism. ‘Our cousins the great apes are adept at political intrigue and quite capable of serial murder and lethal warfare ... there is virtually no known human behaviour that we call “sin” that is not also found among nonhuman animals.’ Darwinian Theory teaches us ‘that these behaviours exist because they promote the survival and reproduction of those individuals that perform them.’<sup>59</sup> A similar explanation is provided by George Murphy.<sup>60</sup> These accounts attempt to explain human concupiscence (the propensity to sin) by inherited Darwinian tendencies. In this line of thinking Christopher Hays and Stephen Herring stress that ‘even if one did not believe that Adam’s fall was the source of human concupiscence, one could quite easily provide an alternative ac-

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58 Wenham, G.J. *op. cit.*, (57), p. 32; Berry, R.J. ‘Adam or Adamah?’ *Science & Christian Belief* (2011) 23, 23-48.

59 Domning, D.P. ‘Evolution, evil and original sin’, *America*, 12 November 2001 <http://americamagazine.org/issue/350/article/evolution-evil-and-original-sin> cited 20 February 2013.

60 Murphy, G. L. ‘Roads to paradise and perdition: Christ, evolution, and original sin’, *Perspectives on Science and Christian Faith* (2006) 58, 109-118.

count of the doctrine, saying, for example, that humans have an evolutionary biological propensity to selfishness that is reinforced and quickened by our society, psychology and spiritual estate'.<sup>61</sup>

An alternative account could be that when God created the first human persons he bestowed them with intelligence and free will powerful enough to overcome the Darwinian tendencies, so that these first human beings were capable of living according to higher moral principles.<sup>62</sup> By contrast the animals continued to act according to such tendencies but, as Domning and Murphy point out, they cannot be considered to commit sins, since they are not morally responsible. The first trespass against God caused the first sinners to lose control over their powerful Darwinian tendencies, and the propensity 'to act selfishly, no matter the cost to others' became transmitted as original sin. In this interpretation concupiscence is the result of both Darwinian principles and original sin.

If God respects human freedom, then it is reasonable to claim that God creates human persons free from concupiscence, so that they can decide to obey Him without any handicap from their nature. Indeed the temptation by the snake in Genesis 3: 5 is a pure spiritual temptation, with the insinuation that you will 'become like God', reach divine life and no longer be a creature, and this without God, but infringing His law. The way the temptation progresses unveils the structure of the primeval human psyche: Eve was endowed with spiritual force to master concupiscence, and it had been foolish on the part of the snake to try to seduce her by praising the sensual beauty of the forbidden fruits. Instead the snake shrewdly challenges Eve's fidelity to God. However, as soon as Eve begins to doubt, the concupiscence emerges, and the woman by herself (without any insinuation on the part of the snake) sees that the fruit is 'good to eat', 'a delight to the eyes', and 'desirable'. Gordon Wenham comments: 'The woman's covetousness is described in terminology that foreshadows the tenth commandment.'<sup>63</sup>

But why God does not act in the same way after the first sin and so avoid transmitting the state of original sin? The answer follows from what has been stated in the preceding sections: God ardently desires to redeem fallen persons, but without violating their freedom. With this aim it is necessary to maintain only persons sharing the state of original sin and feeling concupiscence; that is, persons who are aware of the need for the redemption and grace Jesus Christ won for us. In this respect it is significant that Jesus Christ accepts temptation by the devil, to make it clear to

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61 Hays, C.M. & Herring, S.L. *op. cit.*, (38), p. 53.

62 This does not mean that the first humans already possessed perfect knowledge or did not need food, but rather that they would have avoided war, harming and deceiving each other, and even been able of overwhelming pain to some extent; see Aquinas *op. cit.*, (34) I, q.97-101.

63 Wenham, G.J. *op. cit.*, (57), p. 75.

us that ‘we do not have a high priest who is unable to feel sympathy for our weaknesses, but we have one who has been tempted in every way, just as we are —yet he did not sin’ (Hebrews 4: 15). To repeat: original sin is the product of human pride, God’s respect for human freedom and God’s mercy.

Richard Dawkins himself seems to support the proposed alternative account when he says:

I very much hope that we don’t revert to the idea of survival of the fittest in planning our politics and our values and our way of life. ... to live our lives in a Darwinian way, to make a Darwinian society, that would be a very unpleasant sort of society in which to live. ... That’s exactly why I said that I despise Darwinian natural selection as a motto for how we should live. I tried to say we should not live by Darwinian principles but Darwinian principles explain how we got here and why we exist in the scientific sense.<sup>64</sup>

Dawkins is telling us that the principles by which we should live cannot come from evolution; that is to say that they must be derived from elsewhere. Thus Dawkins’s reasoning seems to strengthen Immanuel Kant’s moral proof for the existence of God. If Dawkins despises Darwinian natural selection as a motto for how we should live, it is safe to assume that God bestowed the first personal humans with the necessary spiritual powers to master their Darwinian tendencies.

Original sin caused the first humans who trespassed against God to return to a Darwinian way of life. Worse than that, they could now misuse the ‘gleam of Heavenly light’ that had been bestowed on them, to enhance selfish destructive behaviours, to use Goethe’s wording in *Faust*: ‘He calls it Reason, but only uses it to be more a beast than any beast as yet.’<sup>65</sup>

## VIII Conclusion

The hypothesis that humans do not biologically originate from a single couple is supported by recent genetic research. This can be considered a well-established fact if one acknowledges that the first human persons shared the sense of moral responsibility and law, and accordingly were created during the Neolithic period. This means that the first sinners (couple or community) could not be the biological progenitors of all human persons.

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64 Richard Dawkins in: George Pell vs. Richard Dawkins, Debate ABC-TV, <http://www.abc.net.au/tv/qanda/txt/s3469101.htm> cited 17 February 2013.

65 Goethe, J.W. von *Faust*, Part I, Prologue, <http://www.poetryintranslation.com/PITBR/German/Fausthome.htm> cited 2 March 2013.

We have shown that this tenet is compatible with the teaching that original sin is the lack of the original state of grace in each human soul, caused by the first actual sin of the primeval couple (or community). In accordance with Romans 11: 32, this privation (the fallen state) becomes necessarily transfused into all other human persons ‘by propagation, not by imitation, and is in each one as his own’, that is, as if he himself had sinned, even if he is not guilty of it. In our explanation the multiplication of human persons at the beginning neither occurred by means of incestuous marriage among the descendants of Adam and Eve, nor by ‘sodomitical marriage’ between persons and non-persons.

Since it is possible that the primal single couple and their posterity did not sin for some generations, there is no compelling theological reason to exclude the possibility that the original sin was the trespass of a community. To some extent this hypothesis may even contribute to a better understanding of the mystery.<sup>66</sup>

The story goes that Pius XII was once asked why he had not condemned ‘polygenism’ in the encyclical letter *Humani generis* and he declared that ‘it is in no way apparent how such an opinion can be reconciled’ with the belief in original sin.<sup>67</sup> Apparently the Pope answered: ‘One Galileo in two thousand years is enough.’ Pius XII’s claim regarding ‘polygenism’ in *Humani generis* is formulated in such a way as to suggest that the Holy Spirit is challenging us to explore in more depth the relationship between the mystery of original sin and science, according to Anselm’s *fides quaerens intellectum*. The final outcome of the Pope’s teaching seems to be that one should not deduce original sin and redemption from ‘Adam and Eve’, but resort to the primeval single couple only if there is no other way of explaining how the first personal sin ‘is passed on to all’. In this article I have tried to show that other explanations are possible.

Much work remains to be done to fathom the mysteries around original sin, by science as well as by anthropology and biblical exegesis. However, deciding between a biologically monogenist or polygenist origin of humanity is not crucial for Christian belief. It may be wise to state that both the monogenist and polygenist hypotheses are compatible with faith; deciding between them should be better left to science. Whatever the result, we can be sure that it will help us to a better understanding of the Bible’s narrative and strengthen the Christian faith. For this faith is not founded

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66 See online supplementary material Appendices 3-4.

67 ‘Now it is in no way apparent how such an opinion can be reconciled with that which the sources of revealed truth and the documents of the Teaching Authority of the Church propose with regard to original sin, which proceeds from a sin actually committed by an individual Adam and which, through generation, is passed on to all and is in everyone as his own [Cfr. Rom., V, 12-19; Conc. Trid., sess, V, can. 1-4]’ (Pius XII, *Humani generis*, sec. 37, 12 August 1950).

on 'Adam and Eve', but on original sin and redemption by Jesus Christ.<sup>68</sup>

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