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Evolution Science and Imago Dei: A Richer and More Robust Treatment of Theological Anthropology

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EVOLUTION SCIENCE AND *IMAGO DEI: A RICHER AND MORE ROBUST TREATMENT OF THOLOGICAL ANTHROPOLOGY.*

A Thesis by

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ABSTRACT

In my thesis, **Evolution Science and the *Imago Dei:* A Richer and more Robust Treatment of Theological Anthropology**, the first chapter demonstrates, from the historical analysis of the content attributed to the concept *imago Dei* over the centuries, that different ages in the Church have interpreted the content of that expression in different ways. From this historical analysis that the *imago Dei* assumes different meanings at different points in history, I justify my expectation that the term is open to ever new meanings.

With the second chapter, by exploring the evolutionary contribution to the emergence of modern human, I establish the similarity and divergence between humans and nonhumans, genetically and phenotypically. In the third chapter, I criticize the exclusive reference of the *imago Dei* to only humans. Even though humans continue to be special and distinct from other species, human species has a lot in common with nonhuman species. Evolutionary science helps demonstrate that what our ancestors in faith thought was unique to humans is not so.

My claim is that every living species is *imago Dei* in different ways. Every time that there is similarity between species, there is *imago Dei,* and every time that there is divergence, there is *imago Dei* in a different way. The divergence is not a difference between members of the same species, or else there would be in the same species so many *imago Dei* in different ways. Rather, the divergence is the speciation, that is, the difference between species. Because we are all *imago Dei,* we have a purpose which is not only individual, self-centered, or universal but which is divine; therefore, the meaning of our life does not end in this life but is opened to eschatology. Because we are *imago Dei,* we

are called to be in solidarity and to live in sincerity with each other. Solidarity, rather than having anything to do with pity or charity, affirms that as *imago Dei,* we all have value in the eyes of our God.

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George E. Griener, S.J., Dr Theo., Director Date

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While the Bible and the Christian tradition use the language of image of God specifically of the human, they also see the whole of creation, and the diversity of life on Earth, as the self-expression of God and, in this sense, as imaging God.[1]

General Introduction

Anthropological science, as the scientific study of human biological and physiological characteristics (physical anthropology) and human societies and cultures and their development (social anthropology), is often readjusted in light of new discoveries in science. When discoveries or new scientific theories are conceived, it impacts in one way or another the past and present comprehension of the human being. When Christians think about the human being, they approach it with a theological anthropology perspective where they explain man considering their faith, in light of Revelation and the Christ event. Christian anthropology has developed variations on the understanding of the human being as *imago Dei.* Might contemporary evolutionary science contribute to further development? Understanding *Homo sapiens* as a product of a long history of evolution governed by natural selection rather than divine intervention re-frames much of the theological discussion. If the modern human is understood as a being which descends from a common ancestor with other species, what can be the implications in the Christian theological anthropology? What will it mean then to be *imago Dei?* Is it exclusively being a human person? Does something or any feature belong uniquely or exclusively to human beings? And how can we understand the strict reference of *imago Dei* to the non-physical, the soul or spirit, reason or conscience, during history? This thesis will demonstrate that the human person is so thoroughly embedded in natural physical processes that the concept

[1] Denis Edwards, *Ecology at the Heart of Faith: The Change of Heart that leads to a New Way of Living on Earth* (New York: Orbis Books, 2006), 14.

of the *imago Dei* must incorporate our evolutionary history, biology, and future. In other words, this thesis will demonstrate that the traditional way of referring the notion of *imago Dei* exclusively to humans needs some readjustment. In this thesis, then, considering the contribution of Biological, Cultural, and Epistemic evolution and the similarities and divergences between humans and nonhuman species, we will propose the extension of the notion of *imago Dei* to every living species in different ways. The claim that we will demonstrate is that every living species is *imago Dei* in different ways.

The first chapter will trace the metaphor of the *imago Dei* through different phases of its history. We will present different approaches to the imago Dei. We will emphasize the meaning of *imago Dei* from the biblical perspective before focusing on the patristic and medieval Eastern and Western contributions on *imago Dei*, where the structural view of the *imago Dei* will be developed. From there, we will analyze the functionality, or stewardship, and the communal, or relational, views of *imago Dei.* The second chapter will focus mainly on Contemporary Evolutionary theories, but we will begin by paying attention to Darwinism and Neo-Darwinism, which are the foundation for Contemporary evolutionary theories, like Social Darwinism, Sociobiology, evolutionary psychology, and cultural evolution. In that context of the contemporary evolutionary theories, we will analyze the emergence of the modern humans, where the similarities and divergences between modern humans and chimpanzees will be emphasized. The third chapter will demonstrate how the evolutionary perspective sheds light on Christian anthropology. We will demonstrate that when we speak of the human being as the product of contemporary understanding of the Evolutionary theories, that requests an openness or an extension of *imago Dei* to other species, but in different ways. From there, we will argue that having

evolved along evolutionary pathways does not mean that we do not have purpose or value. In the end, we will develop the notion of solidarity and sincerity between human beings as *imago Dei*, and between human beings and the rest of creation as created also, in a different way, in the image of God.

CHAPTER I: VARIOUS UNDERSTANDING OF *IMAGO DEI*

As the witness of Scripture, Tradition and the Magisterium makes clear, the truth that human beings are created in the image of God is at the heart of Christian revelation. This truth was recognized, and its broad implications expounded by the Fathers of the Church and by the great scholastic theologians. Although, as we shall note below, this truth was challenged by some influential modern thinkers, today biblical scholars and theologians join with the Magisterium in reclaiming and reaffirming the doctrine of the *imago Dei*.[2]

Introduction

Among the three major monotheistic religious traditions, Judaism[3], Islam[4] and Christianity, there is an agreement that, while everything is created by God, human beings are the only thing created as *imago Dei*, meaning in the image of God, to whom God has entrusted the rest of creation. During their history, each of these major religious traditions has supported and explained in her own way the exclusive reference of *imago Dei* to human beings. From the Christian perspective, especially from the Old Testament perspective, the *imago Dei* referred to the whole of the human being, in the sense that the different composite parts of the human person were not perceived as divided, like body or soul, flesh

[2] International Theological Commission, *Communion and Stewardship: Human Persons Created in the Image of God,* http://www.vatican.va/roman_curia/congregations/cfaith/cti_documents/rc_con_cfaith_doc_20040723_communion-stewardship_en.html. (accessed November 26, 2019), 6.

[3] The idea of *imago Dei* in Judaism is first of all found in the Torah and it can be found also in different works, such as Yechiel Barilan, "From Imago Dei in the Jewish-Christian Traditions to Human Dignity in Contemporary Jewish Law," *Kennedy Institute of Ethics journal* 19, no. 3 (Sep 2009): 231-59; and Dominique Scallisi, "5 Things Muslims and Christians Can Agree On," *Intellectual TakeOut* (July 23, 2018), https://www.intellectualtakeout.org/article/5-things-muslims-and-christians-can-agree/ (accessed April 22, 2020); and Martin Gosman, *Holy Scriptures in Judaism, Christianity and Islam: Hermeneutics, Values and Society* (Amsterdam & Atlanta GA: Rodopi, 1997).

[4] In Islam, the idea of *imago Dei* is also based in the Holy Scriptures, the Quran, and it can be found also in some works like Admin, "Islam, End Times, and the Imago Dei," *Crosspolitic Studios,* (2018), https://crosspolitic.com/islam-end-times-and-the-imago-dei/ (accessed April 22, 2020); and Samuela Pagani, "*Imago Dei* e l'Interdizione di Uccidere Nell'Islam. Il Capitolo su Giona Dei *Fusus Al-Hikam Di Ibn'Arabi,*'' in *In The Image of God: Foundations and Objections within the Discourse on Human Dignity,* ed. Alberto Melloni, and Riccardo Saccenti (Berlin: Lit Verlag, 2010), 227-261.

or spirit. It also referred to the capacity of the creatures to be in relation to the Creator and to other creatures who look like them. And, in the New Testament, the *imago Dei* referred principally to Jesus, the First-born, the true image of God.

However, in the course of history, the Church fathers from Eastern and Western Christian traditions, emphasizing in their own way the meaning of the *imago Dei,* dissociated themselves from the reference of the *imago Dei* to the whole of human person, i.e., the undivided person. From the distinction of being in the likeness or being in the image, they considered that the whole of the human person cannot be at the same time the likeness and the image of God. The medieval thinkers emphasized their own meaning of the *imago Dei* by referring the image of God in the human person to some cognitive faculty that the human being has, such as reason. That approach was already developed by Augustine of Hippo during the Latin father period. Referring the image of God in the human person to reason or self-consciousness is qualified as the structural view of *imago Dei.* Alongside the structural view, there are the relational or communal view and the functional or stewardship view of the *imago Dei.*

In the context of this first chapter of our thesis, we will begin by clarifying the meaning of *imago Dei* from the biblical perspective where the *imago Dei* is understood as undivided and relational, before presenting the perception of the *imago Dei* from the patristic, medieval, and contemporary periods in the Eastern and Western Christian traditions. From there, we will emphasize the two other views: the functionality or stewardship and the communal or relational dimensions of the *imago Dei.*

1.1. The *imago Dei* from the official teaching of the Catholic

The Catechism of the Catholic Church reaffirms that when God created men and women, He created them to occupy a unique place in creation, to be the image of God, to unite the spiritual and material worlds; male and female God creates them and established his friendship with them.[5] Among all visible creatures, *The Catechism* states that "only man is able to know and love his creator."[6] Man is also confirmed as the "only creature on earth that God has willed for its own sake, and he alone is called to share, by knowledge and love, in God's own life."[7] *The Catechism* makes it clear that "being in the image of God the human individual possesses the dignity of a *person*, who is not just something, but someone. He is capable of self-knowledge, of self-possession and freely giving himself and entering into communion with other persons."[8] According to *The Catechism*, "God created everything for man, but man in turn was created to serve and love God and to offer all creation back to him."[9] The human person as created in the image of God is "a being at once corporal and spiritual. […] Man, whole and entire, is therefore willed by God."[10] The emphasis was more on the whole person rather than on individual qualities or capacities of the structural *imago Dei*.

Men and women as willed by God are on one hand "in perfect equality as human persons; on the other, in their respective beings as man and woman."[11] Being made in the image of God, men and women "possess an inalienable dignity which comes to them

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[5] *The Catechism of the Catholic Church*, Revised edition. (Nairobi: Pauline Publications Africa, 1995), 355.
[6] *Gaudium et Spes*, 12.
[7] Ibid., 24.
[8] *The Catechism of the Catholic Church*, 357.
[9] Ibid., 358.
[10] Ibid., 362.
[11] Ibid., 369.

immediately from God their Creator. Man and woman are both with one and the same dignity in the image of God."[12] Man and woman are created to complement each other, to be in communion with one another, with the world and with God. In that communion, according to *The Catechism* "man and woman have the vocation of 'subduing' the earth as stewards of God. This sovereignty is not to be an arbitrary and destructive domination."[13] It continues by stating that "God calls man and woman, made in the image of the Creator, […] to share in his providence towards other creatures, hence responsibility for the world God has entrusted to them."[14] With the help of the encyclical letter *Laudato Si'* and the *Ecology at the Heart of Faith* of Denis Edwards, we will come back in the third chapter to this model of stewardship.[15]

The Catechism has also clarified that God is not in man's image. It states "in no way is God in man's image. He is neither man nor woman. God is pure spirit in which there is no place for the difference between the sexes."[16] However in their respective perfection, man and woman reflect something of the infinite perfection of God: those of a mother and

[12] *The Catechism of the Catholic Church,* 373.
[13] Ibid.
[14] Ibid.
[15] We will then insist on the invitation of Pope Francis to humans for the importance of ethics in our relationship to the environment. This is an approach to ecology which respects our unique place as human beings in this world and our relationship to our surroundings. And after presenting briefly the 5 models (kinship with creation; domination of nature; ecological egalitarianism; kinship within a community; and cultivating and caring for creation) of relationship between human beings and the rest of the creation of Edwards, we will emphasize the fifth model 'the cultivating and caring for creation'. According to Edwards, the cultivating and caring model is where human beings can see themselves as interrelated in a community of life with other creatures, who are also the self-expression of God, and in this sense, the image of God like human beings. Cf. Denis Edwards, *Ecology at the Heart of Faith: The Change of Heart that leads to a New Way of Living on Earth* (New York: Orbis Books, 2006), 14-26.
[16] *The Catechism of the Catholic Church,* 370.

wife and those of a father and husband. These are briefly what we can learn from the official teaching of Catholicism from *The Catechism of the Catholic Church.*[17]

1.2. The *imago Dei* from the Scriptures: Old and New Testament

The concept of *imago Dei* is traditionally referred to human beings. And the idea of human beings as created in the image of God is at the real heart of the Christian revelation. Before getting to the traditional reference of the theme of *imago Dei* in Genesis, it can be noted that the theme *imago Dei "*emerges from a common royal ideology where individual Mesopotamian, Hittite, Assyrian, Babylonian, and Egyptian priests-kings are referred to as the image and likeness of particular gods."[18] The *imago Dei* (*selem elohîm*) in Hebrew, which is the term used in Genesis, is "the exact counterpart of the Akkadian expression (*salam* [God's name]) 'image of Enlil [Marduk, etc.]'), an expression which often appears as an epithet of Mesopotamian priest-kings."[19] "Reference to the king as the image (*salmu*) of God abound in the Neo-Assyrian royal correspondence."[20] In the ancient Near Eastern conception, the king (understood as a priest-king) was seen as "the god's authorized deputy or viceroy on earth."[21] In fact, "description of Near Eastern Kings as the image of a god . . . provides the most plausible set of parallels for interpreting the *imago Dei* in Genesis."[22] From the book of Genesis, God said:

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[17] In addition to this teaching, we have a text, *Communion and Stewardship: Human Persons created in the Image of God*, developed by an International Theological Commission held at Rome during the period 2000-2002. This document was submitted to Joseph Cardinal Ratzinger, the President of the Commission, who has given his permission for its publication in 2004.

[18] Joshua Moritz, "One *Imago Dei* and the Incarnation of the Eschatological Adam," in *Astrotheology: Science and Theology Meet Extraterrestrial Life,* chap. 19, Kindle.

[19] Phyllis A. Bird, "Theological Anthropology in the Hebrew Bible," in *The Blackwell Companion to the Hebrew Bible,* ed. Leo Perdue (Oxford: Blackwell, 2001), 260–261.

[20] Simo Parpola, "The Assyrian Tree of Life: Tracing the Origins of Jewish Monotheism and Greek Philosophy," *Journal of Near Eastern Studies* 52, no. 3 (1993): 168.

[21] Richard Middleton, *The Liberating Image: The Imago Dei in Genesis 1* (Grand Rapids Michigan: Brazos Press, 2005), 119.

[22] Ibid., 121.

> Let us make humankind in our image, according to our likeness; and let them have dominion over the fish of the sea, and over the birds of the air, and over the cattle, and over all the wild animals of the earth, and over every creeping thing that creeps upon the earth. So, God created humankind in his image, in the image of God he created them; male and female he created them.[23]
>
> This is the written account of Adam's family line. When God created mankind, he made them in the likeness of God. He created them male and female and blessed them. And he named them "Mankind" when they were created. When Adam had lived 130 years, he had a son in his own likeness, in his own image; and he named him Seth.[24]
>
> Whoever sheds human blood, by humans shall their blood be shed; for in the image of God has God made mankind.[25]

These passages from Genesis are in the context of the narrative of creation. In this narration, the fact that the human beings are made in the likeness and image of God leads Gerhard von Rad to identify human beings as "God's representative in the world."[26] Theologians like Jack Mahoney, SJ, said the "passage was given a special anthropological interpretation based on what was considered uniquely characteristic of humanity above all other creatures."[27] Traditionally, *imago Dei* is referred to men and women because when "God created man in his image; in the image of God he created him; male and female, he created them."[28]

From the biblical interpretation, God has created male and female[29] in his image. The theme *imago Dei* is "seen as the key to the biblical understanding of human nature and to all the affirmations of biblical anthropology in both the Old and New Testaments."[30] The

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[23] Gen.1: 26-27.
[24] Gen. 5: 1-3.
[25] Gen. 9: 6.
[26] Gerhard von Rad, *Genesis: A Commentary,* 2nd rev. ed. (London: SCM, 1963), 55.
[27] Jack Mahoney, "Evolution, Altruism, and the Image of God" *Theological Studies* 71, no.3 (Sep 2010): 678.
[28] Gen. 1:27; cf. Gen. 5:1-2.
[29] In *Familiaris Consortio,* Pope John Paul II clarifies how male and female all share equal dignity and responsibility and how they are equally created in God's image. Men and women have equal dignity and responsibility because they are all created in the image of God. Unfortunately, the history left us a kind of discrimination and dominance of male over female, which is not really what all created in the image of God should be.
[30] International Theological Commission, 7.

imago Dei at this point is the definition of humanity. And the mystery of *imago Dei* seems strongly connected to the mystery of God. The biblical interpretation understood the *imago Dei* as the whole of the human being, as *The Catechism* has reaffirmed. Whenever we read how God creates Mankind in His image, the text never divides mankind as if God creates the intellect or reason or the domination of humankind.

> Biblical anthropology excludes mind-body dualism. It speaks of man as a whole. Among the basic Hebrew terms for man used in the Old Testament, *nèfèš* means the life of a concrete person who is alive (Gen 9:4; Lev. 24:17-18, Proverbs 8:35). But man does not have a *nèfèš*; he is a *nèfèš* (Gen 2:7; Lev 17:10). *Basar* refers to the flesh of animals and of men, and sometimes the body as a whole (Lev 4:11; 26:29). Again, one does not have a *basar*, but is a *basar*. The New Testament term *sarx* (flesh) can denote the material corporality of man (2 Cor 12:7), but on the other hand also the whole person (Rom. 8:6). Another Greek term, *soma* (body) refers to the whole man with emphasis on his outward manifestation. Here too man does not *have* his body but *is* his body. Biblical anthropology clearly presupposes the unity of man and understands bodyliness to be essential to personal identity.[31]

Created in the image of God, every part of the human being participates in the being and becoming of the *imago Dei.* The biblical interpretation of *imago Dei* as united man is shaped by two themes: "the whole of man is seen as created in the image of God. […] (and) the creation accounts in Genesis make it clear that man is not created as an isolated individual."[32] The human body or the human spirit or mind or reason are all part of the *imago Dei* without insistence on one part. Even when the Gospel insists on the fact that "the word became flesh" (sarx), the Evangelist surely makes it clear that Jesus has a real physical body which is not a phantom body (as this could favor Docetism), a real body which is part of the being of Jesus as the perfection of *imago Dei*. It is clear with the biblical interpretation that *imago Dei* is a unified reality and that human bodyliness is part of the image of God. Not only has God created mankind not divided but He has created

[31] International Theological Commission, 28.
[32] Ibid., 9-10.

mankind as a relational person. The first human beings were placed in relation with other persons, with the world, with God and with themselves. So, the created image from the Old Testament is that mankind is neither a divided person nor an isolated person.

From the New Testament, the perfect and true *imago Dei* is in the *imago Christi*. The theme of *imago Dei* as Mahoney emphasizes, "was transposed from the Hebrew Bible's treatment of it as an anthropological statement about the creation of humanity to the center of Christian theology with Paul's identification of Christ as the image of the invisible God, the firstborn of all creation."[33] He continues by mentioning that "through his human existence and actions Jesus has presented us with a unique eikon, or created representation, of his heavenly Father, and we in turn are being called to be associated with Christ as his brothers and sisters."[34]

Jesus Christ is seen as the true and perfect image of God or, "in the original Greek, as the *icon* of God."[35] In the letter to the Corinthians, Paul speaks of Christ as the image of God. He says: "the god of this age has blinded the minds of unbelievers, so that they cannot see the light of the gospel that displays the glory of Christ, who is the image of God."[36] It is in His grace that others are conformed to His image. In the letter to the Hebrews, the author states, "the Son is the radiance of God's glory and the exact representation of his being, sustaining all things by his powerful word. After he had provided purification for sins, he sat down at the right hand of the Majesty in heaven."[37] And it is confirmed that others are conformed to this image by grace in the letter to Romans, "for those God

[33] Mahoney, 679.
[34] Ibid.
[35] Edwards, 15.
[36] 2 Cor 4: 4.
[37] Heb 1: 3.

foreknew he also predestined to be conformed to the image of his Son, that he might be the firstborn among many brothers and sisters."[38] The hymn to Christ in the Letter to the Colossians sings of Christ as the "image of the invisible God, the firstborn of all creation."[39] Jesus is the true and perfect image of God, "the one in whom all things are created and the one in whom all are reconciled."[40] The *imago Christi* as the perfect *imago Dei* determines the becoming of others as *imago Dei,* so that "to become the image of God requires an active participation on man's part in his transformation according to the pattern of the image of the Son […] who manifests his identity by the historical movement from his incarnation to his glory."[41]

The transformation to the *imago Christi*, so that to become an *imago Dei* is a journey of conversion from sin to salvation and consummation which is accomplished through the sacraments. Created as *imago Dei* and perfected as *imago Christi* by the power of the Holy Spirit in the sacraments, we are embraced in love by the Father. The *imago Christi* is the full or complete revelation of what it means to be created in *imago Dei.* "In him (*imago Christi*), we find the total receptivity to the Father which should characterize our own existence, the openness to the other in an attitude of service which should characterize our relations with our brothers and sisters in Christ, and the mercy and love for others which Christ, as the image of the Father, displays for us."[42] This transformation to the *imago Christi* is a form of the biblical tradition.

[38] Rom 8: 29.
[39] Col 1: 15.
[40] Edwards, 15.
[41] International Theological Commission, 12.
[42] Ibid., 53.

The theology of *imago Dei* as perfected in *imago Christi* finds some clarifications from *Gaudium et Spes,* where it states that

> It is only in the mystery of the Word made flesh that the mystery of man truly becomes clear. For Adam, the first man, was a type of him who was to come, Christ the Lord. Christ the new Adam, in the very revelation of the mystery of the Father and of his love, fully reveals man to himself and brings to light his most high calling. No wonder, then, that all the truths mentioned so far should find in him their source and their most perfect embodiment.[43]

Here, Jesus is the one who reveals to men and women the fullness of their being because of having been created "through him and in him."[44] Becoming *imago Dei* is no longer in the past but it is in the future. Ted Peters in "The *Imago Dei* as the End of Evolution"[45] has developed an idea about the human race becoming *imago Dei* at the end (*terminus* as conclusion and *telos* as goal) in *imago Christi* who despite having been after Adam, "provides the definition of what is truly Adam"[46], in the sense that the sin which is conceived to come after the being *imago Dei,* now precedes it. Peters develops a complementary approach between evolutionary science and the eschatology. "For creatures within the lengthy story of evolution, the *imago Dei* is the divine call forward, a call we hear and respond to now but that draws us towards transformation into a future reality."[47] He continues by affirming that "the full flourishing of the image of God in humans is a promise to hope for."[48] It is in the eschatology that we hope to see the fullness of the *imago Dei.* And with the proleptic model, "we begin with Jesus Christ, not Adam

[43] *Gaudium et Spes,* 22.
[44] Col. 1: 16.
[45] Ted Peters, "The *Imago Dei* as the End of Evolution," in *Finding Ourselves: Conversation on the Image of God, Original Sin, and the Problem of Evil After Darwin,* ed. Stanley P. Rosenberg, Michael Burdett, Michael Lloyd, and Benno Van Den Toren (Grand Rapid, Michigan: Baker Academic, 2018), 92-106.
[46] Ibid., 94.
[47] Ibid., 106.
[48] Ibid., 93.

and Eve. Accordingly, we begin with the resurrected Christ and then, retroactively incorporate Christ's *imago* into ourselves through faith, hope and love."[49]

The proleptic model as the promise to rise in the new creation with Christ who rose on Easter, synthetizes creation and redemption, and includes ontological ("it is the being of God's future that determines the being of all that has happened in past nature and history"[50]) and ethical components ("ethics as human action aimed at making tomorrow better than yesterday. The Christian ethicist begins with a vision of God's future and then seeks to work creatively to transform present reality in light of this vision."[51]) With his contribution, Peters clarifies from evolutionary and eschatological perspectives how the fullness of the *imago Dei* derives "not from Adam and Eve in the past but from the eschatological Christ in the future. (and) […] when we and the cosmos are redeemed, we will be fully created. Then God can finally say, "Behold, it is very good."[52]

1.3. The *imago Dei* from the Patristic and Medieval views in Eastern and Western traditions

1.3.1. From Eastern Christianity

In general, the biblical anthropology of *imago Dei* as non-divided and non-isolated has occupied a prominent "place in Christian anthropology in the Fathers of the Church and in later theology, right up to the beginning of modern times."[53] An indication of the centrality of the biblical vision of the image of God can be found in the endeavor of early Christians "to interpret the biblical prohibition against artistic representations of God (cf. Ex 20:2f; Dt 27:15) in the light of the incarnation. For the mystery of the incarnation

[49] Peters, "The *Imago Dei* as the End of Evolution", 95.
[50] Ibid.
[51] Ibid.
[52] Ibid., 106.
[53] International Theological Commission, 14.

demonstrated the possibility of representing the God-made-man in his human and historical reality."[54] We can recall the defense of artistic representation of the Incarnate Word and of the events of salvation during the iconoclastic controversies of the seventh and eighth centuries which "rested on a profound understanding of the hypostatic union which refused to separate the divine and the human in the image."[55]

In their development of the notion of *imago Dei*, the Eastern and Western Christian traditions developed differently. The Eastern tradition, with the Greek fathers, focused not only on the notion of image, but also expanded on the notion of person which refers to Christ as one person with two natures.[56] In "The Human Person as Image of God: Eastern Christianity," Lars Thunberg explained that the human as a person in Christian spirituality is not an individualistic human being, but "the human person is always seen as in a social context. […] (it is) also always understood as being created in the image of God."[57] The human being as a social person and not as an antisocial individual and God as the "copersonal counterpart are seen as the decisive factors in this spirituality."[58] Image and person are two concepts crucial to the way that the human being as person is always understood as being created in the image of God, because "Divine life is understood as personal. (And) God is divinity in three persons-and thus the human being, as bearing the image of God, is necessarily a person."[59]

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[54]International Theological Commission, 14.
[55] Ibid.
[56] Lars Thunberg, "The Human Person as Image of God: Eastern Christianity," in *Christian Spirituality: Origins to the Twelfth Century*, ed. Bernard McGinn, John Meyendorff, and Jean Leclercq. (New York: Crossroad, 1985), 291.
[57] Thunberg, 291.
[58] Ibid.
[59] Ibid., 292.

God as one substance manifesting in three persons – the Father, the Son, and the Holy Spirit – led to the insight that the person is the individualization within the same nature or species. Therefore, the ancient church considers "Christ as divine/human person (Greek *hypostasis*, Latin *persona*) which means that *the category of person transcends the limits of what is naturally given.* Christ consists of two natures but is nevertheless one person, as the Council of Chalcedon in 451 stated."[60] In this logic, the early Christian Church despite considering humans as composite beings – body and soul – considered the human being as "unity charged by God with a purpose in the world that is linked to their being in the image of God."[61] The human being as *imago Dei* was still considered by the early Christians as a unity, meaning as a whole human despite the composite being that is the human person, and the evaluation of human beings was not possible without considering "their relationship to God – one in three persons – or to Christ, the divine/human Savior, who is one person in two natures."[62]

The early church that emerged within the Hellenistic cultural context, where it was bound to deal with both Greek philosophy and the Old Testament in its Greek version, the Septuagint, produced a significant development of the biblical account which makes a distinction between the image and the likeness. However, at a certain point, the patristic and medieval theology diverged from the biblical vision which identified the *imago Dei* with the whole man, meaning the undivided or totality of man. Therefore, the rendering of Gen 1:26 "seems more explicitly distinctive: the human is created not only 'in the image of God' (*kat' eikona*) but also 'into his likeness' (*kat' homoiosin*), and this seems to imply

[60] Thunberg, 292.
[61] Ibid.
[62] Ibid.

a distance between what is given at the outset and what could be realized within the category of time."[63] And combined with the concept of humanity's fall and sinfulness, "it might lead to an understanding of humans as in tension between their 'ontological' image character and their 'moral' similitude."[64] And, adopting the view of the New Testament which defines the true image of God in Christ, because Christ is identical with the creative Word/Logos and incarnate in humanity, the early Church reaffirmed, like all the Christian tradition, that human beings are according to the image of Christ, which means, human beings are the image of the image of God. The Logos is seen as the prototype, which "God used in creating humans in his image, and Christ is seen as the archetype of what is to be human. But Christ is, in his duality, also a person. And thus, human beings, in reflecting the archetype successively, may develop their likeness to God as *personal* fulfillment."[65]

In their distinction between image and likeness, first references by Christian authors go back to the debate on the composite beings of humans, as body and soul, or as flesh and spirit which has impacted considerably the notion of the non-divided *imago Dei.* Origen of Alexandria or Origen Adamantius (185-254), who basing himself on Genesis 1:26 (where God is said to have created man in his image and likeness), and Genesis 2:7 (where we learned that God created the human out of the dust and breathed his own spirit into the human's nostrils), "constructed a theory of a double creation[66]: the first being one of pure spirits gathered around God, but finally falling into corruption; the second being effectuated by God in the act of rescuing fallen creation, giving humans bodies to gather

[63]Thunberg, 293.
[64] Ibid.
[65] Ibid.
[66] The idea of a double creation (based on the two different creation narratives in Genesis 1 and 2) is found already in Philo, the Jewish theologian (see *On the Creation of the World* 134; *Allegory of the Jewish Law* 1.31) but was modified and changed by Origen (see *Commentary on John* 20.22 and a number of other places).

up their falling and frozen souls (*psychai*)."[67] This theory of double creation which supposed that there was no initial coexistence of body and soul, was condemned as heresy. It was condemned because it was in conflict with the traditional view of creation as good.

The second reference is Irenaeus of Lyons (120/140-200/203) who is considered as the first to have elaborated the human duality and "who regarded Adam as not yet mature but endowed with a divine task to develop his capacities to their fullness."[68] But because of the fall, this development was interrupted. It was only in the restoration of humanity in Christ that humans could regain their freedom.

Gregory Nazianzen (329-389), one of the three Cappadocian fathers, wrestled considerably with the problem of the composite makeup of human beings, which are the mixture of body/soul, and flesh/spirit. According to Gregory, as body and soul, human person is fully initiated into the visible creation but only partially into the intellectual. However, being partially initiated into the intellectual creation is "not only the expression of the fallenness of human beings (as in Origen), but also a sign of their being preserved—by God in creating them both body and soul—from the most disastrous destiny (exemplified by the fallen angel Lucifer) of a creation that revolts against its Creator."[69] The human composite being of body and soul is understood as the special prerogative of human persons, which puts humans "into a unique position within the created order without letting them either usurp the exclusive position of God or be absorbed by material creation. They are in a position in between, which implies struggle, and it is precisely this position that renders humans both weak and pretentious."[70]

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[67] Thunberg, 294.
[68] Ibid.
[69] Ibid.
[70] Ibid.

Gregory of Nyssa (332-395), another Cappadocian father, did not agree with Origen's approach of two creations, which makes the coexistence of the soul and body as something which happened in the second creation. For Gregory of Nyssa, in *De hominis opificio (On the Creation of Man)*, "the Origenist position was intimately connected with an idea of *metempsychosis* and he argued that a fall into the material world would not imply a purification but rather successive falls—or a superiority of sensual life over against spiritual life."[71]

Like the others Church fathers, Maximus the Confessor (580-662) rejects the theory of Origen and affirmed that body and soul are linked to each other by necessity. For Maximus, it is part of God's plan that human beings should consist of body and soul, and "body and soul not only form a composite nature, with its own principle of being, but also a complete species. Thus, the human as a composite being is unique, and it is this uniqueness that is according to the image."[72]

Cyril of Alexandria (378-444), making used of the analogy between humanity's composite and the unity between divine and human nature in Christ, explained that "since Christ is the true image of God, this analogy seems to convey to the whole of humanity a secondary image character, which is fundamental and basic, even if it remains a fact that the early church located the image of God in humans in the soul, particularly in the higher part of the soul, the mind (*nous*)."[73]

With this understanding of human composite being, the early church established the distinction between image and likeness in the biblical story of creation. It seems that in

[71] Gregory of Nyssa, *Doctrine of Man* 28; cf. *De anima et resurrectione* (*PG* 46, col. 108B).
[72] Thunberg, 295.
[73] Ibid.

Hebrew, the "terms *selem* (image) and *dĕmût* (likeness) do not convey any such distinction but are simply synonyms. But in the Greek Old Testament, the terms *eikon* (image) and *homoiōsis* (likeness) seem to be more open to a distinction between two meanings."[74] Origen as a Greek father linked this distinction with his theory of double creation. He believes that, in Genesis 1:26, because both image and likeness are mentioned, God's final intention is sketched out, and because in Genesis 1:27, only the image is mentioned, this indicated "that human being received in the first creation the dignity of image but the perfection of the likeness was reserved for the end of history on account of God's pedagogical efforts as well as humanity's positive imitation of God."[75] At the end, for Origen, "likeness was acquired by human beings through imitation of God."[76]

According to Irenaeus of Lyons, who has been the first church father to use the distinction of *image* and *likeness*[77] in the sense that "image' denotes an ontological participation (*methexis*) and 'likeness' (*mimesis*) a moral transformation,"[78] the human character of image is not a sign of perfection, but it indicates "a task, the culmination of which is supposed to be likeness to God."[79] For Irenaeus, the image is used to refer to humanity created by God and likeness is used for what occurs when human beings are conformed to Christ through grace.[80] In other words, "the mind which alone carries the divine image, is bound down through its relationship to the body and has to free itself through ascetic efforts in order to gain the divine likeness."[81]

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[74] Thunberg, 297-298.
[75] Ibid., 298.
[76] Ibid.
[77] Irenaeus, *Adversus haereses* 5.6.1: Migne, PG 7.1137-38; in Mahoney, 679.
[78] International Theological Commission, 15.
[79] Thunberg, 298.
[80] Edwards, 15.
[81] Thunberg, 298.

While Irenaeus makes his distinction between the ontological participation and the moral transformation, Tertullian (155-222), one of the Latin fathers, notes that "God created man in his image and gave him the breath of life as his likeness. (And) while the image can never be destroyed, the likeness can be lost by sin."[82]

For Maximus the Confessor, likeness seems to be above the image, but the use of the distinction between image and likeness did not seem to cause any difficulty. For him, "human beings are created in the image of God, in order that they may become like God. And this likeness is both their own maturity as human beings and their fulfillment as a microcosmic and mediating task within the created universe."[83]

1.3.2. From Western Christianity

The question of the *imago Dei* in the course of the history of the early Church was not only the preoccupation of Eastern Christianity,[84] it was also the preoccupation of Western Christianity. With Origen, Irenaeus of Lyons, Gregory of Nazianzen, Gregory of Nyssa, Cyril of Alexandria, and Maximus the Confessor, we emphasize their divergence

[82] International Theological Commission, 17.
[83] Thunberg, 299.
[84] In the Eastern Christian early church, there was also the concern about the question of dominion. The human dominion over the earth as part of the image character is understood as a spiritual enterprise, and, when human beings become absorbed by the material side of this enterprise, this is regarded as an expression of their sinfulness. While Origen believes in his homily on Genesis 1:26, that humanity holds a position of dominion in creation because of the rational souls and not because of their bodies, even though they are a unity of both, Basil the Great makes observation about humanity's role in relation to the animals, John Chrysostom states that nothing on earth is superior to humanity and that everything is submitted to it, Theodoret of Cyrus observes that human beings are exercising dominion in their accomplishment, Cyril of Alexandria believes that the actual exertion of dominion is also an additional gift of God, since everything that we possess is a gift of God, Philo understood the dominion as a dominion over the passions, since the passions are a manifestation of what humanity shares with the animals. For all these church fathers, the human dominion within creation has to be exerted through reason and has to have God's dominion as its model. And human dominion over the earth has to be exerted in parallel to the development of mastery over bodily passions. Human dominion does not imply a subjugation of the created order to human will in opposition to other purposes, but a creative communication with the universe in its differentiation, the purposes of which rest immobile in God's own intention. Cf. Lars Thunberg, 299-304.

from the biblical perspective of *imago Dei,* but also their approach of the composite beings of the human persons which are the bases on which most of them build their divergence.

In the Western tradition, "the ways in which Latin authors understood how humanity was made in and reformed to God's image were much influenced by their inheritance from both Jewish and Greek sources."[85] The Western Christian authors not only used the Old Testament which contains the Hebrew view of the human person as called by God to acts of loving obedience, but they also used the anthropology of Greek philosophers, like Plato and his followers, with its notion of the soul as bearing an image of divinity.[86] There were some important differences between Jewish and Greek anthropologies. While the Greek anthropology makes a distinction between the body and soul "which led to an emphasis on the latter as the true person and an insistence that the soul's immortality was the true human destiny,"[87] the "traditional Jewish anthropology knew nothing of the distinction between body and soul, and in its apocalyptic phase had created the notion of the resurrection of the body in order to vindicate divine justice in a time of persecution."[88] Even if Christian authors made use of Greek philosophical language in explaining their anthropology, their use of it is radically new, because of the trinitarian and Christological character of medieval understanding of the *imago Dei,*

> Divinization, a concept taken over from the Greeks, was given a new content in Christian belief and practice, not only through the new religion's insistence on the necessity of grace to restore the image but also because Christian understanding of the image itself was based not upon a fluid Greek notion of divinity but rather on

[85] Bernard McGinn, "The Human Person as Image of God: Western Christianity," in *Christian Spirituality: Origins to the Twelfth Century*, ed. Bernard McGinn, John Meyendorff, and Jean Leclercq. (New York: Crossroad, 1985), 313.
[86] Ibid.
[87] Ibid.
[88] Ibid.

the mystery of the one God who had revealed himself as Father, Son, and Holy Spirit.[89]

In Western Christianity during the patristic and medieval period, three possible traditions of *imago Dei* were established: "that which finds the image of God primarily in the person considered as an intellectual subject; that which concentrates on the freedom of the subject as the true location of the image; and that which emphasizes the interpersonal character of the image."[90] To understand what it means to be created in the image and likeness of God, Augustin and Marius Victorinus made use of Neoplatonic thought. Victorinus makes a distinction between the Logos, who is the true *imago Dei,* and the human soul, which is created *ad imaginem*—that is, after the pattern of the Logos.[91] For Victorinus, the original human person whose creation is described in Gen 1:26 bears the divine image – the soul possesses 'to be,' 'to live,' and to 'understand' in conformity with the three divine persons, whereas the body's division into two sexes as recounted in the story of the creation of terrestrial humanity in Gen 2:7 mirrors the double nature of the Logos as both male and female.[92]

For St. Augustine, instead of a distinction between image and likeness, he presents a more personalistic, psychological and existential account of the *imago Dei*. Using his life story in the *Confessions,* Augustine broke[93] with Neoplatonic anthropology,[94] "human destiny is no longer seen as the absorption of the individual back into the All, but as the

[89] McGinn, 316.
[90] Ibid.
[91] Marius Victorinus, *Against Arius*, IA.20. Cf. McGinn, 316.
[92] Ibid., 317.
[93] He broke also with earlier Christian understandings of humanity that placed less emphasis on the effects of original sin and gave more weight to the inherent value of ascetic striving toward God. Cf. Bernard McGinn, 318.
[94] After the Pelagian controversies, Augustine abandoned some of the more Platonic elements found in the *Confessions,* such as the notion of the fall of the soul and the role of the natural desire for God. Cf. McGinn, 318.

recovery of the true self through divine reordering of the will."[95] To become a true human person, there is a need for confession, a need for a direct interpersonal address to God which is simultaneously confession of our own sinfulness and praise of God's loving-kindness.[96] Augustine developed the notion of *imago* as a particular kind of likeness (*similitudo*) in the way that the image is expressive of its source because of proximity and because its nature is formed through conversion, that is, a dynamic turning back toward the source in the very moment of its creation.[97]

"Like Victorinus, Augustine admitted that some images can have a relation of equality with their source, […] (but) unlike Victorinus, Augustine insisted with Paul (1Cor 11:7) that the human person can be said not only to be made *ad imaginem* but also to be in itself a true *imago Dei.*"[98] Augustine rejected[99] also the idea according to which the sexual division of humanity could be the result of the fall.[100] In *The Trinity,* exploring how the whole of created reality mirrored the triune God[101] and how the inner person had been created as a special image of the one God, Augustine insisted that "the external world and

[95] McGinn, 317.
[96] Ibid.
[97] As Augustine has stated in *The Trinity,* 11.5.8, certainly, not everything in creatures, which is in some way or other similar to God, is also to be called his image, but that alone to which he himself alone is superior; for the image is only then an expression of God in the full sense when no other nature lies between it and God.
[98] McGinn, 318.
[99] Even if Augustine did not conceive of the image in a sex-specific sense as if male alone bore the true image of God, in several of his works, he did make use of an allegorical interpretation of the account of the fall that goes back of Philo, in which the serpent stands for the sense faculty, the woman for the inferior reason that is directed to the things of this world, and the man for the superior reason directed to God. This distinction became eventually popular in the later Western anthropology. One thing which is clear in his works is that he insisted on the equality of men and women as partakers in the *imago Dei,* the symbolic value he gave to the genders shared the limitations of his culture. Cf. McGinn, 319.
[100] Augustine, *City of God,* 14:21.
[101] In *The Trinity* 12.6.6, Augustine makes this reflection. God said: "Let us make man in our image and after our likeness," and a little later it was said: "So God created man in the image of God." For Augustine, it would be incorrect to say "our," because it is a plural number, if man were made in the image of one person, whether of the Father, or the Son, or the Holy Spirit; but because he was made in the image of the Trinity, it was therefore said: "to our image." Cf. McGinn, 319.

even the outer person (*homo exterior*) bear only the vestiges of the Trinity (*vestigia Trinitatis*) and that only the inner person can be seen as a real *imago Trinitatis.*"[102] For Augustine, the image of the triune God resides only in the *mens,* or the higher dimension of the soul. According to Augustine, it is in that part of human nature wherein the human being surpasses the brute and beasts, which of course, is reason, mind or intelligence, and that human beings are made in the image of God. It is in that part of his nature that man is made in the image of God.[103]

"Augustine developed understanding of the human person as trinitarian image based both upon love and knowledge."[104] Augustine makes it clear that "the image of God in man orients him to God in invocation, knowledge and love."[105] In his understanding of the mind as the *imago Trinitatis,* Augustine concludes that "the image of God in man has a Trinitarian structure, reflecting either the tripartite structure of the human soul (spirit, self-consciousness, and love) or the threefold aspects of the psyche (memory, intelligence, and will)."[106] And "it is only because the human person retains the image of the Trinity even after sin that it is possible for God's grace to restore that image through act of knowing, remembering, and loving him."[107] Augustine[108] placed clearly the *imago* character of the human subject in its intellectual nature.[109]

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[102] McGinn, 319.
[103] Ibid.
[104] Ibid.
[105] Augustine, *Confessions,* I, 1, 1.
[106] International Theological Commission, 15.
[107] McGinn, 320.
[108] Augustine, *De Genesi ad litteram,* 3.20.30; in Mahoney, 678. Mahoney points out the fact that Augustine believes in "the significance of humanity's being made in God's image in order to have dominion over the fish and bird and other animals lacking reason. And understood in this way, the *imago Dei* makes human beings superior to other creatures and unique in their relationship with God.
[109] McGinn, 317.

As McGinn notes, it is good to remember that "Augustine's view of the human subject as the *imago Trinitatis* always needs to be considered in the light of his thoughts on the mystery of grace and freedom."[110] Augustine was resolutely opposed to any conception of freedom as the unhindered autonomy or self-determination of the individual subject. For him, "freedom was always in need of a modifier – it was freedom 'to' or freedom 'from.' Adam's freedom had a degree of versatility not open to his descendants."[111] But, after the fall, "humanity was freely bound *to* sin and enjoyed a perverse freedom *from* justice; Christ restored true freedom (*libertas*) to our power of free choice (*liberum arbitrium*) by granting freedom from bondage to sin and the freedom to cooperate with grace in living according to *caritas.*"[112] This Augustinian anthropology about the human person as *imago Dei* was challenged by other Western Christians church fathers and medieval thinkers, but it was preserved during the Middle Ages by Benedictine monasticism.

Pope Gregory the Great (540-604), one of the Latin fathers, who was Pope from 590 till his death, has contributed considerably to the Western Christian anthropology. He is known as someone who did more to form the monastic culture and mentality, especially in areas dealing with the situation of the human person. He based his anthropology largely on that of Augustine, with a genuine capacity to emphasize his own view. "Gregory's acute sense of human misery as a result of sin […] was joined to an intense realization of how compunction for our sinful state gives rise to the desire for the experience of God as a foretaste of the perfect life to be enjoyed in heaven"[113] At the same moment that Gregory

[110] McGinn, 321.
[111] Ibid.
[112] Ibid.
[113] Ibid., 322.

the Great insisted that in contemplation of God, a person recognizes his own worthlessness, he was also convinced that in that contemplation the taste of interior quiet is already experienced.[114]

John the Scot (800-877) also made use of the intellectual heritage of Augustine, but more often he used the approaches of the Greek fathers. His *Periphyseon* contains a profound theological anthropology of a pronounced Neoplatonic character. In that book, after adopting the traditional understanding of human person as created *ad imaginem* (because the Logos is the true *imago Dei*), and the understanding according to which the image resides in the human person's higher intellectual nature and bears a trinitarian structure, John the Scot went further "by insisting that the idea of humanity (*homo*) is the first of the primordial causes in which God created all things."[115] For him, man was made among the primordial causes in the image of God, so that in man, every creature, both intelligible and sensible, should become an inseparable unity, and that the man should be the mediating term and unification of all creatures.[116] In that same logic, he explained that the first creation was a spiritual one in which all things "were united in the primordial idea of the First Man, Adam. His fall through pride produced the differentiated material universe in which we now live, but this world of division is being led back to its pristine unity through the saving work of the New Man, Christ the incarnate Word."[117] The human person at this point, for John the Scot, is "a particular intellectual idea eternally created in the mind of God (*Periphyseon* 4.7) – and the real similarity between the image and its divine

[114] McGinn, 322.
[115] Ibid.
[116] Ibid.
[117] Ibid.

Exemplar paradoxically resides more in ignorance than in knowledge."[118] Therefore, as human beings, according to John the Scot, we are most truly the image of God in our inability to grasp or define our true nature, which precisely as *imago Dei* remains forever mysterious.

Other important figures in the Western tradition are Bernard of Clairvaux (1090-1153), who saw human freedom as the site of the image, and Richard of St. Victor (died in 1173), whose thought contains profound reflections on how the interpersonal human subject is an image of the three-personed God.[119] As a likely a master of the Cistercian school and the only rival of Augustine among medieval Latin authors, Bernard insisted on self-knowledge, which consists of three things: that a person know what he has done, what he deserves, and what he has lost.[120] Self-knowledge and self-love are the path to the loving union with God. Like Augustine's view of freedom, Bernard was "fundamentally theocentric in the sense that God's unfailing goodness as the free and spontaneous expression of the divine being is the basic source of all liberty."

Even if Bernard did not emphasize individual autonomy, Etienne Gilson claims that Bernard finds the image of God *par excellence* in human free will. For the human person who exercises self-knowledge and self-love, the image of God is in the free will.[121] And the freedom seems to have three states according to Bernard: *freedom from necessity* (external coercion) which human beings possess, both before and after the fall, which

[118] McGinn, 322.
[119] Ibid., 324.
[120] Ibid.
[121] The understanding of human freedom as the true location of the *imago Dei,* by Bernard was conditioned by the role that love played in the life and thought of this most passionate of monks. When he talks of love, he talks of the paradox which comes with it, yet love is free, completely voluntary but it is absorbing and obsessive at the same time. Among all the motions, senses, and affections of the soul, it is love alone in which the creature is able, even if not on an equal basis, to repay its Creator for what it has received, to weigh back something from the same measure. Cf. McGinn, 325.

assures that the sins are voluntary expression of human wills; *freedom from sin* (free counsel) which humanity lost in the fall, and which is restored by Christ; and *freedom from sorrow* (free from pleasure) which is the unfailing enjoyment of the goodness of God in heaven. And as he said, "we must learn from our freedom of counsel not to abuse free choice, in order that one day we may be able fully to enjoy freedom of pleasure. Thus we are repairing the image of God in us, the way is being paved, by grace, for the retrieving of that former honor which we forfeited by sin."[122] Evoking the distinction between image and likeness, which helps to describe how humanity retained its basic relation with God even after the fall, Bernard in *Grace and Free Choice* identified image with free choice[123] and likeness with free counsel and free pleasure.[124]

Richard of St. Victor, from the Western Christian tradition, emphasizes considerably the affective and intellectual powers of the soul in addressing the question of the human person, and this affected his understanding of the Trinity. For Richard, as for all his contemporaries, "the soul has two fundamental powers, love and knowledge, the two feet by which we journey to God."[125] The love which Richard is talking about is the love that is itself a form of knowing, a love which is not anti-intellectual, a love which allows the transformation or divinization of the person, a love which is a true *caritas*, which is opposed to the false self-love of *cupiditas*. And Richard, following Augustine, developed an understanding of how the three persons can be one God through an analysis of the nature of *caritas.* "God, who is by definition perfect charity or outpouring generous love, requires

[122] Bernard of Clairvaux, *Grace and Free Choice* 8.27. Cf. McGinn, 326.
[123] In the *Sermons on the Song of Songs* 80-82, the image consists in the greatness (*magnitudo*) and uprightness (*rectitudo*) of the soul, and the likeness is found in the permanent simplicity, immortality, and free choice of the soul.
[124] Bernard of Clairvaux, *Grace and Free Choice* 9.28-10.35. Cf. McGinn, 326.
[125] McGinn, 327.

someone equal to himself toward whom to direct this love."[126] Like the shared love between the persons of the Trinity, "in those who are mutually loved, the perfection of each, in order to be completed, requires with equal reason a sharer of the love (*condilectus*) that has been shown to them."[127] From this understanding of the Trinity as the supreme shared love of three equal persons, Richard claims that "the human person, then, like the divine person, is called to share love: this is what makes it what it is truly meant to be. Being made in the image and likeness of God means being made to share in the shared love of the Trinity, and like the Trinity to communicate that love to others."[128] So, being *imago Dei* is being this new creature who lives a life of loving service to others. Therefore, the true meaning of *imago Dei*, according to Richard, is to become an *imago Christi* in this life.

While Bonaventure (1218-1274) understood that the image of God in the human person is realized through the will in the religious act of man,[129] Thomas Aquinas (1225-1274) believed that the image of God in the human is realized through reason, knowledge and love. And holding that the human person is not only the soul, but a composition of the body and soul, Thomas did not believe in an absolute separation of body and soul, but their correlation or interdependence in man. By emphasizing the human body, Thomas did not mean that the image of God is in man's body, but "that the human body as a trace exhibits the image of God, which is located in the soul."[130] While he claimed that all creatures

[126] Bernard McGinn, 327.
[127] Ibid.
[128] Ibid.
[129] Bonaventure, *Sent.* II d.16 a. 2 q.3. Cf. International Theological Commission, 16.
[130] Dominic Olariu, "Thomas Aquinas' definition of the *imago Dei* and the development of lifelike portraiture," *BUCEMA* (Feb 17, 2013), https://journals.openedition.org/cem/13251 (accessed Mar 9, 2020).

possess some likeness to God, which he called a trace, he believed that only human being is made in the image of God.[131]

For Thomas, "the *imago Dei* possesses an historical character, since it passes through three stages: the *imago creationis* (*naturae*), the *imago recreationis* (*gratiae*), and the *similitudinis* (*gloriae*)."[132] For him, the human person is made in the image of God in these three different ways. According to the stage of *imago creationis* (*naturae*), the human person is the *imago Dei* because of his or her ability to know and to love. According to the stage of *imago recreationis* (*gratiae*), the human person is the *imago Dei* when he or she knows and loves God. And, according to the stage of *similitudinis* (*gloriae*), the human person is the *imago Dei* when he or she knows and loves God in heaven as God knows and loves Himself. At the heart of "St. Thomas's account of the human person as the *imago Dei* is his claim that the human person is made in the image of God because of his or her rational nature, i.e., his or her ability to know and to love."[133] According to Thomas, being *imago Dei* is to live, to think and to love. And being the *imago Dei*[134] refers to the mind,

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[131] In Question 93 of the first part of the *Summa Theologiae*, when Thomas confronts the idea of Augustine of the image of God in the intellectual soul, he (Thomas) answers affirmatively by saying that the image of God is in man as regards the mind only. For him, all creatures possess some likeness to God, which he calls a trace, for all things come from God, but only the human being is said to represent God by way of image. Therefore, it must be that what makes us in the image of God is what we have that the other animals do not have – a mind. In the mind we have a likeness of the Trinity, as there is a procession of the word as we understand and a procession of love as we will. However, as there is only likeness to God as a trace in the other animals, there is only likeness as a trace in our animal nature, that is, everything about us except the intellectual soul. So, we find in man a likeness to God by way of *image* in his mind, but in the other parts of his being by way of *trace.* Cf. Montague Brown, "*Imago Dei* in Thomas Aquinas," *The Saint Anselm Journal* 10.1 (Fall 2014), https://www.anselm.edu/sites/default/files/Documents/Institute%20of%20SA%20Studies/Brown.pdf (accessed Mar 9, 2020).

[132] Thomas Aquinas, *Summa Theologiae* I. q. 93.6.

[133] Nicanor P. G. Austriaco, "On the Evolution of the Imago Dei: Insights from St. Thomas Aquinas," *Biologos* (Feb 15, 2015), https://biologos.org/articles/on-the-evolution-of-the-imago-dei-insights-from-st-thomas-aquinas (accessed Mar 9, 2020).

[134] For Thomas, because the intellectual nature of the angels is more perfect than the one of human beings, the angels are then more in the image of God than human beings. And it is clear for him that the image of God exists most perfectly in the acts of the soul, because the soul is that which is most perfect in us and so best image of God.

reason, or rational soul which includes the intellect and will, the abilities of knowledge and love, that human beings have but animals do not have. And to become the more perfect image of God, human beings have to know and to love God, who is the most perfect object of the acts of intellect and will.[135] And this is "a profoundly Trinitarian insight because the acts of knowing and loving are the acts that constitute the very persons of the Triune God.[136]

It is clear in that case that only intellectual creatures are the image of God. The *imago Dei* is the basis for participation in the divine life, and it is realized principally in an act of contemplation in the intellect. While it is true, according to Thomas, that likeness is common to all things, in the sense that the other creatures have the likeness without being the image of God, it is true also that, for him, likeness relates to image as its perfection, in the way that every time that the acts of knowledge and love, by seeking God as their object, "are more like God than just their potential existence in the capacity of the rational soul,…thus through these activities our image becomes more like God."[137] In reference to the difference between potentiality and actuality, Thomas insists that we are more in the image of God in our acts than in our powers. And because everything is created in Christ, who is fully human— body, mind and spirit—He is the perfect image of God.

"Reformation controversies demonstrated that the theology of the *imago Dei* remained important for both Protestant and Catholic theologians."[138] The Catholics are

[135] Thomas Aquinas, *Summa Theologiae* I. q. 93.7.
[136] Ibid., I. q. 93.6.
[137] Montague Brown, "*Imago Dei* in Thomas Aquinas," (accessed Mar 9, 2020).
[138] International Theological Commission, 17.

accused by the Reformers[139] of reducing the *imago Dei* to an "*imago naturae*" which offered a static conception of human nature and encouraged the sinner to constitute himself before God. On their side, the Catholics accused the Reformers of denying the ontological reality of the image of God and reducing it to a pure relation. In addition, the Reformers insisted that the image of God was corrupted by sin, whereas Catholic theologians viewed sin as a wounding of the image of God in man.[140]

1.4. The *imago Dei* during the contemporary period

Generally during history, the *imago Dei* retained its central position in theological anthropology. But during the nineteenth and twentieth century, the notion of *imago Dei* lost its centrality. It became unfavorable at some point. It was undermined because it was regarded as an expression of human arrogance by which man compares himself to God and by which man considers himself as more important than anything else. The view of the universe has displaced the traditional comprehension of a cosmos as something made in the divine image, and this has affected the theology of *imago Dei.* It is affected in the way that the empiricists consider *imago Dei* as "ill-adapted to experience"[141] while the rationalists consider the idea of man as *imago Dei* ambiguous.

Some important intellectuals of the twentieth century, intellectuals like Ludwig Feuerbach, Karl Marx, and Sigmund Freud, undermine the theology of the *imago Dei.* For them, it is not a man who is made in the image of God, but it is God who is made in the image of man. Here, God is nothing except an image projected by man. However, the

[139] The idea of *imago Dei* from the reformers' views can be found in Allen G. Jorgensen, "Beyond Luther's *Imago Dei:* Imagining a Modest Humanity," *Canadian Theological Review* 3 (2014): 66-81; and Jason Van Vet, *Children of God: the Imago Dei in John Calvin and his Context* (Göttingen, Germany: Vandenhoeck & Ruprecht, 2009).
[140] International Theological Commission, 17.
[141] Ibid., 19.

interest in the theology of *imago Dei* grew again in the mid-twentieth century because of the impact of Vatican II. "The council gave new impetus to the theology of the *imago Dei,* most especially in the Constitution on the Church in the Modern World, *Gaudium et Spes.* Invoking the theme of the image of God, the Council affirmed in *Gaudium et Spes* the dignity of man."[142]

When the Conciliar fathers asked, "What is man?" in *Gaudium et Spes,* they answered, "About himself he has expressed, and continues to express many divergent and even contradictory opinions. In these he often exalts himself as the absolute measure of all things or debases himself to the point of despair."[143] But they reaffirmed, "for the Sacred Scripture teaches that man was created 'to the image of God,' is capable of knowing and loving his Creator, and was appointed by Him as master of all earthly creatures […] that he might subdue them and use them to God's glory."[144] The Conciliar fathers insisted on the fact that a man is not a solitary, but called to be in community, which is the "primary form of interpersonal communion."[145] The *imago Dei* of Vatican II consists "in man's orientation to God, which is the basis of the human dignity and of inalienable rights of the human person."[146] It is because the human as person is *imago Dei* that no man could be made subservient to any kind of system in the world.

The theology of *imago Dei* illumines somehow the relation between anthropology and Christology. While opening to the unique grace which comes to human beings through incarnation, theologians recognize the essential value of human beings created in the image

[142] International Theological Commission, 21.
[143] *Gaudium et Spes,* 12.
[144] Ibid.
[145] Ibid.
[146] International Theological Commission, 22.

of God. "The possibilities that Christ opens up for man do not involve the suppression of the human reality in its creatureliness but its transformation and realization according to the perfect image of the Son."[147] The theology of *imago Dei* is linked to Christology, but it is linked also to moral theology by the fact that it shows man's participation in divine law, participation in the good in the action of men. Vatican II has helped to make it clear that the *imago Dei* has also a "teleological and eschatological dimension which defines man as *homo viator*, oriented to the *parousia* and to the consummation of the divine plan for the universe."[148]

In the contemporary period, Olli-Pekka Vainio[149] and Aku Visala[150] have defended the structural approach of *imago Dei.* Vainio makes his argument by concentrating on the question of rationality, first, through theologies of Thomas Aquinas and Robert Jenson. Vainio argues that there is a significant overlap between contemporary scientific interpretations of rationality and both a traditional Thomistic view and a contemporary ecumenical interpretation of *imago Dei.* In his argumentation, he believes that it is possible to give an account of *imago Dei* which takes structural features as central and which is in accord with contemporary science, without falling prey to the dangers that the critics of structuralism point out.

Visala begins his argumentation by analyzing the three major critiques against the Structural view propose a modified structural *imago Dei* where he gives responses to the critiques and identifies the *imago Dei* with the distinctiveness and a higher mental capacity

[147] International Theological Commission, 24.
[148] Ibid., 24.
[149] Olli-Pekka Vainio, "Imago Dei and Human rationality," *Zygon* 49, no.1 (Mar 2014): 121-134.
[150] Aku Visala, "Imago Dei, Dualism, And Evolution: A Philosophical Defense of the Structural Image of God," *Zygon* 49, no.1 (Mar 2014): 101-120.

of humans than other species. The first argument is that the structural view entails mind/body dualism and dualism is no longer viable given neuroscience and contemporary philosophy. Against that critique, Visala presents the contemporary forms of dualism which circumvent those worries. Contrary to those who criticize the structural view because it disvalues the human body, Visala argues that neither a structural nor dualism approach disvalue the human body. The third issue consists of various evolutionary worries that have to do with the lack of a clear-cut boundary between human capacities and the capacities of non-human animals. Counter to this third critique of the structural view, Visala defends an idea of human beings as distinctive and having certain mental capacities to a higher degree than other species. As he states, "if other species were to develop similar capacities to us, they would, at least to some extent, be images of God as well."[151] Alongside, the structural view of the *imago Dei,* there are the relational or communal, and the functional or stewardship views of the *imago Dei.*

1.5. The *imago Dei* as a person of relation or communion

Created in the image of God from the narration of the first book of the Bible, Man is understood as a person of communion or relation and a person of responsibility or stewardship. Being created in the image of God, as non-divided and non-isolated, human beings in their physical and spiritual beings are made for sharing a world with one another. Created in the image of God, human beings are called to love, communion and relationship between themselves and toward God, the Creator. "It is of the essence of the *imago Dei* in them that these personal beings are relational and social beings, embraced in a human

[151] Visala, 118.

family whose unity is at once realized and prefigured in the Church."[152] The relational dimension of the *imago Dei* is often explained by the radical relationship between the divine persons of the Trinity[153], which was emphasized abundantly in the course of history.

[152] International Theological Commission, 40.

[153] The word Trinity was not used until the late second century, even if the earlier religious experience of the first Christian communities is already trinitarian. Jesus as the Son of God was from beginning filled with the Spirt. Jesus and the Spirit were taken from the beginning of Christian community as sent by the One who is the Source of All. During the Arian controversies of the fourth century over the eternity and divinity of the Word and Spirit, the Christian community articulated its conviction of the full divinity of the Word at the Council of Nicea (325) and of the Spirit at the Council of Constantinople (381). Athanasius, Pope of Alexandria, is a vigorous defender of the divinity of Word and Spirit in unity of being of the one God. According to Athanasius, human beings can only be deified in Christ, if Christ is truly God, and since the Holy Spirit partakes us in divine life, the Holy Spirt who deifies us in Christ, cannot be a creature but must be divine. Of the three Cappadocians (Basil of Caesarea, Gregory of Nyssa and Gregory of Nazianzus), Basil defends the idea that the Son and the Holy Spirit are with the Father, which means the Word and the Spirit and the Father are in the unity of a communion (*koinonia*) of radical equality and mutuality. For the Cappadocians, the radical communion does not diminish or obscure what is distinctive and proper to the three Persons which their call the three *hypostasis* (underlying reality).
Augustine in *De Trinitate*, the supreme image for the Trinity is the inner self-remembering God, understanding God, and loving God. Thomas Aquinas' understanding of God is radically relational. The relations are identical with the divine nature. Aquinas calls them 'subsistent' relations because they belong to God's substance. Bonaventure, the great Franciscan connects the theology of Trinity to the dynamic fruitfulness of divine goodness of the East. In the life the Trinity, everything flows from the fecundity. When God freely chooses to create, the fruitfulness of trinitarian life finds wonderful expression in the diversity of creatures. Each different kind of creature is a reflection and image of the eternal God.
Through the work of John Damascene, the word *perichoresis* was mediated to both Eastern and Western theology. *Perichoresis* suggests a being present to one another in radical intimacy; a mutual presence of love. It points out to unity in diversity, so as not to fall into an undifferentiated unity (modalism) or in three separate individuals, as three gods (tritheism). The unity in diversity in this case are not opposed but enable each other to exist. It expresses the intimate presence of one divine Person to the others, the being-in-one-another in supreme distinctiveness. At the heart of *perichoresis,* there is the idea of the *ecstatic*: the going-out-from-the self. The *perichoretic* relations of the Trinity suggests that to be a person is not to be simply self-contained but to be able to go out from the self in love to other. The theology of Trinity leads to a view of God as essentially relational.
In the contemporary period, the Trinitarian theology affirms not only communion but also difference. It locates unity in difference at the heart of God. A Trinitarian theology supports a relational view of reality, but it is a specific kind of relationality, one in which distinction and difference are enabled to flourish. Walter Kasper in *The God of Jesus Christ,* 280 understands the unity of divine nature as a unity in love, in the sense that being-from-another is also being-for-another. Catherine LaCugna in *God for Us: The Trinity and Christian Life*, 250 also understands the Trinity as relationship at the heart of both, divine and creaturely. She said God's to-Be is to-Be-in relationship, and God's being-in-relationship-to us is what God is. Elizabeth Johnson in *She Who is,* 22 for example claims that the Trinity as pure relationality, epitomizes the connectedness of all that exists in the universe. Orobator Agbonkhianmeghe, in *Theology brewed in an African Pot: Trinity* offers the image of *Obirin meta,* a Yoruba woman who combines strength, character, personality and beauty to think of a God: Trinity as an open-ended, One of many realities, many relationships and many qualities at the same time. Jurgen Moltmann sees Trinity in *The Trinity and the Kingdom of God,* 109 as making space within the divine relational life for a creaturely world to emerge. For him, "the trinitarian relationship between the Father, the Son and the Holy Spirit is so wide that the whole creation can find space, time and freedom in it." Colin Gunton in *The One, the Three and the Many,* 230 writes that "of both God and

We will come back to the Trinitarian relationship when we will present human beings as part of a wider pattern of relationships in nature which is understood as grounded in the trinitarian relations of mutual love, according to Edwards. A person made in God's image with his or her inalienable right of dignity, is not alone in the universe but is called to be in community with others in society. "The human being is truly human to the extent that he actualizes the essentially social element in his constitution as a person within familial, religious, civil, professional, and other groups that together form the surrounding society to which he belongs."[154] Being *imago Dei,* it is not proper to some human beings but it concerns every human being in the society. Being *imago Dei* is also being in relationship with another *imago Dei's* but also with God.

Unfortunately, that relationship with God and others is often ruptured. Theologically, the rupture is caused by sin which came from the abuse by the *imago Dei* of his freedom. One thing which is generally admitted by every theologian is that the *imago Dei* is not totally destroyed or corrupted by sin. For Catholic tradition, sin disfigures the *imago Dei,* but it does not destroy it and the relational dimension of the *imago Dei* with God is not lost because of sin.[155] The relational dimension of the *imago Dei* toward God is oriented towards its Christological realization. Against "the notion of the total corruption

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the world it must be said that they have their being in relation." Graham Buxton in *The Trinity, Creation and Pastoral Ministry,* 195 writes that "relationality is a critical-event essential-dimension of the divine imprint on creation." He sees *perichoresis* as not only a way of articulating the divine life, or communion of Christians, but also a principle of cosmological unity. Ted Peters in *God as Trinity,* 8 addresses the relationship of God's eternity to the world's temporality and claims that thinking of God as Trinity affirms that the word "God" applies to both eternity and temporality. As the incarnate one, as Emmanuel, as God with us, God is temporal. The eternal one enters time, and time thereby enters the divine life. And it stays there, even unto eternity. The incorporation of time into eternity takes place through the eschatological incorporation of the temporal creation into the eternal perichoresis of the three persons that characterizes the trinitarian life. The eternity-time paradox is resolved eschatologically. (Most of our ideas are from the different classes that we had and the book of *Ecology at the Heart of Faith* of Edwards.)

[154] International Theological Commission, 42.

[155] Ibid., 46.

of the *imago Dei*, the Catholic tradition has insisted that grace and salvation would be illusory if they did not in fact transform the existing, albeit sinful, reality of human nature."[156] The man affected by sin does not stop desiring God. The sinful state even makes the man in the need of salvation. Because sin cannot destroy that desire for God, man can be saved by God's grace. The necessity of salvation comes with the indestructible desire or orientation of man toward God. With salvation, the *imago Dei* is freed from sin, from law which is not inspired by the Holy-Spirit, from suffering, and from death to be reconciled with God. Freed from all these, the *imago Dei* is free for God in Christ and the Holy Spirit. This "freedom for" God in Christ and the Holy-Spirit "is made possible by Jesus Christ, the perfect icon of the Father, who restores the image of God in man" and the communal dimension of the *imago Dei.*

1.6. The *imago Dei* as a person of stewardship or responsibility

Created in the image of God, men and women are not only called to a life of communion with one another and with God, there are also called as *imago Dei* to share the governance or stewardship of visible creation, governance in the sense of care. This privilege is granted to the *imago Dei* from the narration of creation where it is said, "God blessed them (mankind): Be fertile and multiply; fill the earth and subdue it. Have dominion over the fish of the sea, the birds of the air, and all the living things that crawl on the earth."[157] God allows the human to name all the animals[158] and in His wisdom has established humankind to rule the creatures produced by Him.[159] With this privilege, men and women made in the image of God are called to participate in God's work, his project

[156] International Theological Commission, 46.
[157] Gen. 1: 28.
[158] Gen. 2: 20.
[159] Wis. 9: 2-3.

of love and salvation and his own lordship over the universe. Paragraph 34 of *Gaudium et Spes* states clearly that "Man was created in God's image and was commanded to conquer the earth and to rule the world in justice and holiness: he was to acknowledge God as maker of all things and relate himself and the totality of creation to him, so that through the dominion of all things by man the name of God would be majestic in all the earth."[160]

This sovereignty or stewardship holds an ascendancy over the whole of visible creation as a king but also a descendancy image as the kenosis of Jesus Christ. In the exercise of this sovereignty, men are supposed to respect the natural order, in other words, the natural law which derives from the divine law. The Bible warns against the sin of usurpation. Like in the case of the parable of talents (Mt 25: 14-31), the Lord entrusts the *imago Dei* to act in his place as stewards who have freedom to develop the gifts which have been entrusted to them. As stewards, every *imago Dei* must be aware that there will be time when they must render an account of their care of creation. "Human stewardship of the created world is precisely a stewardship exercised by way of participation in the divine rule and is always subject to it. Human beings exercise this stewardship by gaining scientific understanding of the universe, by caring responsibly for the natural world (including animals and the environment), and by guarding their own biological integrity."[161] During the nineteenth and twentieth century, the *imago Dei* has achieved a lot in his understanding of the universe. And this scientific progress has considerable impact in the way that the universe is perceived.

[160] *Gaudium et Spes,* 34.
[161] International Theological Commission, 61.

By admitting the Big Bang theory[162], the stardust[163] and the emerging evolutionary history of life[164], we recognize that every stage during the evolutionary process, something new occurs, like the Big Bang, hydrogen nuclei, stars, DNA molecule, single-cell like *eukaryotes,* multi-cells like *ediacara fauna*, mammals, animals, vertebrates, marine life, Dinosaurs, chimpanzees like apes, *Autralopithecines, Homo rudolphensis, Homo Erectus* until *Home sapiens.* And at each one of these stages, the new species depend on what goes before, even if each represents something new. With that recognition, everyone can clearly see that "human beings share a common history of life with all the other creatures of Earth. We carry within us a story of life that goes back to our pre-human ancestors in Africa, back to the trilobites of the Cambrian seas, and ultimately back to the first bacterial forms of life 3.5 billion years ago,"[165] which is one billion years after Earth and the other planets began to form around the sun.

[162] The emergence of the universe from the first fraction of a second after it came into existence, which is estimated to have happened 15 billion years ago. And since then, the universe is cooling. With the emergence of the necessary conditions, there was the formation of atoms, condensations of galaxies, stars. And around 10 billion years ago, the formation of planets happened. Our solar system is strongly estimated to 4.5 billion years ago.

[163] The fact is that it takes more than hydrogen to make a human being. We are a carbon-based life. The molecules of our bodies are composed of atoms of carbon, hydrogen, oxygen, and nitrogen with small amounts of other elements. Collections of atoms make up molecules, which makes up the chromosomes which carry the genetic code. While the hydrogen atoms come from the early universe, the carbon, oxygen, and nitrogen all come from the stars. And while some organisms are single-celled, a human being is made up of about 50 trillion cells specialized to perform an enormous variety of tasks. In Edwards, 10 &79.

[164] The history of Earth and other planets which emerged from 4.5 billion years ago. And the emergence of life on Earth in form of bacterial cells within a billion years after. The emergence of bacterial life and of the self-replicating DNA molecule is an enormous step in our history. The evolution of life is explained from the emergence of the *eukaryotes* (single-cell) to the *ediacara fauna* (multi-cellular), to animals, the vertebrates, the marine life, the Dinosaurs, to chimpanzees like apes, to *Autralopithecines*, to *Homo rudolphensis*, to *Homo Erectus* till *Home sapiens.* At every stage in the process, something new occurs. And each of these depends on what goes before, but each represents something new. In Edwards, 12-13.

[165] Edwards, 13.

This explanation of the life by the Evolutionary perspective came with new challenges:[166] challenges about the doctrine of creation *ex-nihilo*[167] and challenges about men and women made in the image of God. The traditional explanation from biblical literalism can no longer stand. The *imago Dei* is not created in his actual form, but it is the product of the evolution of life. And the work of James Watson and Francis Crick on DNA made the challenge more serious. As all living things are genetically related, why should the qualification of the *imago Dei* be attributed only to men and women? Can it be explained by the increasing brain size, culminating in that of *homo sapiens*? "With the development of the human brain, the nature and rate of evolution were permanently altered: with the introduction of the uniquely human factors of consciousness, intentionality, freedom and creativity, biological evolution was recast as social and cultural evolution."[168] Continuing to see the difference at the biological level between human beings and nonhumans, like humans and Apes, seems difficult nowadays.

According to the International Theological Commission, the Big Bang theory does not contradict the doctrine of *creatio ex nihilo* because the Big Bang theory does not "exclude the possibility of an antecedent stage of matter, it can be noted that the theory appears to provide merely *indirect* support for the doctrine of *creation ex nihilo* which can

[166] About the two major challenges: Creation *ex-nihilo* and the *imago Dei*, theologians have the responsibility to locate modern scientific understanding within a Christian vision of the created universe. As *imago Dei*, men and women are called to reshape the evolution of the universe itself, by stewarding it.

[167] Creation *ex nihilo* is the action of a transcendent *personal* agent, acting freely and intentionally, with a view toward the all-encompassing purposes of personal engagement. In Catholic tradition, the doctrine of the origin of human beings articulates the revealed truth of this fundamentally relational or personalist understanding of God and of human nature. […] The doctrines of the *imago Dei* and the *creatio ex nihilo* teach us that the existing universe is the setting for a *radically personal* drama, in which the triune Creator calls out of nothingness those to whom He then calls out in love. Cf. International Theological Commission, 65.

[168] International Theological Commission, 63.

only be known by faith."[169] Divine causality can be active in the situation of Big Bang. Nothing should reduce the Big Bang effect to the atheistic materialist of Neo-Darwinism which tries to reject the place of the divine providential causality. The evolutionary mechanism, which is contingent, can also be contingent because God made it contingent. It states,

> With respect to evolution of conditions favorable to the emergence of life, Catholic tradition affirms that, as universal transcendent cause, God is the cause not only of *existence* but also the cause of *causes.* God's action does not displace or supplant the activity of creaturely causes, but enables them to act according to their natures, and nonetheless, to bring about the ends he intends.[170]

As it is said, "in the Catholic perspective, neo-Darwinians who adduce random genetic variation and natural selection as evidence that the process of evolution is absolutely unguided are straying beyond what can be demonstrated by science."[171] For the commission, an evolutionary mechanism is possible only if God has made it. It states,

> while science can study these causal chains, it falls to theology to locate this account of the special creation of the human soul within the overarching plan of the triune God to share the communion of trinitarian life with human persons who are created out of nothing in the image and likeness of God, and who, in his name and according to his plan, exercise a creative stewardship and sovereignty over the physical universe.[172]

The *imago Dei*, as a person of relation and a steward, is called at the ecological level to care for the world, our common home. In fact, the exploitation and sometimes destruction of the common home has damaged the universal home in the way that the *imago Dei* is at risk in his life. The stewardship or sovereignty of the *imago Dei* has been criticized as a cause of the Ecological crisis because Christianity has maximized the place of human

[169] International Theological Commission, 67.
[170] Ibid., 68.
[171] Ibid., 69.
[172] Ibid., 70.

beings in the Creation and has placed human beings as the ruler of the rest of creation. "The Genesis account which grants man 'dominion' over the earth (Gen 1: 28), has encouraged the unbridled exploitation of nature by painting him as domineering and destructive by nature."[173] Even if this is not a correct interpretation of the Bible as understood by the Church, "it is true that we Christians have at times incorrectly interpreted the Scriptures, nowadays we must forcefully reject the notion that our being created in God's image and given dominion over the earth justifies absolute dominion over other creatures."[174] The sovereignty or stewardship has been taken as the mark of superiority. The teaching of Christian beliefs was not to disregard or violate or damage the common home. It was to care for the rest of creation. This view of care is strongly developed by the current Pope of the Catholic Church with his encyclical *Laudato Si',* which will be evoked in the third chapter.

Before Pope Francis, John Paul II says during the discourse he gave on January 17, 2001, that "Man's lordship is not absolute, but ministerial… not the mission of an absolute and unquestionable master, but of a steward of God's kingdom."[175] In the same way, he states in *Centesimus Annus* "

> At the root of senseless destruction of the natural environment lies an anthropological error, which unfortunately is widespread in our day. Humankind, which discovers its capacity to transform and in a certain sense create the world through its own work, forgets that this is always based on God's prior and original gift of the things that are.[176]

He makes it even more clearly in the encyclical *Evangelium Vitae* "man has a specific responsibility towards the environment in which he lives, towards the creation

[173] *Laudato Si,* 67.
[174] Ibid., 67.
[175] International Theological Commission, 73.
[176] *Centesimus Annus,* 37

which God has put at the service of his personal dignity."[177] He continues by affirming that it is the ecological question "ranging from the preservation of the natural habitats of the different species of animals and other forms to 'human ecology' properly speaking – which one finds in the Bible a clear and strong ethical direction leading to a solution which respects every life."[178] In the same way, Pope Benedict in one of his addresses to the Clergy urges us to realize that creation is harmed every time that "we ourselves have the final word, where everything is simply our property and we use it for ourselves alone. The misuse of creation begins when we no longer recognize any higher instance than ourselves, when we see nothing else but ourselves."[179]

Conclusion

In this first chapter, we were asking the question about how to understand the *imago Dei* in its history from our context today. Today, *The Catechism of the Catholic Church* affirms the uniqueness of the human person as the *imago Dei*, who, both man and woman, is a unity of spiritual and corporal, created to be in communion with God and other humans and to be a steward of creation. From that official teaching, we moved back to the biblical perspective, where in the Old Testament, the *imago Dei* refers to the whole person, undivided and relational, and in the New Testament, the true *imago Dei* is the *imago Christi*. We also explored Peters' idea that the human person becomes the *imago Dei* at the end in *imago Christi*. Next, we reviewed the concept of the *imago Dei* from the patristic and medieval period, where the *imago Dei* was dissociated from the *likeness* to God. The Eastern Christian tradition, by assuming the distinction between body and soul, made the

[177] *Evangelium Vitae*, 42.
[178] Ibid.
[179] Address to the Clergy of the Diocese of Bolzano-Bressanone (6 August 2008): AAS 100 (2008), 634.

distinction between being the image and the likeness of God. The Western Christian tradition, adopting a structural view, refers the image of God to some human feature given by God, especially the intellectual nature of the human being. From there, we analyzed the functionality, or stewardship, and the relational, or communal, dimensions of the *imago Dei*. We demonstrated, from the historical analysis of the content attributed to the concept *imago Dei* over the centuries, that different ages in the Church have interpreted the content of that expression in different ways. We can conclude from this historical analysis that the *imago Dei* assumes different meanings at different points in history, which is our justification for expecting that the term is open to ever new meanings. From here, we will see how the Contemporary Evolution has shaped the new understanding of the emergence of the human person.

CHAPTER II: THE EVOLUTIONARY CONTRIBUTION TO THE EMERGENCE OF THE MODERN HUMAN.

> **One of the most longstanding debates in the field of biological anthropology is when members of our lineages became "human." There is a keen interest in knowing when we evolved the characteristics seen in our species, and which of these features truly makes us distinctive from other primates and especially earlier forms of hominins. Language, culture, tool use, brain size, and bipedalism have all been cited as traits that differentiate modern humans from other primate species. While it was once thought that these traits were uniquely human, we now understand most of them to be elaborations of similar features in other species, although with some specific manifestations for modern humans.[180]**

Introduction

Human beings have been for a long time, if not all the time, preoccupied by the question of who they are, how they came to be, and what can they say about themselves. Because by looking at themselves, human beings could see phenotypically that they are different from nonhumans, that they communicate in a way of which only they are capable, and that they are the only ones who could transform their environment, it happens that human beings come to consider themselves as so different and separate from all the other nonhuman animals. When that separation of human beings from nonhumans was not explained by the choice that God the Creator made for the human race, it is explained by some features or characteristics that human beings are the only ones to have. If the scientific contributions of the past did not contradict that approach to human uniqueness based on the faculty of reason or the capacity for use of tools, language, or culture, it happens that

[180] Theodore G. Schurr, "When Did We Become Human: Evolutionary Perspectives on the Emergence of the Modern Human Mind, Brain, and Culture," in *Evolution of Mind, Brain, and Culture,* ed. Gary Hatfield and Holly Pittman (Philadelphia: University of Pennsylvania Museum of Archeology and Anthropology, 2013), 45.

evolutionary science sheds more light on the similarities between human beings and other livings beings.

Without denying the difference between humans and nonhumans, evolutionary science has made possible to diminish the massive gap which was thought to separate the two. The huge influential impact of Charles Darwin made it possible that, after Darwinism and Neo-Darwinism, evolutionary science developed during the contemporary period a vast evolutionary contribution, like the Social Darwinism of Herbert Spencer; the Eugenics Movement of Francis Galton; the Sociobiology of Edward O. Wilson; and the Evolutionary psychology of Jerome Barkow, Leda Cosmides, and John Tooby, which can be considered part of biological evolution. With biological evolution in general, changes or variations are understood to occur on the genetic level of a population and to be passed on from one generation to the next. In addition to the change on the genetic level of a population, which is called microevolution because it is a small-scale change, there is also macroevolution, which is explained by the idea that all of life is connected and can be traced back to one common ancestor. This idea of a common ancestor is one of the major foundations on which the notion of similarities between human species and nonhuman species will be elaborated. In addition to biological evolution, another important foundation for our argument will be the cultural evolution, where the evolution of cultures of individuals or societies helps to recognize some cultural patterns in nonhumans. Also, the analysis of the emergence of the anatomical modern humans (AMH) will be another foundation for the notion of similarities and divergences.

In this second chapter, we will begin by emphasizing biological evolution, where we will develop the major contributions of Darwin and their implications for Neo-

Darwinism, social Darwinism, the Eugenics movement, and sociobiology theory before getting to evolutionary psychology. We will continue with the concept of the cultural evolution, where we will emphasize the integrative evolution, the emergence of the anatomical modern human, and the similarities and divergences from nonhuman animals, based on some key genetic adaptations. To finish, we will also acknowledge the recent contribution of Jurgen Renn on the epistemic evolution which emerges from the cultural evolution and makes scientific knowledge a specific characteristic of modern humans.

2.1. Biological Evolution

2.1.1. Darwin and Darwinism

As is the case in many theories, a new theory very often includes the responses or the corrections of the precedent theories. In the case of Darwin also, there were various contributions which helped Darwinism to situate in the reality of the 19th century. The vast complexity of living species was obvious to any human being. In the Hellenistic period, the philosophers were already explaining the biosphere. Aristotle is one of them who influenced the medieval Catholic thinkers like Thomas Aquinas and Albert the Great who expanded on the biological writings of the Greek philosophers. The classification system developed by Karl Linnaeus in the 18th century contributed in its own way to the scientific dynamism in which Darwinism finds itself. As Ted Peters and Martinez Hewlett demonstrated in *Evolution from Creation to New Creation,* the system of Linnaeus already used the nomenclature of *genus* and *species* but did not question whether the organisms existed as such from the beginning or had developed from earlier, now extinct forms.[181]

[181] Ted Peters and Martinez Hewlett, *Evolution from Creation to New Creation* (Nashville: Abingdon Press, 2003), 37.

During the same 18th century, the idea of the fixity of species was already challenged. It was challenged by George Leclerc and even Eramus Darwin, grandfather of Charles Darwin. It was challenged also by Jean Baptiste Lamarck in 1809 in *Philosophie Zoologique*, where the controversial approach to evolution of Lamarck was developed. Despite the fact that his theory of evolution, in which acquired characteristics were inherited by succeeding generations, was thoroughly discredited, Lamarck has the privilege to be the first ever to use the term biology as referring to biological science, and the term *invertebrates* as referring to the animals without backbones. The works and critics of Lamarck against fixity makes him one of the first evolutionists of modern science. Charles Darwin was introduced to the evolutionism of Lamarck through the criticisms of Charles Lyell against Lamarck. In *The Principles of Geology,* Lyell argued that "the earth was very old and had been formed by gradual process and was subjected to natural forces that could be explained in terms of known scientific mechanisms in operation in the present."[182] Not only did Charles Lyell influence Darwin but also William Paley, with his *Natural Theology: Or Evidences of the Existence and Attributes of the Deity, Collected from the Appearances of Nature* of 1802, influenced Darwin.

Although he studied to become both a physician and a clergyman, Darwin's primary interest was natural history (Biology). Due to his studies of biology, Darwin was able to join the naturalist expedition of HMS Beagle for five years. During his five-year voyage as naturalist, he observed the variations within individual species in different locations. From those observations and the voluminous data and research he had collected—including having read a book by Malthus on human populations competing for

[182] Charles Lyell, *The Principles of Geology: Or, the Modern Changes of the Earth and Its Inhabitants as Illustrative of Geology* (London: Murray, 1833).

limited resources—Darwin "had noted the gradual changes in successive generations of animals when human breeders select for a particular trait. In every population there are small random variations that can be inherited."[183] With the experiences he gained from this voyage, Darwin started elaborating the theory of evolutionary change under the force of natural selection.[184] Because animals need to survive, it became a competition that leads to a natural selection. After emphasizing his new theory in a short paper in 1842 and a longer one in 1844, Darwin and Alfred Russel Wallace presented a similar evolutionary theory during a meeting of the Linnean Society in 1858. It was after that meeting, in 1859, that Darwin proceeded to publish the first edition of six of *On the Origin of Species*.

In his theory of evolution, Darwin not only criticized the idea of fixity, but he proposed that all living creatures have a common ancestor, which is the *descent with modification* model. He introduced the force of natural selection, because for him, evolution is driven by natural selection. Darwinism is known to have three principles: variation, conservative force, and struggle for existence. Natural selection is understood as the results from variation within the members of a species. In other words, natural selection "operates on heritable differences (variation) among members of a population."[185] In that sense, when the genetics of some members are suited better to their environment, they are supposed to survive longer, to reproduce themselves and their successors, and to have a better life than those whose genes don't suite the environment. When there is a variation, it happens at the genotype (which refers to the genetic makeup of an individual) and the

[183] Ian Barbour, *When Science Meets Religion* (San Francisco: HarperSanFrancisco, 2000), 90.
[184] Peters and Hewlett, *Evolution from Creation to New Creation*, 38.
[185] Gary Hatfield, "Introduction: The Evolution of Mind, Brain, and Culture," in *Evolution of Mind, Brain, and Culture*, ed. Gary Hatfield and Holly Pittman (Philadelphia: University of Pennsylvania Museum of Archeology and Anthropology, 2013), 4.

phenotype (which refers to the morphological and behavioral features of an individual). The variation may happen "through genetic mutation and, in sexually reproducing populations, through genetic mutation recombination during meiosis." [186] But when the variation happens, it happens in the way that the genotypes that are selectively transmitted as a result of differential survival and reproduction yield changes in the phenotypes within the population over time.

Another important point of the evolutionary change by natural selection in Darwinism is the fact that it is open to the possibility of the formation of new species, and not only to the change of traits of a species or subspecies. The possibility of the formation of new species, which is qualified as a speciation is part of the theory of extinction, and occurs "when variants diverge sufficiently to be no longer capable of interbreeding."[187] There is also gradualism which is understood as the variation or differences between individuals within a population which arise over time by the accumulation of small changes.

As with any kind of scientific theory, Darwinism has some critics. Among the critics, we can identify Thomas Huxley who mentioned that "the natural selection and gradualism could not account for speciation-the development of new species from existing species. A species is defined as a reproductively isolated group of individuals who can interbreed and produce viable and fertile offspring."[188] The second major criticism is the fact that the Darwinism model for biology lacks solid mechanisms to explain some of the central features, such as the inheritability of traits and the target for the force of natural

[186] Gary Hatfield, 4.
[187] Peters and Hewlett, *Evolution from Creation to New Creation,* 41.
[188] Ibid., 43.

selection. By the way, the natural selection argument is considered as the tautologic argument because the survivors are the fittest, or the fittest could only be the survivors. But against those who criticize the natural selection theory, Michael Ruse argues that their arguments are not strong enough. For Ruse, the selection depends upon the fact that more offspring are produced than could survive, and the difference between the survivors and non-survivors is visible. Because of that difference and the systematic feature observed in selection, natural selection could not be criticized as tautologic argument.

Using the same logic, Stephen Jay Gould and Richard Lewontin established the Panglossian pseudo-scientific picture of a world in which natural selection produces everything for the greatest good. And the same Stephen Jay Gould, in collaboration with Niels Eldredge in 1970, elaborated the "punctuated equilibrium"[189] theory in which they challenged gradualism but agreed on evolutionism. This "punctuated equilibrium" is defined as "evolution that is characterized by long periods of stability in the characteristics of an organism and short periods of rapid change during which new forms appear especially from small subpopulations of the ancestral form in restricted parts of its geographic range."[190] In other words, punctuated equilibrium is the theory which stipulates that there have been long periods of stability interrupted by brief periods of rapid changes. And during the long periods of no change, separated by times of very rapid change, it seems that nothing proceeds by a smooth, gradual pathway with the accumulation of small changes.

[189] Stephen Jay Gould and Niles Eldredge, "Punctuated Equilibria," *Paleobiology* 3 (1977): 115-151.
[190] "Punctuated equilibrium," *Merriam Webster,* https://www.merriam-webster.com/dictionary/punctuated%20equilibrium (accessed February 12, 2020).

In "Darwinism and the Expansion of Evolutionary Theory," Gould explained how change is determined by reorganization as well by the selective forces acting on adult organisms. It also comes out in "punctuated equilibrium" that the extinction of species is sometimes the result of sudden contingent events, such as the impact of comets and not only the product of gradual competitive forces.[191] Even if these ideas of Gould and Eldredge received some critiques, especially from Ledyard Stebbins and Francisco Ayala in "The Evolution of Darwinism,"[192] it becomes clear for Neo-Darwinism that evolutionary changes are viewed as "the product of random variations that were then selected by the environment. […] The environment selects individuals, but individuals also select environments, and in a new niche a different set of genes may contribute to survival."[193] One last important criticism of Darwinism is definitely Jean-Baptiste Lamarck. Generally, against Darwinism, Lamarck states that the physiological changes acquired during an organism's lifetime can be directly inherited. He believed in direct inheritance of characteristics acquired by individuals during their lifetime. That idea, however, did not really compete against Darwinism where evolution is explained by the natural selection coupled with the diversity.

Neo-Darwinism[194] is frequently defined as the theory of evolution that represents a synthesis of Darwin's theory in terms of natural selection and modern population

[191] Stephen Jay Gould, "Darwinism and the Expansion of Evolutionary Theory," *Science* 216 (Apr 1982): 384.
[192] George Ledyard Stebbins and Francisco Ayala, "The Evolution of Darwinism," *Scientific American* 253 (July 1985): 72-85.
[193] Ian Barbour, 92.
[194] It was first used in 1896 by August Weismann (1834-1914), who asserted that his germ-plasm theory made impossible the inheritance of acquitted characteristics and supported natural selection as the only major process that would account for biological evolution.

genetics.[195] Neo-Darwinism seems to include the Darwinism model, the Mendelian law of inheritance (also qualified as the Mendelian genetics) and molecular biology.[196] Gregory Mendel, in his law of inheritance, provides an explanation about how inheritance operates. With Mendel, the inheritance law is no longer the blending of parental traits. "Mendel employed the essence of the experimental method to derive a series of statements that argued for the quantitative nature of inheritance and, most important, for the particulate nature of the heritable principle—what came to be called the gene."[197] The work of Mendel has helped to explain the transmission of traits intergenerationally.

With molecular biology, the contribution of Miescher in 1869 on DNA (deoxyribonucleic acid) as part of chromosomes with protein became one of the most important elements of the evolutionary theory to explain variation as differences in the sequences of the four nitrogen-containing bases that make up the molecule of DNA in the nucleus of the cell. The contribution of Miescher helps to explain mutation as a result of the changes in the physical appearances or performances of the organism.[198] In the same way, the contribution of the studies of the DNA molecule by James Watson[199] in 1953 and Francis Crick[200] helped to establish the model of the DNA structure and to indicate the common origin that all living things share. In fact, "in all known organisms,

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[195] John P. Rafferty, "Neo-Darwinism," *Encyclopedia Britannica*" https://www.britannica.com/science/Darwinism (accessed February 12, 2020).
[196] Peters and Hewlett, *Evolution from Creation to New Creation*, 45.
[197] Ibid.
[198] Ibid., 46.
[199] The TED talk that Watson gave about how he with Francis Crick discovered the DNA. https://www.ted.com/talks/james_watson_on_how_he_discovered_dna, (accessed Mar 1, 2020).
[200] James Watson and Francis Crick,, "Molecule Structure of Nucleic Acids: A Structure for Deoxyribose Nucleic Acid," *The American Journal of Psychiatry* 160 (Apr, 2003) https://ajp.psychiatryonline.org/doi/full/10.1176/appi.ajp.160.4.623 (accessed Mar 1, 2020).

the same genetic code is used to translate from DNA to amino acid."[201] The comparison of the molecular structure of similar proteins in different species has shown that "in rhesus monkeys, only one of these amino acids is different; horses have twelve that differ and fish have twenty-two."[202] The assumption of Neo-Darwinism[203] is that "long-term evolutionary changes are the result of the gradual accumulation of many small changes."[204]

Molecular biology, especially the DNA discovery, is fundamentally a support to the Darwinism theory on two points. "First, a mechanism for the production of variations in the population could be imagined. Second, the fact that such variations take place one DNA base at a time gives definition to the principle of graduation that is also a critical part of the theory."[205] Neo-Darwinism has seen the development within itself of Social Darwinism, Sociobiology, and Evolutionary psychology.

2.1.2. Social Darwinism – Eugenic movement - Sociobiology – Evolutionary Psychology

Social Darwinism

Social Darwinism begins fundamentally with the work of Herbert Spencer[206] (1820-1903). His idea is that "one could develop an overriding philosophy that subsumed all of the sciences, including sociology and psychology, under the aegis of

[201] Ian Barbour, 91.
[202] Ibid.
[203] New World Encyclopedia, "Neo-Darwinism," http://www.newworldencyclopedia.org/entry/Neo-Darwinism, (accessed 5/20/2019).
[204] Ian Barbour, 92.
[205] Ibid.
[206] Like any kind of intellectual, Spencer was influenced by his pair evolutionists of those days. Darwin, Lamarck and Lyell had influenced him in different ways. While he agreed with the notion of evolution and deep time of Lyell, he disagreed with the critics of Lyell against Lamarck about the inheritance model. Lamarck seems right for him, in the way that everything seems coordinated from the organic forms in the biosphere to human societies. He stands with the idea of acquired characteristics while Darwin came out with his theory of 'descent with modification trough natural selection' which is a big difference to the inheritance model. Spencer came to support the theory of Darwin and even proposed first the notion survival of the fittest, on which he builds social Darwinism.

the evolutionary model."[207] For that, he advocated for a societal system which are subject to the same Darwinian laws of natural selection as plants and animals. "At the heart of his proposal was the idea that the individual has preeminence and that society evolves as the sum of the individuals within it."[208] This idea supported "the absence of governmental intervention to assist those less able to compete, as well as justification for the *laissez-faire* capitalism of John Stuart Mill."[209] In other words, the greater good of the society will be achieved if it is allowed the freedom to act.

Reflecting on the law of the jungle and what could happen to the unfit, Spencer states that "the whole effort of nature is to get rid of such, to clear the world of them and to make room for better… It is best that they should die."[210] This idea seems to accommodate capitalism's defenders and the middle and upper class. Against Spencer, Thomas Huxley (1825-1895) replied by demonstrating how we can transcend our biological roots. For him, "the conscience of man revolts against the moral indifference of nature."[211] While "Spencer's survival of the fittest yielded to nature blood 'red in tooth and claw' […] Huxley, in contrast to Spencer, envisioned a society governed by caring values that mark an evolutionary advancement from beyond where we have come."[212]

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[207] Peters and Hewlett, *Evolution from Creation to New Creation*, 53.
[208] Ibid.
[209] Ibid.
[210] Herbert Spencer, *Social Statics: The Conditions Essential to Human Happiness Specified, and the First of Them Developed* (New York: D. Appleton, 1864), 414-15.
[211] Thomas H. Huxley, *Evolution and Ethics* (London: Macmillan, 1893), viii, 44.
[212]Peters and Hewlett, *Evolution from Creation to New Creation*, 54.

Eugenics movement

The Eugenics movement of Francis Galton[213] (1822-1911) is fundamentally the belief that influencing the evolutionary trajectory of the individuals will lead to the improvement of the society. It is a belief that humanity could be improved through selective breeding. In *Hereditary Genius*[214] and his autobiography, *Memory of My Life*, Galton gives more details about eugenics:

> This is precisely the aim of Eugenics. Its first object is to check the birth-rate of the Unfit, instead of allowing them to come into being, though doomed in large numbers to perish prematurely. The second object is the improvement of the race by furthering the productivity of the Fit by early marriages and healthful rearing of their children. Natural Selection rests upon excessive production and wholesale destruction; Eugenics on bringing no more individuals into the world than can be properly cared for, and those only of the best stock.[215]

With his eugenic view, Galton considers that the Western European civilization is the pinnacle of evolutionary achievement. In *Hereditary Genius,* Galton compared the civilized world of his own culture, the white Anglo-Saxon British Empire, to the negro race. As Peter and Hewlett point out, Galton concludes in his comparison that "the average intellectual standard of the negro race is some two grades below our own."[216] The approach of Galton is even called positive eugenics because negative eugenics which is found in USA and Germany[217] seems to call for the elimination of those who are Unfit from the breeding population while positive eugenics called for the racial

[213] Francis Galton is the cousin of Charles Darwin because his mother is Viola Darwin, the aunt of Charles. Because he was explorer and meteorologist, he went to South Africa to join the research team of Richard Burton and John Speke which was studying the headwaters of the Nile River. He was later a statistician and criminologist. He was a great scholar on his own in Great Britain during the nineteenth and the beginning of the twentieth century.
[214] Francis Galton, *Hereditary Genius: An Inquiry into Its Laws and Consequences* (New York: St Martin's Press, 1978).
[215] Francis Galton, *Memories of My Life* (London: Methuen & Co., 1908), 322.
[216] Francis Galton, *Hereditary Genius: An Inquiry into Its Laws and Consequences*, 338.
[217] Peters and Hewlett, *Evolution from Creation to New Creation*, 57.

increasing of the population of the Fit. In the 20th century in America, the sterilization laws and marriage laws, which reinforced the prohibition against interracial marriage, are all justified somehow by the negative eugenics. In the same way, it reinforces the nationalism and anti-Semitism of the Nazism of Germany led by Adolph Hitler, where by looking for the purification of the Aryan race, Nazism decided deliberately to exterminate people of Jewish heritage as persons with unfit genes.

Sociobiology

Neo-Darwinism also provided the foundation for the Sociobiology which was developed by Edward O. Wilson (1929…). Sociobiology is traditionally defined by the systematic study of the biological basis of social behavior. It is an attempt to understand and explain animal and human behavior in the light of natural selection and other biological processes. Sociobiology offers a contribution to a better understanding of animal social behavior and altruistic behavior in some animal species.[218] In his book *Sociobiology: The New Synthesis*, Wilson, based on the social behavior of animals combined with the Neo-Darwinist understanding of population and genes, makes conclusions about the social behavior of humans. Human behavior is understood to be based on the traits that are genetically subject to natural selection.[219]

Among the important themes that assist Sociobiology to explain human behavior are the concepts of selfish genes, which was provided by Richard Dawkins, and genetic reductionism and genetic determinism. The genes are understood as a driven force which

[218] Brian Duignan, "Sociobiology," *Encyclopedia Britannica* https://www.britannica.com/science/Darwinism (accessed February 12, 2020).
[219] Peters and Hewlett, *Evolution from Creation to New Creation*, 60.

permits the next generation to exist. It is even said that "what we know as human consciousness and human culture are the means the genes employ to ensure their continuance from one generation to the next."[220] Because of that, Wilson believes that "the chicken is only an egg's way of making another egg," or in other words, "the organism is only DNA's way of making more DNA."[221]

Believing in genetic selfishness, sociobiologists believe that "culture is reducible to a genetic analysis of evolutionary adaptation."[222] Thus everything in culture serves reproductive fitness, which in different ways means that values, ethics, and religions serve the selfish genes interest. Wilson states that "the genes hold culture on a leash […] The leash is very long, but inevitably values will be constrained in accordance with their effects on the human gene pool."[223] Sociobiologists believe also that "they can explain human xenophobia against strangers and altruism toward relatives, because both are expressions of the selfish gene's desire to replicate."[224]

But "instead of an ethic of individual survival, Wilson says society ought to embrace altruism and cooperation."[225] For Wilson, the selfish gene does not mean that human beings will be move to tribalism or xenophobia but we are called to support modern liberal values and altruism. It can sound contradictory to put selfish genes and altruism together, but Wilson and Richard Dawkins did not support the idea of negative eugenics. Wilson did not seem to approve the holocaust and we guess in the same way that he did not approve slavery and colonization. And Dawkins emphasized how

[220] Peters and Hewlett, *Evolution from Creation to New Creation*, 60.
[221] Edward O. Wilson, *Sociobiology: The New Synthesis* (Cambridge, Mass.: Harvard University Press, 2000), 3.
[222] Ted Peters and Martinez Hewlett, *Evolution from Creation to New Creation*, 61.
[223] Edward O. Wilson, *On Human Nature* (Cambridge, Mass.: Harvard University Press, 1978), 167.
[224]Peters and Hewlett, *Evolution from Creation to New Creation*, 61.
[225] Ibid.

selfishness promotes altruistic social behavior.[226] "Dawkins maintains that it is our genes that control what we do."[227] In *The Selfish Gene,* Dawkins states that the argument of his book is "that we, and all other animals, are machines created by our genes." He also adds that he "shall argue that a predominant quality to be expected in a successful gene is ruthless selfishness."[228]

Sociobiology has been a controversial discipline because of its attempts to explain various human social behaviors in terms of their adaptive value for reproduction. Sociobiologists are accused of attributing adaptive value to various widespread but morally objectionable behaviors by justifying them as natural or inevitable.[229] Sociobiology is criticized because of the lack of empirical studies on the connection between human genes and human behavior.

Evolutionary psychology

From the debate about sociobiology, a new discipline was constituted called evolutionary psychology. The website of the Center for Evolutionary Psychology at the University of California Santa Barbara states,

> The goal of research in evolutionary psychology is to discover and understand the design of the human mind. Evolutionary psychology is an *approach* to psychology, in which knowledge and principles from evolutionary biology are put to use in research on the structure of the human mind. It is not an area of study, like vision, reasoning, or social behavior. It is a way of thinking about psychology that can be applied to any topic within it. In this view, the mind is a set of information-processing machines that were designed by natural selection to solve adaptive problems faced by our hunter-gathered ancestors. This way of

[226] Ted Peters and Martinez Hewlett, *Can You Believe in God and Evolution?* (Nashville: Abingdon Press, 2008), 51.
[227]Ibid.
[228] Richard Dawkins, *The Selfish Gene* (Oxford and New York: Oxford University Press, 1976), 2.
[229] Brian Duignan, "Sociobiology" *Encyclopedia Britannica*, https://www.britannica.com/science/Darwinism (accessed February 12, 2020).

> thinking about the brain, mind, and behavior is changing how scientists approach old topics, and opening up new ones[230]

This new field was concretized first with *The Adapted Mind: Evolutionary Psychology and the Generation of Culture*[231] of Jerome Barkow, Leda Cosmides, and John Tooby, who are three of the leading scholars in this very active field of evolutionary psychology. In recent history, different approaches to the evolutionary psychology, which can be defined as the evolution of mind and behavior, have been developed, where the relation between the mental qualities and the species is scrutinized. In fact, Darwin himself examined in *The Descent of Man* and in *The Expression of the Emotions in Man and Animals* the "mental faculties and the qualities in human and nonhuman animals, and argued for the gradual development of human mentality from ancestral primates."[232] Under the influence of the intellectual work of Darwin, Hiram Stanley published in 1895 his *Evolutionary Psychology of Feeling*, which encouraged various scholars like Francis Galton, George Romanes, C. Lloyd Morgan, William James, John Dewey, and James Baldwin to deepen the evolution of mind theory and its application within psychology. While Romanes and Morgan were developing a comparative psychology for studying mental or psychical evolution, James developed functionalism and Dewey held that "Darwin's conception of emotion required adjustment in light of James's theories."[233] Among the first prominent figures of evolutionary psychology we could note the evolutionary biologists like George Gaylord Simpson, Ernst Mayr, and Julian Huxley; the paleontologists Edwin Colbert and Alfred Romer; the comparative psychologists

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[230] Web address, at the Center for Evolutionary Psychology, University of California, Santa Barbara, is http://www.psych.ucsb.edu/research/cep/primer.html. (accessed 5/20/2019).
[231] Jerome Barkow, Leda Cosmides, and John Tooby, *The Adapted Mind: Evolutionary Psychology and the Generation of Culture* (New York: Oxford University Press, 1992).
[232] Hatfield, 26.
[233] Ibid., 27.

Harry Harlow and Henry Nissen; the psychobiologist and physiological psychologist Karl Pribram and Roger Sperry; the physical anthropologist Sherwood Washburn; and cultural anthropologists like Margaret Mead.

The question of how the mind and especially how the human mind evolved has continued to be the preoccupation of some scholars through the 20th century. Harry J. Jerison in 1973 with his *Evolution of the Brain and Intelligence* was scrutinizing "the fossil evidence for interspecific differences in brain size together with evidence of ancient environments and selection pressures in studying the evolution of intelligence from an information-processing point of view."[234] In the same way, Philip Lieberman in 1975 with his *On the origins of Language* conducted research on the evolution of language, and Robert Aubrey Hinde in 1983 with *Ethology* combined ethology and comparative psychology and animal behavior, acknowledging the need for a cognitive perspective. It was because of the inspiration by ethology and his interest for social organization of insects that Wilson founded the sociobiology which held that "social behavior can be explained in terms of inclusive fitness, kin selection, and reciprocal altruism-selection pressures operating on closely related individuals or on population members that aid one another."[235]

At this point, there are five principles which are recognized to be the principles of evolutionary psychology. Peters and Hewlett synthetize these principles beautifully in this way,

> Principle 1. The brain is a physical system. It functions as a computer. Its circuits are designed to generate behavior that is appropriate to your environmental circumstances.

[234] Hatfield, 30.
[235] Ibid.

> Principle 2. Our neural circuits were designed by natural selection to solve problems that our ancestors faced during our species' evolutionary history.
> Principle 3. Consciousness is just the tip of the iceberg; most of what goes on in your mind is hidden from you. As a result, your conscious experience can mislead you into thinking that our circuitry is simpler than it really is. Most problems that you experience as easy to solve are very difficult to solve—they require complicated neural circuitry.
> Principle 4. Different neural circuits are specialized for solving different adaptive problems.
> Principle 5. Our modern skulls house a Stone Age mind.[236]

When evolutionary psychologists are confronted with the question of how human behavior is the product of one's genes, the first thing that they take into consideration is the fact that the human brain in the modern period is "the product of selective forces exerted on our Stone Age ancestors."[237] The second point is that human beings in the modern period are "descendants of those who were subject to the Environment of Evolutionary Adaptedness"[238] without a clarification on the specific time in which it happened. "The idea is that our ancestors were selected for behavior that would have survival and reproductive advantage for their genes. As a result, modules of our brain contain features that exhibit these behaviors."[239]

While it became obvious that there are some components of human behavior that are related to the genes that underlie the structure of our nervous system, it seems evident that human behavior is not only determined by the genes, but also by our choice and/or our free will. For Peters and Hewlett, "it is clear that the Christian perspective is not limited to understanding humans as merely the sum of their genes and the physical

[236]Peters and Hewlett, *Can You Believe in God and Evolution?* 53.
[237] Ibid., 53-54.
[238] Ibid., 54.
[239] Ibid.

structures these genes determine."[240] And they continue by affirming the fact that we human beings see ourselves as "so much more than that. Our concept of ourselves as created in the image of God, […] *imago Dei,* means that we have a wider and, […] richer view of anthropology and psychology."[241] It is said that "the human soul, whatever we think that might be, is not, in the Christian view, only so much neural wiring in the brain."[242]

In the same way, Peters and Hewlett state, "if Wilson, Dawkins and the evolutionary psychologists are correct, then all human activity is simply a product of our evolutionary past and has no real significance beyond the survival value it conferred on our ancestors."[243] And it is quite clear that all human activity is not the product of past evolution. It goes beyond that and has some significance. However, we can recognize that Darwinism, Neo-Darwinism, Social evolution, the Eugenics movement, Sociobiology and Evolutionary psychology, as part of the biological evolutionary science, were preoccupied by the evolution of human being from the past, if not from its origin to the future. Understanding the evolution of human species involves somehow redefining the whole different component branches of human realities, like redefining the divine action and the cultural evolution of human species and other species. It is in that way that some researchers direct their preoccupation for the evolution of human being in connection to human mind, brain, and culture.

[240] Peters and Hewlett, *Can You Believe in God and Evolution?* 54..
[241] Ibid.
[242] Ibid.
[243] Ibid., 55.

2.2. Cultural evolution

2.2.1. The recognition of cultural evolution to nonhumans

The evolutionary science was not only biological. The contemporary evolutionary science has seen the development of the cultural evolution.[244] In 2007 that the University of Pennsylvania Museum of Archeology and Anthropology encouraged research that led to new understanding about human culture, and to more clarification about human societies and their interrelations with the other species. From that conference, the participants sought to "understand the origins of the human mind and of its biological substrate, the human brain and including the mind's expression in and formation by human culture."[245] In their various contributions, these scholars did not share a single theoretical perspective, but they converged on some points. "They acknowledge the need to bring all potential sources of evidence and theory to bear on the problem of hominin cognitive and cultural evolution, including archeological, environmental, cultural anthropological, and comparative perspectives."[246]

Against the traditional belief that the capacity to develop culture is distinctively human, because human beings could be the only ones to possess the capacities or abilities to pass attitude, skills, belief, or knowledge to other, there is another belief

[244] Cultural evolution, also called sociocultural evolution, the development of one or more cultures from simpler to more complex forms. The subject may be viewed as a unilinear phenomenon that describes the evolution of human behaviour as a whole, or it may be viewed as a multilinear phenomenon, in which case it describes the evolution of individual cultures or societies (or of given parts of a culture or society).
Unilinear cultural evolution was an important concept in the emerging field of anthropology during the 18th and 19th centuries but fell out of favour in the early 20th century. Scholars began to propagate theories of multilinear cultural evolution in the 1930s, and these neoevolutionist perspectives continue, in various forms, to frame much of the research undertaken in physical anthropology and archaeology, the branches of anthropology that focus on change over time. Cf. Elizabeth Prine Pauls, "Cultural evolution" *Britannica* https://www.britannica.com/topic/cultural-evolution/Multilinear-theory (accessed Mar 2, 2020).
[245] Hartfield and Pittman ed., Preface to *Evolution of Mind, Brain, and Culture*, xvii.
[246] Hatfield, 43.

which affirms that other animal species also possess cultural traditions.[247] By defining culture as something socially transmitted and group-differential traditions within a species, it became clear that some nonhuman animals possess culture, even if human cultural processes and achievements remain distinctive for the researchers of *Evolution of Mind, Brain, and Culture*. But our point in affirming the culture of nonhuman animals is to question with scientific arguments whether we can continue to consider human beings as the only ones who have culture.

The mechanism by which cultural evolution operates is compared to the mechanism of natural selection, in the sense that the variation in the case of cultural evolution is understood as the social transmission. It is said that the selective retention between generations is applied to the retention of the advantageous elements of the culture. And the "innovations that are advantageous in a given environment and that are socially transmitted because they are advantageous are more heavily represented in the next generation."[248] Cultural evolution is not necessarily genetic evolution or biological evolution. It is the evolution which can happen in the absence of biological evolution, but which brings some changes in human and nonhuman animals' behaviors. Cultural evolution can also be gene-based evolution but not analogous to gene transmission. When it is gene-based, evolution uses genes as a model for the cultural evolution. Richard Dawkins in 1976 was supportive of cultural evolution based on genetics with

[247] As example of cultural evolution in the reign of animal, Hatfield talks about the works of Watanabe in 1994 on washing potatoes in certain troops of Japanese macaque, the works of Boesch in 1990, and Lonsdorf in 2005 on variations in the use of ant and termite probes among some chimpanzees, the work also of Perry in 2003 on hand-sniffing in capuchin monkeys, the whale songs of Payne in 1999 and the work of Sergeant and Mann in 2009 on dolphin foraging traditions. Hatfield evokes also the tool use among corvids which he had defended in 2003. By defining culture as something socially transmitted and group-differential traditions within a species, it became clear that some nonhuman animal possess culture. Cf. Hatfield, 1-2.

[248] Hatfield, 13.

his notion of "meme" which is considered as the unit of cultural evolution. However, his view did not find many supporters.

For culture to be transmitted from one generation to another one, there are four forms which allow the social transmission or social learning to occur. The first form is the location, in the way that the attention of the learner draws on the environment. The second is a desire to emulate, as when a chimpanzee sees that another has attained food by using a stick and seeks to use the stick to achieve the same outcome. The third is imitation, meaning the copying of precise motor procedures. And the fourth is the active intervention of the teacher on the learner in order to improve the performance of the learner.[249]

The recognition of culture in nonhuman animals seems to come from the observations that some populations exhibit distinctive behaviors in comparison with other populations of the same species. It comes also from their social learning. And the "evidence of socially transmitted traditions has been found in birds, dolphins, whales, and anthropoid primates, among others."[250] Even if nonhuman animals or our ancestors like the *Homo heidelbergensis* or *Homo ergaster* could not think, plan, use complex languages, and control complex motor skills like in the case of human beings, the behavioral difference between different groups of the same species and social learning can be taken as a demonstration of the interrelatedness or interconnectedness between nonhuman animals and humans.

[249] Hatfield, 14-15.
[250] Ibid., 15.

The participants in the research on the evolution of mind, brain, and culture in 2007 claimed that while animals can change their environments to their benefit, or use calls to warn or inform conspecifics, or use tools, human beings "mold their environments more profoundly, improve their tools through cultural transmission, engage in social cooperation, develop cultural categories, and conceptions of the world, and pass on systems of belief and knowledge in unprecedented ways."[251] Because of the sharing of not only genetic evolution but also cultural evolution, we can extend the interconnectedness or interrelationship between nonhuman animals and human beings.

2.2.2. Integrative Evolution

One of the recent approaches to the evolution of mind and culture has been the integrative approach to evolution where psychology—meaning the cognitive, comparative and developmental view of mind—has been integrated with neuroscience, evolutionary biology, archaeology, paleoanthropology, genetics, and geology, which leads to the cultural evolution. With his works, *Origins of the Modern Mind: Three Stages in the Evolution of Culture and Cognition*[252] and *A Mind So Rare: The Evolution of Human Consciousness*,[253] Merlin Donald contributes greatly to the integrative evolution by reviewing "evidence from psychology, neuroscience, paleontology, and archaeology."[254] His two books are not only a big contribution to the integrative evolution but they are also a big contribution to the question of the evolution of hominin cognition and the development of the uniqueness (the unique characteristics) of modern

[251] Hatfield, 18.
[252] Merlin Donald, *Origins of the Modern Mind: Three Stages in the Evolution of Culture and Cognition* (Cambridge: Harvard University Press, 1991).
[253] Merlin Donald, *A Mind So Rare: The Evolution of Human Consciousness* (New York: W. W. Norton & Company, 2001).
[254] Hatfield, 36.

humans, which we will develop more when we will explore the emergence of modern humans.

In *Origins of the Modern Mind*, Donald concludes that "the main biological changes in hominin cognition occur in motor skill and memory and that further changes are cultural."[255] He came to this conclusion after presenting an impressive collection of neurological, anthropological, and psychological information about the human brain and cognition and how it differs from those of other primates. Donald conceives four stages which explain the evolution of human cognition, the evolution where humans progressed from other primates by developing gestural, linguistic, written storage, and thought structures. The first stage refers to the cognitive structure of the common ancestor[256] which is episodic, where chimpanzees and other anthropoids perceive and remember but have poor autorecall because the only representational form of memory available to them is the memory of specific events. The second stage, called the *mimetic* stage, refers to the capacity of representation which is attributed to *Homo erectus*, who underwent "a fundamental cognitive shift that set them apart from all other primates including *Australopithecus* and *Homo habilis.*"[257] According to Donald, *Homo erectus* developed sophisticated tools, spread across vast territory and varied climates, and developed "society where cooperation and social coordination of action were central to the species

[255] Hatfield, 36.
[256] Primate cognition consists in recalling specific past events and categorical judgments and applying them straightforwardly to present circumstances. According to Donald, primates are able to use symbols by recalling their use in the past, but they are incapable of representational generation. In primate culture, information like tool use is spread by direct and literal imitation and new ideas are hard to come by. Cf. Trevor Stone, "Review of Merlin Donald's *Origins of the Modern Mind* and *A Mind So Rare*," *Issues and Methods in Cognitive Science* (Spring 2002 completed Spring 2003) https://trevorstone.org/school/donaldreview.html (accessed Mar 29 2020).
[257] Trevor Stone, "Review of Merlin Donald's *Origins of the Modern Mind* and *A Mind So Rare*," *Issues and Methods in Cognitive Science* (Spring 2002 completed Spring 2003) https://trevorstone.org/school/donaldreview.html (accessed Mar 29 2020).

survival strategy."[258] This second, or *mimetic*, stage[259] occurred through changes in the ability to plan and execute motor sequences, and ability for imitation, planning, and autocuing of motor skills. The *mimetic* stage is not explained by the increase of brain size.

The third stage is the *mythic* stage, where the development of complex language is possible, even if Donald "contends that the language ability must spring from pre-linguistic, mimetic representations, which he locates in systems of gesture and the perceptual abilities that guide them and read them."[260] According to Donald, the *mythic culture* is symbolic and appears later than speech. He argues that the hunting and fertility images found in southern Europe were used "to explore and develop the mythic ideas that were already the governing cognitive constructs of human society."[261] "Symbolic art, in Donald's view, is handled by the same cognitive system that handles symbolic language, although he clearly shows that language and visual processing take place in separate places in the brain. Humans would later synthesize symbolic art and symbolic language."[262]

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[258] Merlin Donald, *Origins of the Modern Mind,* 163.
[259] The *Homo erectus* with the mimesis could not speak. They have a generative intentional representational form of communication available in gestures and mime. Mimetic culture allowed our ancestors to model group structure, moving from relationships between individuals to relationships between social roles; establish group norms; voluntarily display emotion; coordinate hunting, allowing some hunters to drive the animal to an appropriate spot and others to attack it; and easily teach skills like tool-making. Knowledge was no longer passed purely through genes and memory of life events; *erectus* could pass hard-won knowledge like "don't eat these berries" directly to friends and family. Cf. Trevor Stone, "Review of Merlin Donald's *Origins of the Modern Mind* and *A Mind So Rare*," *Issues and Methods in Cognitive Science Spring 2002; completed Spring 2003* https://trevorstone.org/school/donaldreview.html (accessed Mar 29 2020).
[260] Hatfield, 36.
[261] Merlin Donald, *Origins of the Modern Mind,* 282.
[262] Trevor Stone, "Review of Merlin Donald's *Origins of the Modern Mind* and *A Mind So Rare*," *Issues and Methods in Cognitive Science Spring 2002; completed Spring 2003* https://trevorstone.org/school/donaldreview.html (accessed Mar 29 2020).

The fourth stage refers to the cultural development where writing is the main characteristic. After the biological evolution regarding the second and the third stage, Donald refers to the final stage of the human cognition as the *theoretic culture*, where visuosymbolic invention is possible.[263] By contrast "with the oral-mythic culture of earlier *H. sapiens*, this new stage brings new cognitive manifestations through graphic invention (image-making, symbol-making, script-making), the resultant external memory […] and theory construction."[264] In his contribution, "Mimesis Theory Re-Examined, Twenty Years after the Fact," Donald reexamines the conception of mimesis, which is really important in his theory of the hominin development. It is nice to recognize that he was also open to the social intelligence theory where "the increasing size of the social group requires an increased capacity for representing members of the group and their relations, and, ultimately, for sharing knowledge through mimetic exchange."[265] In his interest in hominin cognitive evolution, Donald used not only the integrative approach but he posits enhanced motor control and memory capacity as the

[263] While words and semantic symbolic communication are tens if not hundreds of thousands of years old, only within the last 8,000 years or so have people systematically recorded them in external media. Beginning with cuneiform, hieroglyphs, and ideograms, human memory was no longer restricted to the bounds of the body, but could now be held in 'external storage systems.' The cognitive changes accompanying this memory change include the emergence of information retrieval knowledge as more important than rote memorization and the ability to overcome working memory limitations in thought processes using an "external memory field." The ability to critically examine, piece by piece, exact writings led to the rise of "theoretic culture" -- science, philosophy, and other deep investigations into the nature of the world. Cf. Trevor Stone, "Review of Merlin Donald's *Origins of the Modern Mind* and *A Mind So Rare*," *Issues and Methods in Cognitive Science Spring 2002; completed Spring 2003* https://trevorstone.org/school/donaldreview.html (accessed Mar 29 2020).

[264]Merlin Donald, *Origins of the Modern Mind: Three Stages in the Evolution of Culture and Cognition*, Cf. Hatfield, 36.

[265] Merlin Donald, "Mimesis Theory Re-Examined, Twenty Years after the Fact," in *Evolution of Mind, Brain, and Culture*, ed. Gary Hatfield and Holly Pittman (Philadelphia: University of Pennsylvania Museum of Archeology and Anthropology, 2013), 169-92. Cf. Hatfield, 36.

gateway to representational meta-cognition and the ability to teach and learn, which yields culture as the engine of cognitive development.[266]

In *A Mind So Rare*, which Donald wrote a decade after the *Origins of the Modern Mind,* he continues to deal with the evolutionary accounts of human cognitive capacity with the integrative evolution approach. He argues in this book for the presence of a strong consciousness as one of the most important attributes of the human mind. He begins this book by clarifying his view of consciousness. He describes consciousness at the functional level, rather than providing an evolutionary account or a full description of how neurological activity produces consciousness.[267] However, as a neuroscientist, he builds this functional model upon facts about the brain. He aims for an inclusive view of consciousness as "a multilayered, multifocal capacity and a deep, enduring cognitive system with roots far back in evolution."[268] For Donald, the words "consciousness" or "awareness" encompass many phenomena. The first are mental states such as sleep, wakefulness, and alertness. Second, consciousness is a central executive in the mind -- a self-regulating high-level processor that receives input from many sources, examines it, and directs action based on analysis. This form of consciousness is what is generally called thought or understanding. Functionally, such consciousness' domain is general processing power, attention, and general-purpose skill that can be brought to bear on unfamiliar or complex tasks. Finally, the third form of consciousness "has more to do with

[266] Donald, "Mimesis Theory Re-Examined, Twenty Years after the Fact," Cf. 39.
[267] Most of the things that we are going to say about the second book *A Mind So Rare* of Donald, are taken from the review by Trevor Stone, "Review of Merlin Donald's *Origins of the Modern Mind* and *A Mind So Rare*," *Issues and Methods in Cognitive Science Spring 2002; completed Spring 2003* https://trevorstone.org/school/donaldreview.html (accessed Mar 29 2020).
[268] Merlin Donald, *A Mind So Rare*, 10.

enlightenment, or illumination, than with mere attention," playing upon human symbolic capacity rather than just attention.

Consciousness is understood as quantitative and not as something that some have and some do not have. The nonhumans can be more or less conscious. Their conscious capacity can support more or less information. They can handle problems of varying levels of complexity. They may have the first form of consciousness but not the other two, and so on. With this backdrop, Donald allows many animals into 'the Consciousness club,' starting with creatures like ants and bees, which can construct a representation of the world divorced from their immediate sensory input. At progressively higher levels of consciousness are fish and vertebrates, birds, mammals, primates, and humans. Further, not all humans share the same level of consciousness, and a child becomes more conscious as he or she develops.

Donald also presents the evolution of human consciousness. He groups the constituents of consciousness in three levels of awareness. The first, associated with the sensory cortex, is binding or perceptual unity, the ability to combine perceptions to perceive complex phenomena like objects and events. This is the domain of raw feeling. The second is developed with the secondary cortex. It is the domain of short-term memory and control, where the birds and mammals have a sense of time and can focus on both an immediate perception and something which is out of sight but no longer out of mind. Such animals can also use their conscious power to learn new skills. The third is associated with the tertiary cortex, which is typical for humans and other primates. We are able to maintain intermediate-term awareness, at the level of minutes or hours. We are able to perceive, dissect, and act upon very complex situations and events, and several of them at once.

However, for Donald, this third level is not enough for symbolic thought and culture. Humans departed from their primate cousins by developing a superplastic brain and complex webs of culture, neither of which can feasibly exist without the other. Deep or cognitive enculturation is thus added to genes and environment as a driving factor of development. The two last chapters of *A Mind So Rare* present a condensed version of the four stages of human cognition with an eye toward consciousness. With these two books, we could see how greatly Donald has contributed to the integrative evolution and the clarification on the uniqueness of modern humans.

Another integrative work in evolution is the work of Steven Mithen where he combined archeological, paleontological, and psychological studies.[269] He sought to infer the evolution of psychological mechanisms from changes in toolmaking, patterns of hunting and gathering, and social structures. Mithen identifies four categories of intelligence (social – natural history – technical – linguistic) which are in the hominin line. For the evolution of mammalian and primates' minds, Mithen evokes three forms of intelligence. The first is general intelligence for nonprimate mammals. The second is central intelligence which fall under the four categories. And the third is cognitive fluidity which is specific to modern humans. Mithen argues that modern human intelligence is not modularly isolated but creatively combines knowledge and abilities across domains. In hominin development, Mithen demonstrates that while *Homo habilis* possesses social intelligence, *Homo ergaster* has the technical intelligence, and the *Neanderthals* have "increased natural history, technical, and social intelligence, with

[269] Steven Mithen, *Prehistory of the Mind: A Search for the Origins of Art, Religion, and Science* (London: Thames and Hudson, 1996).

language being parasitic on and largely limited to social intelligence."[270] In his contribution "The Cathedral Model for the Evolution of Human Cognition," [271] Mithen emphasizes his view of human cognitive fluidity which allows for the beginning of history, or the cumulative development of events and knowledge, including cultural identities that are expressed in artifact traditions.

Felix Warneken, professor in the department of Psychology at Harvard University, examines the helping behavior in chimpanzees and young children in relation to shared intentions.[272] He demonstrates that while chimpanzees are capable of instrumental helping behavior, only humans can show genuine collaboration in coordinated activities to achieve a goal, with differentiated individual roles and a realization that both parties are seeking the same outcome. For Warneken, the shared goals and shared intentions are unique to humans. He discusses this finding in the context of the possibility that group selection has yielded the human ability for shared intentions.

Other evolutionists who have adopted the integrative evolutionist approach are Peter Richerson from the Environmental Science and Policy department of UC Davis and Robert Boyd of the department of Anthropology of UC Los Angeles. Both are concerned with the origins of the capacity for culture. In their contribution "Rethinking Paleoanthropology: A world Queerer Than We supposed," both apply their models to

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[270] Steven Mithen, *Prehistory of the Mind: A Search for the Origins of Art, Religion, and Science* (London: Thames and Hudson, 1996). Cf. Hatfield, 38.
[271] Steven Mithen, "The Cathedral Model for the Evolution of Human Cognition," in *Evolution of Mind, Brain, and Culture*, ed. Gary Hatfield and Holly Pittman (Philadelphia: University of Pennsylvania Museum of Archeology and Anthropology, 2013), 217-33.
[272] Felix Warneken, "The Origins of Human Cooperation from a Developmental and Comparative Perspective," in *Evolution of Mind, Brain, and Culture*, ed. Gary Hatfield and Holly Pittman (Philadelphia: University of Pennsylvania Museum of Archeology and Anthropology, 2013), 149-68.

the evolution of cognition and culture. They stress the changing character of environmental circumstances over the past 14 million years, especially the 2.5 million years in which the genus *Homo* has existed. Both demonstrate that different cognitive strategies or different cognitive mechanisms would be favored by different rates of environment change in the sense that long periods of environmental stability would favor the evolution of innate cognitive mechanisms. But in the case of our hominin ancestors, such stability was not possible because of the rapid changes. Both argued then that cognitive flexibility would be favored over innate fixity. For them "the mechanisms for such flexibility include imitative learning and tribe-oriented values, which might be subject to group selection."[273]

The other important contributions to integrative evolution are the work of Kim Sterelny from Australian National University in the School of Social Sciences, Peter Gärdenfors in Cognitive Science at Lund University, and Philip Chase from the Pennsylvania Museum at the University of Pennsylvania. While Sterelny[274] emphasizes the importance of the evolution of cognitive bases for cooperation in the hominin line, Gärdenfors[275] focuses on the sensory, motor, and cognitive differences between humans

[273] Peter Richerson and Robert Boyd, "Rethinking Paleoanthropology: A world Queerer Than We supposed," in *Evolution of Mind, Brain, and Culture,* ed. Gary Hatfield and Holly Pittman (Philadelphia: University of Pennsylvania Museum of Archeology and Anthropology, 2013), 263-302. Cf. Hatfield, 41.

[274] Kim Sterelny, "Human Behavioral Ecology, Optimality, and Human Action," in *Evolution of Mind, Brain, and Culture,* ed. Gary Hatfield and Holly Pittman (Philadelphia: University of Pennsylvania Museum of Archeology and Anthropology, 2013), 303-324.

[275] Peter Gärdenfors, "The Role of Cooperation in the Evolution of Protolanguage and Language," in *Evolution of Mind, Brain, and Culture,* ed. Gary Hatfield and Holly Pittman (Philadelphia: University of Pennsylvania Museum of Archeology and Anthropology, 2013), 193-216. For Gärdenfors, the key cognitive differences are in imagination, planning, mindreading, self-consciousness, and linguistic abilities. Being able to plan or to have a mental stimulation, are recognized as the new hominin capacities. The "ability for intersubjective cognition underlies hominin symbolic behavior and the evolution of cooperation."[275] And he makes a clear distinction between the indirect reciprocity (the fact to be helped by someone else) and the intersubjectivity needed for shared intentions and future planning which occurs with the protolanguage, while the indirect reciprocity requires full predicative language. In Hatfield, 41.

and nonhominin anthropoids, and Chase seeks to demonstrate that the *social codes* created by human culture is one of the unique things about human culture. He examines the distinctive features of culture as a group and recounts the evidence for the timing of its evolution.[276] These are some of the integrative evolutionists who have contributed not only to the research on evolution of mind, brain, and culture but also to the research on the evolution of species and the evolution of modern humans.

2.3. Emergence of anatomically modern humans (AMH)[277]

Focusing on the fundamental question of the unique distinctive characteristic of human being, Theodore Schurr from the department of Anthropology of the University

[276] One of the unique things that is unique for human culture is the *social codes* which can exist as a possession of groups, such as the codes for driving. And "socially created codes condition the *motivation* of individual behavior, and such codes form an *all-encompassing system* that assigns meaning and value to nearly all aspects of human life. [276] And from his survey of the archeological evidence, Chase concludes that "the ability for social coding, including referential language, entered the hominin line no later than the late Middle Pleistocene (some 150kya) and that cultural motivation and the formation of complex worldviews arose later." Cf. Hatfield, 43.

[277] According to International Union for Geologic Sciences based on the redating of a geologic, from the first unicellular organism (eukaryotes), which is estimated between 4-3.5 billion years ago (bya), the evolutionary pathways leads through the first multicellular (*the ediacara fauna)* which is estimated between 800 and 600 million years ago (mya), and to the separation from the other major branch of animals, which includes mollusks, arthropods and some worms in 550 mya; all these periods are referred to as the "Precambrian" period. The evolutionary pathway leads also to the development of chordates in 525 mya; and to the constitution of vertebrates with a spinal cord surrounded by segmented vertebrae in 518 mya; and to development of amphibians in 370 mya; and to the development of mammal which are like reptiles in 320 mya; all these periods of the evolutionary development are referred as the "Paleozoic" period.

From there, the evolutionary pathway leads to the "Mesozoic" period which is composed of the constitution of true mammals and dinosaurs between 220 and 120 mya; and to constitution of the first birds in 160 mya; and to the development of the first placental mammals in 120 mya. After the Mesozoic period, there was the "Cenzoic" period which began with the first primates around 65.5 mya; while the primates with modern aspects are estimated to occur around 55 mya; and the first anthropoid primates are estimated to exist between 50 and 45 mya; and the first Apes which are distinct from the Old World Monkeys are estimated around 30-20 mya; and the first hominins are estimated for 7-5 mya.

To get to the *Homo sapiens* in Africa, the modern studies to which Hatfield refers show that the primary line of descent for *Homo sapiens* is from the *Australopiths* around 6 mya which are the first bipedalism in the first hominins, to the *Homo Habilis* between 2.5 and 1.6 mya; to the *Homo ergaster* which is the African form of *Homo erectus* in 1.8-0.7 mya, from which the Asian form of *Homo erectus* happened to evolve around 500 thousand years ago (kya). The African form of *Homo erectus* called *Homo ergaster* gave form to the *Homo heidelbergensis* also identified as *Homo rhodesiensis* around 600 kya which is now considered the common ancestor to *Homo neanderthalensis* (400-28 kya) in Eurasia and

of Pennsylvania began his reflection "When Did We Become Human?" by acknowledging the fact that "language, culture, tool use, brain size, and bipedalism have been cited as traits that differentiate modern humans from other primate species."[278] If it was once thought that these characteristics were the traits of human beings, he states that "we now understand most of them to be elaborations of similar features in other species, although with some specific manifestations for modern humans."[279] Not only is it recognized in chimpanzees and great apes that they have culture and that they have some 30 different behaviors like anting, greeting gestures, and reconciliation which are part of cultural patterns,[280] and that they can make use of tools,[281] but it is also recognized that they have emerging language abilities[282] to comprehend and manipulate symbols and communicate emotions,[283] even if they cannot make use of complex language. It has also been recognized by some scholars that the emergence of human language is probably found in the manual gestures, facial expressions, and vocal signals of

Homo sapiens which is also called anatomically modern humans (AMH) around 200 kya in Africa. At this point, the *Neanderthals* are considered as the cousins of the *Homo sapiens* and no longer as parents of them, and both of them shared the same ancestor, *Homo ergaster,* with *Homo erectus* of Asia.

[278] Schurr, 45.

[279] Ibid., 45.

[280] The idea of Chimpanzees, Bonobos and great Apes having culture are defended by various scholars. Some of them are Andrew Whiten et al., "Cultures in Chimpanzees" *Nature* 399 (1999); and with Victoria Horner and Sarah Marshall-Pescini, "Cultural Panthropology" *Evolutionary Anthropology* 12 (2003).

[281] The idea of making use of tool is emphasized by Elizabeth A. Fox et al., "Intelligent Tool Use in Wild Sumatran Orangutans," *The Mentalities of Gorillas and Orangutans: Comparative Perspectives*, ed. Sue Taylor Parker, Robert W. Mitchell, and H. Lyn. Miles, 99-116; also, by Gottfried Hohman and Barbara Fruth, "Culture in Bonobos? Between-Species and Within-Species Variation in Behavior" *Current Anthropology* 44 no4 (Aug 2003): 563-571.

[282] The idea that Chimpanzees and apes have incipient language abilities is mostly developed by Francine Patterson and Eugene Linden, *The Education of Koko* in 1981; and by Sue Savage-Rumbaugh, Duane M. Rumbaugh and Kelly McDonald, "Language Learning in Two Species of Apes," *Neuroscience and Biobehavioral Reviews* 9 (1985).

[283] The capacity to communicate emotions or having a rudimentary understanding of grammar is emphasized by David Premack, "Is Language the Key to Human Intelligence?" *Science* 303 (2004): 318-320, and Philip Liberman, "The Evolution of Human Speech: Its Anatomical and Neural Bases," *Current Anthropology* 48 no1 (Sep 2007): 39-66.

chimpanzees and bonobos or gorillas.[284] These various pieces of evidence of sharing of culture or cultural patterns "diminish the assertion of modern human uniqueness, despite clear quantitative differences between *Homo sapiens* and other primate species."[285]

The genetic variation in humans and other primates helps us to see the anatomical, behavioral, and cognitive differences and similarities between them. The studies or the comparison of the human genome with that of other primates like apes and chimpanzees provide serious information about the evolution of modern humans and about the phylogenetic relationships among primate species, and reveal the major moments of selection which help to explain the anatomical, behavioral, and cognitive differences. As Theodore Schurr states in "When Did We Become Human?," the "difficulty in finding a direct line linking earlier hominins with modern humans means that we must examine evidence for the emergence of human traits across the entire hominin lineage, and within the primate order, as well."[286] Before the polymerase chain reaction (PCR)[287] method, which was developed in 1983 by Kary Mullis, an American biochemist, to analyze genetic variation, there was the chromosomal banding method[288]

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[284] The idea that human language from the vocal signals of chimps and bonobos is mostly developed by Amy S. Pollick and Frans B. de Waal, "Ape Gestures and Language Evolution," *Proceedings of the National Academy of Sciences USA* 104 no19 (Mar 2007): 8184-8189; and Gillian S. Forrester, "A Multidimensional Approach to Investigations of Behaviour: Revealing Structure in Animal Communications Signals," *Behavior* 76 no5 (Nov 2008): 1749-1760.

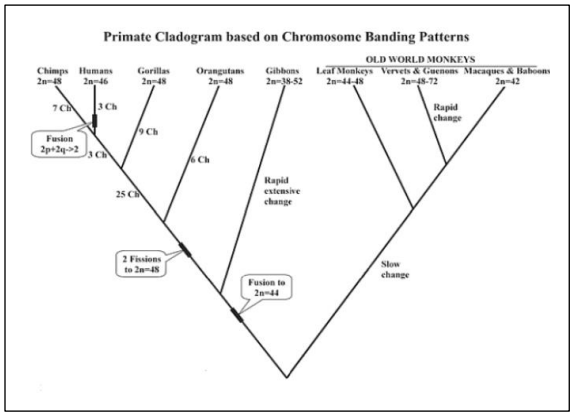
[285] Schurr, 47.

[286] Ibid., 55.

[287] Polymerase chain reaction (PCR) is a technique used to make numerous copies of a specific segment of DNA quickly and accurately. The PCR enables investigators to obtain the large quantities of DNA that are required for various experiments and procedures in molecular biology, forensic analysis, evolutionary biology, and medical diagnostics. Cf. "Polymerase chain reaction" *Britannica,* https://www.britannica.com/science/polymerase-chain-reaction (accessed Mar 11, 2020).

[288] Chromosome banding is the lengthwise variation in staining properties along a chromosome… normally independent of any immediately obvious structural variation, and thus excludes patterns such as those seen on polytene chromosomes of Drosophila, which have a morphological component. Although the first observations of what could be called chromosome banding were made at the end of the nineteenth century, modern chromosome banding methods date from 1968 and can be applied to chromosomes of a wide variety

where "researchers characterized chromosomal banding patterns and compared segmental positions in different primate species to understand phylogenetic and functional differences between them."[289] These studies on genetic variation, the chromosomal banding method, and the polymerase chain reaction (PCR) did not "generate direct genealogical insights into the phylogenetic relationships between species as do studies of single copy nuclear genes or uniparentally inherited genetic systems, such as the mitochondrial DNA (mtDNA) or the Y-chromosome."[290] However, in large part due to recombination and other rearrangements that have taken place over many millions of years, it is recognized that these studies have demonstrated that between humans, chimpanzees, and apes, there is a "relative similarity of the genomes of these species, and identified sorts of evolutionary processes that they have experienced over the past 10-20 million years."[291]



1. Primate cladogram based on chromosomal banding patterns. Cf. Theodore G. Schurr, Fig.2.3.

of species with no more than slight modifications. Following the introduction of Q-branding by Casperson and his colleagues in 1968, Pardue and Gall inadvertently produced differential staining of heterochromatin, leading to C-banding, and in 1971 G-banding was discovered by several authors. In general, there are too many branding techniques, to be mentioned individually. Cf. A. T. Sumner,
"Chromosome Banding Pattern" *ScienceDirect https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/chromosome-banding-pattern* 2001, (accessed Mar 11, 2020).

[289] Schurr, 56.

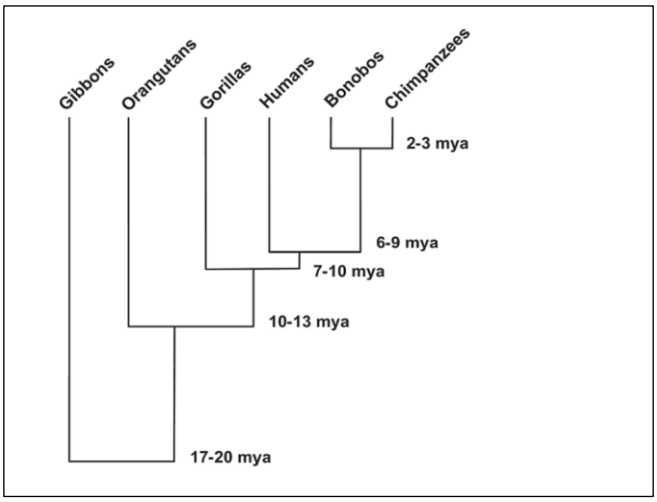
[290] Ibid.

[291] Ibid.

This cladogram based on chromosome banding patterns shows a significant change in chromosome structure over the past 14-25 million years, including fusions, and inversions. From the Old World Monkeys, which are Macaques and Baboons, Vervets and Guenons, and Leaf Monkeys, the "Gibbons have undergone tremendous chromosome rearrangements, and they also show a range of karyotypes, while the branch leading to the orangutan and African apes has undergone two fissions to produce the 48-chromosome karyotype."[292] And "in the human lineage, there has been a fusion of two chromosomes present in chimpanzees and other primates to create the human chromosome 2, thereby reducing the human karyotype to 2n=46."[293] From the perspective of the cytogenetic and molecular data, there have been genomic rearrangements more frequently during primate genome evolution. And this genomic rearrangement can explain the DNA differences between the human species and the ape's and chimpanzee's species, because it could have played a role in the gene expression of each species.

To elaborate the exact implications of the chromosomal expansion for selection and adaption in the human and chimp lineages, the model of nuclear gene variation has been used to reconstruct phylogenetic relationships of humans and hominid ape species.

[292] Schurr, 56.
[293] Ibid.



2. A phylogeny showing the evolutionary relationships between different hominoid species. The numbers indicate estimated millions of years (myr) from the last branch point to the present along particular lineages. The time estimates are based on both fossil evidence and genetic data from the species represented in the tree. Cf. Theodore G. Schurr, Fig.2.5.

With various nuclear gene sequences, it has been possible to reconstruct a phylogenetic relationship of humans and hominoid ape species. In that reconstruction, the human-chimpanzees lineage is separated from the Gorillas lineage. The human and chimpanzees and Bonobos separation are later than the separation of Humans and Gorillas, Orangutans, and Gibbons. In a "study of four genomic regions from human, chimp, gorilla, and orangutan comprising ~2 million base pairs, […] estimate the human-chimp speciation event at 4.1 ± 0.4 mya and fairly large ancestral effective population sizes (65,000 ± 30,000 for the human-chimp ancestor)."[294] After the speciation between human and gorilla, it is noted in the studies conducted in 2007 by Hobolth and Christensen, et al., "Genomic Relationships and Speciation Times of Human, Chimpanzees, and Gorilla Inferred from a Coalescent Hidden Markov

[294] Schurr, 61.

Model,"[295] that approximately half of the human genome coalesced with chimpanzee. According to Patterson, and Richter et al., in "Genetic Evidence for Complex Speciation of Humans and Chimpanzees,"[296] the short divergence between humans and chimpanzees on the X chromosomes can be explained by an interspecific hybridization even in the ancestry of these two species.

To study the genomic divergences between humans and other hominoids, Feng-Chi Chen and Wen-Hsiung Li, in "Genomic Divergences between Humans and Other Hominoids and the Effective Population Size of the Common Ancestor of Humans and Chimpanzees," selected 53 autosomal intergenic non-repetitive DNA segments from the human genome and sequenced them in a human, a chimpanzee, a gorilla, and an orangutan. "The average sequence divergence was only 1.24% ± 0.07% for the human-chimpanzee pair, 1.62% ± 0.08% for the human-gorilla pair, and 1.63% ± 0.08% for the chimpanzee-gorilla pair."[297] And "the average sequence divergences between orangutans and humans, chimpanzees, and gorillas were 3.08% ± 0.11%, 3.12% ± 0.11%, and 3.09% ± 0.11%."[298] These estimations, which were confirmed by additional data from GenBank, are substantially lower than previous ones, which included repetitive sequences and might have been based on less-accurate sequence data.[299] When these DNA segments were subjected to phylogenetic analysis, they strongly supported the *Homo-Pan* clade. It states that "the neighbor-joining tree derived from the concatenated sequence of the 53

[295] Asger Hobolth et al., "Genomic Relationships and Speciation Times of Human, Chimpanzees, and Gorilla Inferred from a Coalescent Hidden Markov Model," *PLoS Genetics* 3 (Feb 2007): e7.
[296] Nick Patterson et al., "Genetic Evidence for Complex Speciation of Humans and Chimpanzees," *Nature* 441 (May 2006): 1103-8.
[297] Feng-Chi Chen and Wen-Hsiung Li, "Genomic Divergences between Humans and Other Hominoids and the Effective Population Size of the Common Ancestor of Humans and Chimpanzees," *American Journal of Human Genetics* 68 (Feb 2001): 444.
[298] Ibid.
[299] Ibid.

segments—24,234 bp in length—supports the *Homo-Pan* clade with a 100% bootstrap value."[300]

Several studies conducted by the *Chimpanzee Sequencing and Analysis Consortium* have noted that "X-linked genes are significantly overrepresented among rapidly evolving genes in humans and chimps."[301] In this same study on "Initial Sequence of the Chimpanzee Genome and Comparison with the Human Genome," the authors of the Consortium find that "the patterns of evolution in human and chimpanzee protein-coding genes are highly correlated and dominated by the fixation of neutral and slightly deleterious alleles."[302] They also "use the chimpanzee genome as an outgroup to investigate human population genetics and identify signatures of selective sweeps in recent human evolution."[303] The comparison of human and chimpanzee genomes have permitted a closer examination of regions of the human genome that may reflect adaptive evolution. "Within these regions, a number of loci of biological importance were identified, including ones involved in pigmentation pathways, components of the dystrophin protein complex,"[304] and also "clusters of olfactory receptors, genes involved in nervous systems development and function, immune system genes, and heat shock genes."[305] Despite the various biological changes between humans and chimpanzees, Clark et al., in ''Inferring Nonneutral Evolution from Human-Chimp-Mouse Orthologous Gene Trios," demonstrate that "based on the comparison of genomic data, human and chimpanzee

[300] Chen and Li, 444.
[301] Chimpanzee Sequencing and Analysis Consortium, "Initial Sequence of the Chimpanzee Genome and Comparison with the Human Genome," *Nature* 437 (Sep 2005): 69-87.
[302] Chimpanzee Sequencing and Analysis Consortium, 69.
[303] Ibid.
[304] Schurr, 64.
[305] Ibid., 64.

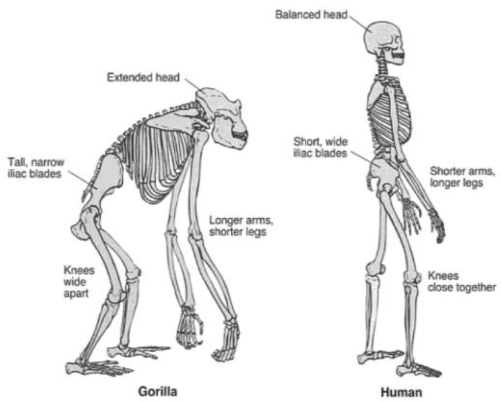
gene sequences are nearly 96% identical, implying close phylogenetic links between them.[306]

2.4. The key genetic adaptations for similarities and divergencies

In his exploration of the relationship of some key genetic adaptations in the hominin lineage to anatomical, physiological, and behavioral characteristics, Schurr noted that the olfactory, bipedalism, dietary changes, linguistic, encephalization, sexual, etc. genes help for the observation of genetic adaptation. About the olfactory genes, he notes that those genes have undergone very rapid change in the chimpanzee and human lineage.[307] Even Chen and Li estimate that there are about 50 genes linked to smell which have shown evidence of positive selection.[308] The olfactory receptors (OR) as the genes with the sense of smell were known to undergo rapid divergence in primates. These differences probably reflect the reduced importance of smell in the human lifestyle relative to that of chimpanzees. One of the key human adaptations is bipedalism, which is a defining feature of the hominin clade. Bipedalism is marked by a series of skeleton-muscular, neurological, postural, and developmental changes that permit habitual movement and balance on two legs. Bipedalism supposes also some anatomical changes like pelvic structure, angled knees, curved lumbar region, and reorientation of muscle attachments, among others.[309] Comparative genomic study has indicated that certain

[306] Andrew G. Clark et al. ''Inferring Nonneutral Evolution from Human-Chimp-Mouse Orthologous Gene Trios" *Science* 302 (Dec 2003): 1960-63.
[307] Schurr, 65.
[308] Feng-Chi Chen and Wen-Hsiung Li, 445.
[309] C. Owen Lovejoy, "The Origin of Man," *Science* 211 (Jan 1981): 341-50; R. McNeil Alexander, "Human Locomotion," in *The Cambridge Encyclopedia of Human Evolution,* ed. Steve Jones, Robert Martin, and David Pilbeam, (Cambridge: Cambridge University Press, 1992) 80-85; Nina G. Jablonski and George Chaplin, "Origin of Habitual Terrestrial Bipedalism in the Ancestor of the *Hominidae*," *Journal of Human Evolution* 24 (1993): 259-80.

selective changes may have occurred in genes that influenced the evolution of bipedalism. And these selective changes include long-bone growth, hair loss, actin binding, and cytoskeletal formation.[310]



3.Human bipedality and ape anatomy. A comparison of gorilla and human anatomy and stature. (From Bernard G. Campbell et al., *Humankind Emerging,* 9th ed., 2006, Fig. 13.16.) From Theodore G. Schurr, Fig. 2.7

The emergence of bipedalism is explained in two different ways. With the fossil evidence, it seems that *Sahelanthropus* could be the first bipedal. Fossil femora discovered in the Lukeino Formation of Kenya and attributed to *Orrorin tugenensis* provides the earliest postcranial evidence of hominin bipedalism at 6 mya. But there has been a debate about the functional and phylogenetic significance of these femora. There is even an article by Brian G. Richmond and William J. Jungers in 2008, "*Orrorin tugenensis* Femoral Morphology and Evolution of Hominin Bipedalism," which shows that the *Orrorin tugenensis*[311] has a different femur from those of apes and *Homo,* and his femur seems to

[310] Clark et al., 1960.

[311] Brian G. Richmond and William J. Jungers, "*Orrorin tugenensis* Femoral Morphology and Evolution of Hominin Bipedalism," *Science* 319 (Mar 2008): 1662-65; shows that the *Orrorin tugenensis* has different femur from those of apes and *Homo,* but his femur seems to resemble to those of *Australopithecus* and *Paranthropus.* Femoral morphology also indicates that *Orrorin tugenensis* shared distinctive hip biomechanics with australopithecines. Cf. Schurr, 66-67.

resemble those of *Australopithecus* and *Paranthropus.* From the comparative biomechanical anatomy of *Orrorin tugenensis,* it seems for some scholars that the *Orrorin tugenensis* was adapted to bipedalism. But there was some evidence that an *Australopithecus* was bipedal. However, truly obligate bipedalism apparently did not arise until the emergence of *Homo erectus.* Bipedalism seems to have "an important influence on the development of human cognitive abilities."[312] And the "shift from a quadrupedal to a bipedal locomotory adaptation led to a major transformation of hominins at anatomical, behavioral, cognitive, and physiological levels."[313]

The comparison of the human and chimp genomes has also shown that almost 80 genes used to digest proteins differ between these two species.[314] "These differences likely reflect how the human diet has changed in the 5 million years since hominins split from chimpanzees."[315] Like the transformation from quadrupedalism to bipedalism, the hominin digestive system underwent major transformation to adapt itself to the new diet. According to Leslie Aiello and Peter Wheeler in "The Expensive-Tissue Hypothesis: The Brain and the Digestive System in Human and Primate Evolution," and Katharine Milton in "Hypothesis to Explain the Role of Meat-eating in Human Evolution," Chimps (and most probably early hominins) have a longer large intestine and a shorter small intestine, as needed by an omnivorous species with a significant intake of vegetative matter and fibrous food sources.[316] By contrast, humans have the opposite configuration, a shorter

[312] Schurr, 66.
[313] Ibid., 69.
[314] Clark et al., 1960.
[315] Schurr, 69.
[316] Leslie C. Aiello and Peter Wheeler, "The Expensive-Tissue Hypothesis: The Brain and the Digestive System in Human and Primate Evolution," *Current Anthropology* 36 (Apr 1995): 199-221; Katharine Milton, "Hypothesis to Explain the Role of Meat-eating in Human Evolution," *Evolutionary Anthropology* 8 (June 1999): 1-21. Cf. Schurr, 69

large intestine and longer small intestine, allowing them to absorb more nutrients, minerals, and fats in the food sources that they consume.[317] This remodeling of the body had significant bioenergetic implications, as both the brain and the stomach are metabolically costly organs. It is said that overall, *Homo erectus* exhibits features more like those of modern humans than those of earlier "and contemporaneous australopithecines and paranthropines. The *Homo erectus* and modern human seem to have in common "larger relative brain sizes, larger bodies, higher energetic needs, obligate bipedalism, and smaller teeth and jaws."[318] In their divergence and similarity in their diet, chimpanzees and humans had different strategies in scavenging or hunting. Because these two activities suppose the coordination of group actions to procure food sources, some forms of communication were necessary. The comparisons between chimp and human scavenging and hunting practices reveal a lack of coordinated group actions in chimps, which could be explained by the level of communication.

Indeed, the ability to communicate is another way to demonstrate the genetic adaptation and to explain the genomic divergence and similarity between humans and apes and chimpanzees. It has been demonstrated by Premack that "both humans and apes are capable of learning and imitation, but only humans can clearly teach others how to do tasks, while apes require human training to repeatedly perform imitative behaviors." And, "while great apes can clearly master the use of hundreds of symbols and rudimentary grammar, humans are capable of learning a far greater vocabulary and symbolic repertoire"[319] In addition, "humans have both recursive and non-recursive

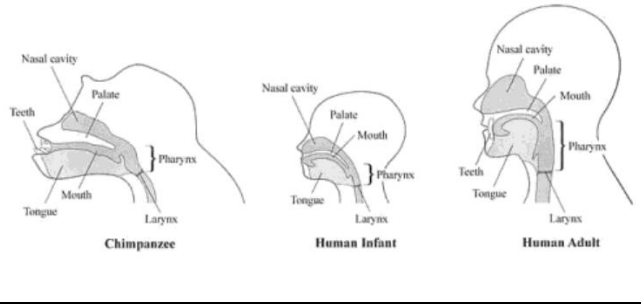
[317]Aiello and Wheeler, 199-221.
[318] Ibid.
[319] David Premack, "Is Language the Key to Human Intelligence?" *Science* 303 (Jan 2004): 318-20.

theories of mind, and the capacity to understand recursive and non-recursive grammars, whereas apes and monkeys are limited to non-recursive grammars."[320]And, in "The Evolution of Human Speech: Its Anatomical and Neural Bases," Philip Lieberman notes that speech "requires a brain that can 'reiterate' or freely reorder a finite set of motor gestures to form a potentially infinite number of words and sentences."[321] According to him, this appears to be lacking in the chimpanzees and other nonhuman primates. With the analysis of brain anatomy and neuronal complexity, it becomes obvious that the Broca and Wernicke [322] views of locating the abilities of language to the left hemisphere of the brain or in the parietal lobe and temporal lobe is limited, because we "now understand that many different parts of the brain are involved in speech production and comprehensive and symbolic behavior."[323]

The comparison of the human and chimpanzee genomes "have identified changes in 21 human genes that are linked to hearing. Such genes not only enable humans to understand speech in the brain, but also are involved in hearing and are likely related to the linguistic abilities of modern humans."[324] The language or speech production relies

[320] Premack, 318-320.
[321] Philip Lieberman, "The Evolution of Human Speech: Its Anatomical and Neural Bases," *Current Anthropology* 48 (Feb 2007): 39-66.
[322] Broca's area was named after Paul Broca, a French doctor of the nineteenth century and Carl Wernicke was a German physician who gave his name to Wernicke's area. The cerebrum is the largest and most obvious part of the brain. It consists of two halves which are known as cerebral hemispheres. The hemispheres are joined together by a band of tissue called the corpus callosum. Each hemisphere consists of four visible lobes known as the frontal, parietal, temporal, and occipital lobes. Broca's area is a patch of tissue located in one of the two frontal lobes. It's usually found in the left hemisphere, but it is sometimes located in the right one. Broca's area plays an important role in the creation of speech. Ten years after Broca's discovery, Carl Wernicke discovered another area that is often located mostly in the temporal lobe and partially in the parietal lobe. It's involved in understanding the meaning of spoken words. Cf. Linda Crampton, "The Brain: Broca's and Wernicke's Areas and the Circle of Willis," *Owlcation* (Dec 2019) https://owlcation.com/stem/Exploring-the-Brain-Three-Regions-Named-after-Scientists (accessed Mar 12, 2020).
[323] Andrew G. Clark et al., 1960-63.
[324] Ibid.

also on having the appropriate anatomical features of vocal apparatus. "Humans and apes differ considerably in the size and shape of the vocal tract, the position of the tongue in the oral cavity, and the location of the larynx in the throat."[325] While in apes, there is the higher position of the larynx, a longer shallower tongue and oral cavity, and the inability to use the tongue and oral cavity to produce vowel sounds, in humans, the tongue shape and position creates oral-to-pharyngeal proportions of the supralaryngeal vocal tract.[326]



4. A comparison of chimpanzee and human vocal anatomy. (From Bernard G. Campbell et al., *Humankind Emerging,* 9th ed., 2006, Fig. 13.16.) From Theodore G. Schurr, Fig. 2.10.

One of the possibilities to explain the ontogenetic aspects of language abilities[327] in humans and apes is that the human vocal ability follows a general ape trajectory until the shift to the human track. "In this model, the human child has its larynx situated higher in its throat like apes until 2-3 years of age, when it begins producing articulate

[325] Schurr, 73.
[326] Ibid.
[327] In 2002, the Specific Language Impairment Consortium, composed by several researchers had identified a gene that is central to the human ability to develop language, the forkhead-box P2 gene (FOXP2) which is found in many vertebrate, and was initially identified as the genetic cause of a speech disorder in a family in which half of the members have severe articulation difficulties accompanied by linguistic and grammatical impairment. With the researchers of the Consortium, the FOXP2 is identified as the regulate gene expression by binding to DNA, and it is also required for a proper development of speech and language in humans. "The predominant features of the FOXP2 phenotype of affected individuals were an impairment of both the selection and sequencing of fine orofacial movements underlying fluent speech, and the linguistic processing for both spoken and written language. Cf. Schurr, 76.

speech, at which time several developmental changes take place, including the descent of the larynx into its adult position in the throat."[328] The emergence of the human ability to comprehend and produce semantically meaningful sounds is then marked by both anatomical and cognitive changes.[329]

Another key genetic adaptation is encephalization,[330] since the size of the brain is considered one of the primary traits of demarcation between human and apes and between the rest of hominins. The human genome for genes related to brain growth shows evidence of positive selection in human lineage, in the way that those genes are viewed as potentially contributing to the emergence of modern human cognition. There are two genes which are associated with primary microcephaly (small cerebral cortex), the first being abnormal spindle-like microcephaly (ASPM) and the second being microcephalin (MCPH1).[331] "Microcephaly reduces the human brain to 50% or less of its normal mass, i.e., to about the size of the brain of chimpanzees or early hominin ancestors (and the microcephalin gene) is highly polymorphic in human populations,

[328] Lieberman, 39-66.
[329] Ibid.
[330] While relative size does have some relationship to certain aspects of language ability, cultural behavior and symbolic use, primate species with smaller brains show some abilities to communicate, comprehend symbols, express cultural traditions, and recognize members of their social groups. Both relative size and the smaller brains of primates, and the neurological organization and the development are really important in the emergence of large-brained of hominin and the complex linguistic and cognitive functions that humans are to perform. Cf. Schurr, 80.
[331] Yin-Qiu Wang and Bing Su, "Molecular Evolution of Microcephalin, a Gene Determining Human Brain Size," *Human Molecular Genetics* 13 (Mar 2004): 1131-37; Patrick D. Evans, Sandra L. Gilbert and Nitzan Mekel-Bobrov et al., "Microcephalin, a Gene Regulating Brain Size, Continues to Evolve Adaptively in Humans," *Science* 309 (Sep 2005): 1717-20.

with most mutations being non-synonymous in nature."[332] The ASPM and MCPH have undergone adaptive evolution in the hominin lineage.[333]

When it comes to modeling brain evolution in apes and humans, relative size does seem to matter. It is traditionally admitted that there is a "relationship between brain size and the complexity of hominin behavior as viewed through the lithic production, faunal analysis, coordination of group activities, language ability, and adaptability to numerous different environments."[334] However, "more recent studies of brain anatomy employing modern imaging techniques are showing that expanding brain size is only part of the story behind the emergence of modern human cognitive function and behavioral capacities."[335] In his analysis of brain structure sizes across the primate order, James Rilling, in his MRI results, showed that both human and ape brains exhibited specializations with respect to other anthropoid brains. More specifically, "ape specializations include elaboration of the cerebellum (all apes) and frontal lobes (great apes only), and probably connectivity between them."[336] And human brain

[332] Yin-Qiu Wang and Bing Su, "Molecular Evolution of Microcephalin, a Gene Determining Human Brain Size," *Human Molecular Genetics* 13 (Mar 2004): 1131-37; Patrick D. Evans, Sandra L. Gilbert and Nitzan Mekel-Bobrov et al., "Microcephalin, a Gene Regulating Brain Size, Continues to Evolve Adaptively in Humans," *Science* 309 (Sep 2005): 1717-20.

[333] He gives more details about how these two genes had undergone adaptative evolution. It has been identified within the modern humans, a group of closely related haplotypes at MCPH1, called haplogroup D, and found that it arose from single copy ~37,000 years ago and subsequently swept to a very high frequency. They suggest that this haplogroup originated in a hominin lineage that had diverged from modern humans around 1.1 mya and then introgressed into humans by ~37,000 years ago. If true, then this finding would imply that admixture occurred between archaic and modern humans. About the ASPM shows evidence of accelerated evolution in the African hominoid clade, which preceded hominin brain expression by several million years, as well as during the recent human evolution. It has been estimated that, on average, ASPM fixed one advantageous amino acid change in every 300.000-400,000 years since the human lineage diverged from chimpanzees. The regions of the ASPM gene under positive selection in primates are also the most highly diverged regions between primates and non-primate mammals. Therefore, current data indicate that the ASPM gene has undergone adaptative evolution in the hominin lineage. Cf. Schurr, 80

[334] Schurr, 81.

[335] Ibid., 81.

[336] James K. Rilling, "Human and Non-human Primate Brains: Are They Allometrically Scaled Versions of the Same Design?" *Evolutionary Anthropology* 15 (Apr 2006): 65.

specializations include an overall larger proportion of neocortex, "with disproportionate enlargement of prefrontal and temporal association cortices, an apparent increase in cerebellar connections with cerebral cortical association areas involved in cognition, a probable augmentation of intracortical connectivity in prefrontal cortex."[337]

Until now, most studies of the emergence of language production and comprehension have focused on genes influencing brain anatomy[338] or the analysis of cognitive and neurological phenomena, but there is a study on the masticatory muscles in humans and primates, as well as the myosin gene which is one of the genes involved in producing them.[339] It is noted in "Myosin Gene Mutation Correlates with Anatomical Changes in the Human Lineage," by Hansell Stedman et al., that powerful masticatory muscles "are found in most primates, including chimpanzees and gorillas, and were a prominent part of the adaptative strategies of *Australopithecus* and *Paranthropus.* In contrast, these muscles are considerably smaller in both modern and fossil members of the genus *Homo.*"[340] For them, according to Stedman et al., the myosin mutation "facilitated greater encephalization in the hominin lineage due to removing physiological and structural constraints on brain and cranial growth."[341]

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[337] James K. Rilling, "Human and Non-human Primate Brains: Are They Allometrically Scaled Versions of the Same Design?" *Evolutionary Anthropology* 15 (Apr 2006): 65.
[338] The increased of growth of the brain is also explained by the sexual selection. Michael A. Schillaci in "Sexual Selection and the Evolution of Brain Size in Primates," *PLoS One* 1 (Dec 2006): e62, examined the relationship between brain size and sexual selection. While observing no significant relationship between relative brain size and sperm competition as measured by testis size in primates, he did find a significant negative relationship between them. These results suggested to him that the largest relative brain sizes among primate species are associated with monogamous mating systems, suggesting that primate monogamy may require greater social acuity and abilities of deception. However, we hope that this study of Schillaci et al. is not another way of perpetuation of racism and supremacism on the peoples and traditions which continue to find value in polygamy.
[339] Schurr, 84.
[340] Hansell H. Stedman, Benjamin W. Kozyak and Anthony Nelson et al., "Myosin Gene Mutation Correlates with Anatomical Changes in the Human Lineage," *Nature* 428 (Mar 2004): 415-18.
[341] Ibid.

By exploring the emergence of the modern human, which shows the similarities and divergences between humans and others species, especially chimpanzees, it is realized that "while having roots in primate and hominin prehistory, modern humans have undergone significant biological and behavioral changes over the last 2 million years."[342] Comparing the human genome to those of the chimpanzees, gorillas, and other primate species, it is showed that the human genome has undergone profound changes in terms of its size, content, and regulation.

Despite the close genetic affinity between apes and humans, such that these taxa share over 96% of their genomic sequences, it is evident that "there are significant differences in the expression and regulation of these genes in the two species, as well as specific allelic and chromosomal changes (e.g., segmental duplications) that led to the phenotypic, physiological, and behavioral differences seen in them."[343] The differences are even observable in the way that each lineage (humans and apes) was affected by selection, which had implications for the cultural and even the sexual lives of each of these species. Schurr illuminated the cognitive difference between apes and humans, and the evolutionary forces that have influenced them. The size of brain is clearly one feature that distinguishes humans from apes, but it is, according to Schurr, one dimension of the transformation of the hominid brain, because some others dimensions have also been observed, like the cortical areas which are related to higher cognitive function, the neuronal density and the neuroanatomical architecture.[344] And as he states, "it is clear that the hominin brain has been transformed in a manner that now allows us to have

[342] Schurr, 87.
[343] Ibid.
[344] Ibid.

articulate speech, abstract reasoning, and complex cultural behavior in contrast to other hominoid apes."[345]

Until now, it is difficult to determine the exact timing of the emergence of the genus *Homo* in the Pliocene-Pleistocene boundary and the timing of most of the transition which remain speculative. And the conditions "under which the transformation of the genus *Homo* took place – which shaped the evolution of the species or lineage – are still incompletely understood."[346] The hypothesis is that there could have been major climate changes which might have triggered a shift in subsistence towards broader spectrum diet and greater consumption of meat, and accompanying behavior changes like hunting and scavenging. This dietary shift led to the transformation in gut morphology of hominids, "setting the biological foundation for the later encephalization of the lineage, and perhaps also the bioenergetic basis for more hominin-like forms of bipedalism, which permitted the expansion of the lineage outside of its Africa homeland."[347] There are still also questions about the timing of the emergence of modern human language,[348] the selective forces that promoted rapid brain size growth, and the relationship between brain size and complexity and primate and hominin linguistic and cultural abilities.

Terrance Deacon, who could be associated with the integrative evolution, not only because of his integrative works of neuroscience with evolutionary biology while

[345] Schurr, 88.
[346] Ibid.
[347] Ibid.
[348] When the question of the emergence of language was brought up, it is to the evolution of brain structures that some answers were provided, because it is the evolution of brain structures that have facilitated the use of language. Considering the fact that human beings are AMH (anatomically modern humans) and behaviorally modern as well, which is attributed to the evolution of brain structures, the question of the emergence found some solutions there.

he was investigating the human cognition, but also because of the close connection of his symbolic representation with the inter-relation of the biological and cultural evolution of Merlin Donald, makes some important contributions on the development of language in human beings. With *The Symbolic Species: The Co-Evolution of Language and the Brain*, he offers a wealth of insights into the significance of symbolic thinking, from the co-evolutionary exchange between language and brains over the two million years of hominid evolution to the ethical repercussions that followed man's newfound access to other people's thoughts and emotions. Like many of those who were interested in the question of language, Deacon was intrigued by what makes the human brain capable of speech, and by the reasons why animals don't have such language. The exclusivity of the ability for language in the human species is explained ultimately by the capacity of symbolization, which is lacking in all the rest of the species. From his argumentation, what makes language unique and special for humans is the fact that it uses symbols or symbolic reference. While emphasizing the symbolic threshold (icon-index-symbol),[349] Deacon states,

> (The) referential relationship between the words—words systematically indicating other words—forms a system of higher-order relationship that allows words to be *about* indexical relationships, and not just indices in themselves. But this is also why words need to be in context with other words, in phrases and sentences, in order to have any determinate reference. Their indexical power is *distributed,* so to speak, in the relationships between words. Symbolic reference derives from *combinational* possibility and impossibilities, and we therefore depend on combinations both to discover it (during learning) and to make use of

[349] The use of these three terms (icon-index-symbol) which are important in the argumentation of Deacon, come from the impact of Charles Sanders Peirce. But because Deacon is not linguist or philosopher, his use of these three seem quite different, even if he makes his point. Some people had made critics against his use of these three terms. For example, when he said (this referential relationship between words – words systematically indication other words), some people find it difficult to understand because reference for a linguist or a philosopher is the action of mentioning or alluding to something or the relation between a word and an element of the world.

> it (during communication). Thus, the imagined version of a nonhuman animal language that is made up of isolated words, but lacking regularities that govern possible combinations, is ultimately a contradiction in terms.[350]

He rejects the traditional approach of complexity, which could make human language unique.[351] Against the approach of Noam Chomsky of a universal grammar encoded in our brains, i.e., an 'innate grammar' which could explain why humans could learn complex language, Deacon argues that it is language itself which provides the facility for the emergence of language. And, the prefrontal cortex, which is more developed in humans than in apes and all other species, is the part of the brain which is responsible for symbolic reference or symbol formation. In other words, the capacity for 'symbolic reference' is made possible by the fact that humans have the prefrontal cortex which is larger than the one of chimpanzees. He argues considerably about the localization of the speech function within the brain and has rejected Broca and Wernicke's views of locating the abilities of language in the left hemisphere of the brain or in the parietal lobe and temporal lobe. It is clear for Deacon also that the ability to use a symbolic reference requires not only the prefrontal cortex, but also the vocal tract and the lower position of the larynx in the human throat when compared to the one of apes or chimpanzees. Indeed, it is because of that lower position of the human larynx that humans can produce sounds and are able to choke when they swallow something.

Deacon has also argued about the influence of symbolic reference during the evolution of the modern human. According to him, the *Neanderthals* were able to use the symbolic reference. Before that, like in the case of the *Homo erectus,* there is no assurance that they used symbolic communication. And without demonstrating it, he

[350] Terrence W. Deacon, *The Symbolic Species: The Co-Evolution of Language and the Brain* (New York: W. W. Norton & Company, 1997): 83.
[351] Ibid., 433-438.

believes that the demise of the *Neanderthals* was not due to a cultural or linguistic inferiority, but it was due to disease.[352] From Deacon's contribution, the symbolic reference and the prefrontal cortex, but also the vocal tract and the lower position of the larynx, are majors elements which explain how human language is unique and special, and why animals don't have language.

2.5. Epistemic evolution

Jürgen Renn presents a new way to approach the history of science and technology, the history of knowledge. *The Evolution of Knowledge: Rethinking Science for the Anthropocene*[353] and in the article "The Evolution of Knowledge: Rethinking Science in the Anthropocene,"[354] this new approach offers a grand narrative of human history where knowledge serves as a critical factor of cultural evolution. He argues that humanity has entered into a new stage of evolution,[355] the stage of epistemic evolution. Just as the cultural evolution emerged from the biological evolution, he believes that epistemic evolution emerged as an aspect of cultural evolution and now dominates the global fate of humanity. It is characterized by the increasing dependence of global society on the achievements and further extension of science and technology in order to ensure its sustainability in the age of the Anthropocene.[356]

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[352] Deacon, 438-454.

[353] Jürgen Renn, *The Evolution of Knowledge: Rethinking Science for the Anthropocene* (Princeton & Oxford: Princeton University Press, 2020).

[354] Jürgen Renn, "The Evolution of Knowledge: Rethinking Science in the Anthropocene," *Journal of History of Science and Technology* 12 (Sep 2018): 1-22.

[355] After talking about the climate changes, Renn notes that the planet is changing with irreversible consequences. There is no hope that we might ever be able to return to some "natural state" of affairs. Humanity has affected the energy balance at the Earth's surface, resulting in the transition of our planet into a new stage. Cf. Renn, "The Evolution of Knowledge: Rethinking Science in the Anthropocene," 3.

[356] The term Anthropocene was used for the first time by Paul Crutzen (Nobel Prize winner and discoverer of the hole in the Ozone layer) during a conference on Earth system science outside Mexico City when he was struck by a sudden dislike for the Holocene which seemed to utterly belittle the human impact on the

Renn examines the role of knowledge in global transformations going back to the dawn of civilization, while providing vital perspectives on the complex challenges confronting us today in the Anthropocene – "the new geological epoch of humankind [..] (and) the ultimate context for a history of knowledge and the natural vanishing point for an investigation of cultural evolution."[357] This book is an examination of the possible role of the history of science in understanding the Anthropocene, in the way that it reframes the history of science and technology within a much broader history of knowledge. He reframes this history by analyzing key episodes such as the evolution of writing, the emergence of science in the ancient world, the Scientific Revolution of early modernity, the globalization of knowledge, industrialization, and the profound transformations wrought by modern science. He investigates the evolution of knowledge using an array of disciplines and methods, from cognitive science and experimental psychology to earth science and evolutionary biology. With his cultural evolutionary approach, he emphasizes the evolution of knowledge and its transformation. The result is an entirely new framework for understanding structural changes in systems of knowledge and a bold new approach to the history and philosophy of science.

Renn structures his reflection in five parts. In part 1, he argues about the double character of knowledge, the empowerment it provides, and the unintended consequences

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Earth system. He told the delegates to stop using the term "Holocene" and, while speaking, searched for a better one. "We are not in the Holocene anymore. We are in the…the… the Anthropocene." The Holocene was described as the second period of so-called Quaternary period, after the Pleistocene, which is an Ice Age that began 2.6 mya, while the Holocene is interglacial period in which the ice retreats. The Holocene began 11,700 years before 2,000 CE, and its climatic conditions have been unusually stable ever since. The term 'Anthropocene' has been used by the limnologist Eugene F. Stoermer since the 1980 And as Renn notes in his article, the concept of Anthropocene has opened our eyes towards a fundamentally altered global environment and the fact that humanity has meanwhile changed the planet to a degree comparable to geologic forces. Cf. Renn, *The Evolution of Knowledge: Rethinking Science for the Anthropocene,* 5.

[357] Renn, *The Evolution of Knowledge: Rethinking Science for the Anthropocene*, ix.

to which it leads. In part 2, he argues about the historical nature of thinking and the structural changes of knowledge. He dedicates part 3 to the "economy of knowledge" by investigating how knowledge structures affect society and how society affects knowledge structures. In part 4, he focuses on the globalization processes of knowledge, asking how knowledge spreads. And finally, in part 5, he argues about the kind of knowledge our future depends. Recapitulating the role of knowledge in and for Anthropocene, Renn states

> Humans have massively intervened in various Earth system cycles, such as the carbon cycle, causing climate change, as well as the water, nitrogen, phosphorus and sulphur cycles, all of which are fundamental to life on Earth. Humanity has affected the energy balance at the Earth's surface, resulting in the transition of our planet into a new stage, the Anthropocene, propelled and empowered by the knowledge embodied in our technologies and our material culture. The question of whether and when the Anthropocene began is still debated. What is clear is that this knowledge has accumulated over generations and ever more quickly since the Scientific Revolution, the Industrial Revolution, and the so-called Great Acceleration of the 1950s.[358]

In the 5th part, when he returns to the relation between the Anthropocene and the evolution of knowledge, Renn begins by clarifying that cultural evolution is what distinguishes humanity from the rest of the biosphere. Cultural evolution is a unique layer of metabolism and learning on top of biological evolution. With their rapidly evolving culture, humans have introduced an 'ergosphere' "(a sphere of work, as well as of technological and energetic transformations) as a new global component of the Earth system, in addition to the lithosphere, the hydrosphere, the atmosphere, and the biosphere, thus changing the overall dynamics of the system."[359] And, "ergosphere may be on its

[358] Renn, "The Evolution of Knowledge: Rethinking Science in the Anthropocene," 6-7.
[359] Ibid., 7.

way to becoming a "technosphere" in which technological and other global infrastructures created by humans assume a self-organizing, quasi-autonomous character."[360] In chapter 15, "Exodus from Holocene," he argues that the entry into a new state of the Earth system is not due to a single cause and cannot be tied to a particular event in human history. It can best be described in terms of a cascade of evolutionary processes, as a transition from cultural to epistemic evolution.

> In cultural evolution, human societies have entered what Marx refers to as "relations of production" dependent on their material culture. In epistemic evolution, human societies' interactions with the Earth system have become dependent on science-based technologies, such as the use of fossil fuels, nuclear power, artificial fertilizers, and genetic engineering. Without the empowerment of the means of production through scientific knowledge, humanity would not have entered the Great Acceleration of the 1950s that is now being discussed in the geological sense as the beginning of the Anthropocene.[361]

What stone tools, hunting, gathering, and later food production, clothing, and the building of shelters were for the Holocene, science[362] and technology are for the Anthropocene. These two are now essential conditions of human life. The transition from cultural to epistemic evolution is based on the development of knowledge.

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[360] Renn, *The Evolution of Knowledge: Rethinking Science for the Anthropocene*, 31.
[361] Ibid.
[362] About science, Renn says "the development of science is not a unidirectional or deterministic process. Modern science is evidently one outcome of a global history of knowledge that cannot be understood without taking into account the interaction of knowledge with a variety of other societal structures, in particular the rise of capitalist and later industrial economies." While he was emphasizing on "The Multiple Origins of the Natural Sciences", he raised the question of the origin of modern science and compared it to the question of the origin of the human species. The answer "involved considerations about the emergence of a new evolutionary process: cultural evolution. Cultural evolution began as a peripheral phenomenon of biological evolution [..] before it eventually became the dominant process of human history." To that same question about the origin of science, it becomes plausible that science could emerge *and* become a dominant factor of our current state without being necessary result of some initial conditions. From such a perspective, scientific knowledge is just as unlikely to be an inevitable consequence of some given initial conditions, as according to Darwin's theory of evolution, the emergence of human beings is but a contingent result of the processes of evolution. At the same time, considering the succession of cultural and biological evolution makes it conceivable that this cascade of evolutionary processes might be continued by new forms of evolutionary processes, first emerging as marginal effects of the currently dominating evolutionary process and then taking over. Cf. Renn, *The Evolution of Knowledge: Rethinking Science for the Anthropocene*,323-324

"Understanding the dynamics of knowledge is therefore crucial for our survival in the Anthropocene. Both knowledge and changes in the environment accumulate across generations in long-term processes, and not necessarily in such a way that human survival is guaranteed."[363] As Renn developed in chapter 14 on "Epistemic Evolution,"

> In the transition from biological to cultural evolution, the role of 'niche construction' has been transformed from one among several aspects of biological evolution into an essential feature of cultural evolution, as the role of material culture and tool use for the very emergence of modern humans illustrates. In the transition from cultural to epistemic evolution, the role of scientific knowledge has been similarly turned from an aspect into a characteristic feature of novel evolutionary dynamics.[364]

"In cultural evolution, the internalization and reproduction of given external conditions within societal development was largely a matter of circumstance. In epistemic evolution, it will have to become more and more a matter of knowledge."[365] The awareness that we are living in the Anthropocene does not concern only politics and economics but also the quest for more knowledge that may trigger cross-scale effects on social behavior. And in chapter 16, "Knowledge for the Anthropocene," Renn argues that the internet offers, at least in principle, a knowledge economy toward a global coproduction of knowledge and new forms of organizing, integrating, locally adapting, and implementing scientific knowledge. A future Web of Knowledge or an Epistemic Web which would help to balance asymmetries in the ownership and control of knowledge and allow users to become 'prosumers,' for instance by replacing browsers with interfaces optimized for interacting with global human knowledge as represented on the Web. Not only content but also the network of links would have to become an

[363] Renn, "The Evolution of Knowledge: Rethinking Science in the Anthropocene," 7.
[364] Renn, *The Evolution of Knowledge: Rethinking Science for the Anthropocene*, 31-32.
[365] Ibid., 33.

openly accessible public good. However, before getting to epistemic evolution, human species has to evolve to be anatomical modern humans (AMH).

Conclusion

In this chapter on the evolutionary contribution to our understanding of the emergence of the modern humans, we have developed three stages of evolutionary theory: biological, cultural, and epistemic evolution. By evolutionary contribution, we mean not only biological evolution or evolutionary science. Rather we have extended our analysis to the cultural and epistemic evolution. We have even dealt with the emergence of the anatomical modern humans which helps us to address the similarities and divergences between humans and nonhumans starting from chimpanzees and great apes. From the biological to the cultural and finally to epistemic evolution, there is a reciprocity which is demonstrated in the integrative evolution which we have developed in the course of this second chapter.

In general, evolutionary theory challenges the traditional understanding of the species as having been created in a fixed way and separate from each other. As part of biological evolution, Darwin's theory, with its *descent with modification* model, challenges the theory of fixity, and with its natural selection in relation to the principles of variation, multiplicity, and heredity, opened the window to the new understanding of human beings as a species which shares the same common ancestor with other species. Human uniqueness could no longer be based on a certain fixity or separation from other species. Then, Neo-Darwinism, which synthesized Darwin's theory in relation with molecular biology, natural selection, and modern population genetics, showed that there is more evidence of the similarities between human beings and other species. The

scientific contribution of the DNA molecules has shown the similarities between the molecular structure of similar proteins in different species.

During the contemporary period, there have been vast contributions to the biological evolutionary science which have added to the explanation of the emergence of the modern humans. The Social Darwinism of Herbert Spencer advocated for a societal system which is subject to the Darwinian laws of natural selection; the Eugenics Movement of Francis Galton considered that humanity could be improved through selective breeding; the Sociobiology of Edward O. Wilson developed a scientific study of the biological aspects of social behavior in animals and humans. The Evolutionary psychology of Jerome Barkow, Leda Cosmides, and John Tooby developed an approach to psychology in which knowledge and principles from evolutionary biology are put to use in research on the structure of the human mind. For the evolutionary psychologists, all human behaviours reflect the influence of psychological and physical predispositions that helped human ancestors survive and reproduce.

In addition to the biological evolution, we emphasized the cultural evolution which recognizes cultural patterns in great apes and chimpanzees. We emphasized also the integrative evolution where an inclusive approach has been used by evolutionists in their explanation of human cognitive and cultural evolution. In the integrative evolution, we analyzed the evolution of human cognitive capacity where the theoretic culture, the superplastic brain, and complex webs of culture, which correspond to the symbolization of Deacon, are what distinguish modern humans from nonhumans.

It was in that context of cultural evolution contributions that we focused on the question of the emergence of the modern human, where we, acknowledging the real

divergence of human beings from other species, recognized also that we have more in common with chimpanzees and bonobos than how we diverge from them. Even if apes don't have complex languages or symbolic language, we recognized in them the use of incipient languages, the capacity to comprehend and communicate various emotions. We also recognized in most ape species the use of tools, which indicates their use of the brain and strategic planning. We also recognized in chimpanzees and orangs the cultural patterns in more or less thirty different behaviors, including anting, greeting gestures, and reconciliation.

The use of language, the presence of culture, tool-use, brain size, and even bipedalism, which were seen as unique and exclusive traits which differentiate modern humans from other primate species, are now understood to be elaborations of similar features in other species, although with some specific manifestations for modern humans. Keeping in mind that the genomic sequences of humans and chimpanzees, for example, are 96% identical, modern humans are not then unique or exclusive simply because they have language, culture, tool use, and larger brain size. These common features among humans and primates diminish the assertion of modern human uniqueness, despite clear quantitative differences between *Homo sapiens* and other primate species.

At the end of this chapter, we have analyzed the epistemic evolution which, according to Jürgen Renn, is based on knowledge. From the cultural evolution, humanity has entered into the epistemic evolution stage which is characterized by the increasing dependence of global society on the achievements and further extension of science and technology in order to ensure its sustainability in the age of the Anthropocene. Just as the cultural evolution emerged from the biological evolution, the epistemic evolution

emerged from the cultural evolution. This epistemic evolution, like the capacity for symbolization according to Deacon, is understood to belong only to modern humans. Ultimately, we have demonstrated in this chapter that, in the analysis of the emergence of the modern anatomical human, despite the divergencies between species, there are more similarities between human species and nonhuman species, starting with the chimpanzees, bonobos and great apes than there are difference which would isolate the human species.

To date, we have demonstrated that the content of the notion of *imago Dei* has been influenced by historical circumstances and changing conceptual frameworks, which is the justification for our proposal for further conceptual development. This chapter has provided the contemporary scientific date for guiding that further development. The following chapter will present our constructive proposal for that development.

CHAPTER III: A CONSTRUCTIVE PROPOSAL: EXTENSION OF *IMAGO DEI* TO OTHER SPECIES AS A NEW APPROACH TO THEOLOGICAL ANTHROPOLOGY.

> **As Israel holds a place of honor among the races, so humans occupy a place of honor among the non-human beings (including animals and angels). However, as "the election of Israel neither signaled YHWH's renouncement of the other nations nor involved their rejection in any way," so the election of humans in no way indicates God's rejection or lack of concern for non-human creatures.[366]**

Introduction

Reflecting on the various understandings of the notion of *imago Dei* in the first chapter, it emerged that all the definitions were built on the assertion that human beings are unique and exclusive among other species. Because of their belief in being created as fully different entities, separated from other species from the beginning, human beings identified themselves as the only *imago Dei.* When this uniqueness or exclusiveness is not explained by being the chosen of God, it is explained by having a soul or the intellectual ability to reason while other species lack it. With the contributions of Evolutionary science, without denying the divergences and similarities between human beings and other species, like chimpanzees, it is clear that human beings and other species have the same ancestor, because everything began with the *eukaryotes,* the first unicellular organism, estimated between 4 – 3.5 bya. It is also clear that as human beings, we can no longer attribute to ourselves alone language, culture, tool use, brain size, and even bipedalism.

[366] Joshua Moritz, "One *Imago Dei* and the Incarnation of the Eschatological Adam," in *Astrotheology: Science and Theology Meet Extraterrestrial Life,* ed. Ted Peters (Eugene OR: Cascade Books, 2018), chap. 19, Kindle.

With the Big Bang theory and the emerging evolutionary history of life, we recognize not only that human beings share a common history of life with all other species, but also that new species which existed during the evolutionary pathways depended on what went before them, even if they represented something new. As human beings, who share a lot with other creatures, can we continue to consider ourselves as the only *imago Dei*? Are we still the masters, those responsible for or the stewards of creation? How can we understand our care for the environment? When God allowed the Big Bang and the emergence of the life to happen, was it not in His images that He did it?

In this third and last chapter, we will begin by emphasizing the possibility of inclusivity of the *imago Dei.* We will first focus on *Laudato Si: On Care for Our Common Home*, where Pope Francis challenges the notion of stewardship by encouraging the human being as *imago Dei* to care for and have awareness of the importance of ethics in his/her relationship to the environment. From there, we will emphasize the extension of *imago Dei* to other species from the perspective of interrelatedness of Denis Edwards, moral capacity of the apes of Oliver Putz, and election of the *imago Dei* which benefits all creation of Joshua Moritz. By agreeing with the argument for inclusivity or openness, we will demonstrate our view of the diversity of *imago Dei,* so that every species can be considered as *imago Dei* in different way. And to conclude, we will affirm that every *imago Dei* has purpose and value, and that, although humans emerge from the evolutionary pathways, this does not mean that we are purposeless. Finally, we will develop our idea of the solidarity of all creation within the concept of *imago Dei.*

3.1. *Imago Dei* as person of care

In his encyclical, *Laudato Si: On Care for Our Common Home,* Pope Francis raises awareness of the importance of ethics in our relationship to the environment. *Laudato Si* also reflects considerably on the sharing of all creation in the next life. Even if the Pope provides "an approach to ecology which respects our unique place as human beings in this world and our relationship to our surroundings,"[367] and even if he never affirms that every creature is in the image of God, he strongly raises awareness about the rest of creation being part of the next life. For him, it is also clear that our understanding of being stewards because we are *imago Dei* is part of an "integral ecology" and should not have anything to do with domination but should make us recognize and respect the value of other species, as God does. From simple consumers to decision-makers to scientists, we all have an ethical responsibility in our relationship to the environment, our common home, because "the destruction of the human environment is extremely serious, not only because God has entrusted the world to us men and women, but because human life is itself a gift which must be defended from various forms of debasement."[368]

The pope begins by describing many aspects of the need to take care of our environment since its imbalance today is largely due to human abuse, selfishness, and

[367] *Laudato Si, 15.*
[368] Ibid., 5.

human violence against it. Pollution,[369] waste,[370] sea-level rising,[371] deficiencies of raw materials such as water,[372] the consequences of certain technological innovations or technocracy, loss of biodiversity,[373] and global warming due to the emission of greenhouse gases[374] such as carbon dioxide, methane, nitrogen oxide, etc., are the responsibility of humans. Because of that, "Humanity is called to recognize the need for changes of lifestyle, production and consumption, in order to combat this warming or at least the human causes which produce or aggravate it."[375] It is time to stop considering the rest of creation as "potential resources to be exploited, while overlooking the fact that they have value in themselves."[376]

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[369] Some forms of pollution are part of people's daily experience. Exposure to atmospheric pollutants produces a broad spectrum of health hazards, especially for the poor, and causes millions of premature deaths. People take sick, for example, from breathing high levels of smoke from fuels used in cooking or heating. There is also pollution that affects everyone, caused by transport, industrial fumes, substances which contribute to the acidification of soil and water, fertilizers, insecticides, fungicides, herbicides and agrotoxins in general. In *Laudato SI,* 20.

[370] Each year hundreds of millions of tons of waste are generated, much of its non-biodegradable, highly toxic and radioactive, from homes and businesses, from construction and demolition sites, from clinical, electronic and industrial sources. The earth, our home, is beginning to look more and more like an immense pile of filth. In many parts of the planet, the elderly lament that once beautiful landscapes are now covered with rubbish. Industrial waste and chemical products utilized in cities and agricultural areas can lead to bioaccumulation in the organisms of the local population, even when levels of toxins in those places are low. In *Laudato Si,* 21.

[371] A very solid scientific consensus indicates that we are presently witnessing a disturbing warming of the climatic system. In recent decades this warming has been accompanied by a constant rise in the sea level and, it would appear, by an increase of extreme weather events, even if a scientifically determinable cause cannot be assigned to each particular phenomenon. In *Laudato Si,* 23.

[372] Warming has effects on the carbon cycle. It creates a vicious circle which aggravates the situation even more, affecting the availability of essential resources like drinking water, energy and agricultural production in warmer regions, and leading to the extinction of part of the planet's biodiversity. In *Laudato Si,* 24.

[373] Things are made worse by the loss of tropical forests which would otherwise help to mitigate climate change. Carbon dioxide pollution increases the acidification of the oceans and compromises the marine food chain. If present trends continue, this century may well witness extraordinary climate change and an unprecedented destruction of ecosystems, with serious consequences for all of us. In *Laudato Si,* 24. The loss of forests and woodlands entails the loss of species which may constitute extremely important resources in the future, not only for food but also for curing disease and other uses. Different species contain genes which could be key resources in years ahead for meeting human needs and regulating environmental problems. In *Laudato Si,* 32.

[374] A number of scientific studies indicate that most global warming in recent decades is due to the great concentration of greenhouse gases (carbon dioxide, methane, nitrogen oxides and others) released mainly as a result of human activity. In *Laudato Si,* 23.

[375] *Laudato Si,* 23.

[376] Ibid., 33.

To that assessment of the damage done to the environment Francis proposes "A Gospel of Creation," that in Christian morality, taking care of the environment is an obligation for every Christian because the environment has been created, and entrusted to man to promote his good and not for him to dominate it. We are called to stewardship instead of domination. As Francis states, "if the simple fact of being human moves people to care for the environment of which they are a part, Christians in their turn realize that their responsibility within creation, and their duty towards nature and the Creator, are an essential part of their faith."[377] We therefore have a moral obligation according to Christian doctrine to cultivate, work, safeguard, preserve, and, above all, care for our environment. This is what our Creator prescribes for us. Caring for God's creation means that "human beings, endowed with intelligence, must respect the laws of nature and the delicate equilibria existing between the creatures of this world."[378] By caring for the rest of creation, Francis is calling us "to recognize that other living beings have a value of their own in God's eyes."[379]

Pope Francis stresses the human roots of the ecological crisis, "the dominant technocratic paradigm and the place of human beings and of human action in the world."[380] Francis calls for the wise way to use the power that scientific knowledge is giving to human beings, so that that scientific power will not be used to kill other human beings. In that use of power, it is important to consider the importance of the inalienable value of the human being which goes beyond his search for progress.[381] Caring for the earth as *imago Dei*

[377] *Laudato Si,* 64.
[378] Ibid., 68.
[379] Ibid., 69.
[380] Ibid., 101.
[381] Ibid., 136.

presupposes that humans should be ethical, demonstrate wisdom in the use of technological power, and seek a conversion in our relationship between every *imago Dei*.

Pope Francis proposes a revised way of thinking of our relation to creation, an "Integral ecology" which draws attention to the entirety of ecology; Human beings must stop thinking of themselves as being separate from the rest of creation because today everything is closely interrelated. Our inclusion in nature obliges us to take care of it and preserve it for future generations because it is a gift from our God. Integral ecology considers the human, family, work, urban contexts and the relationship of each person with himself and his relationship with others and the environment. Respect for the environment also means accepting oneself as being created. "The acceptance of our bodies as God's gift is vital for welcoming and accepting the entire world as a gift from the Father and our common home, whereas thinking that we enjoy absolute power over our own bodies turns, often subtly, into thinking that we enjoy absolute power over creation."[382] We necessarily need to accept ourselves as created beings, otherwise the tendency will be to dominate the environment around us, as if we were the creators. We certainly continue the creation, but we are not the creators.

As a resolution, Francis proposes some lines of orientation and action in the face of the environmental imbalance caused by human action which affect the way we imagine ourselves. It is important that as people made in the image of God we engage in a "dialogue which can help us to escape the spiral of self-destruction which currently engulfs us."[383] It is important to put in place global regulatory norms "to impose obligations and prevent unacceptable actions, for example, when powerful companies or countries dump

[382] *Laudato Si,* 155.
[383] Ibid., 163.

contaminated waste or offshore polluting industries in other countries."[384] It is urgent to make ethical decisions based on solidarity and transparency in decision-making to regulate all the causes of this environmental imbalance, but these decisions must be carefully studied so as not to cause other international injustices. The solutions advocated by the Holy Father call for the solidarity and generosity of decision-makers, and, also for a culture of values, so that we can facilitate the continued creation of the Creator and leave future generations a more dignified environment, which will restore as much as possible harmony between God, man, and the earth.

Emphasizing an "ecological education and spirituality" in the six and last chapter, Pope Francis insists on the awareness that we must have of our common origin, our mutual belonging and the sharing of a common future. Even if Pope Francis did not extend the idea of being made in the image of God to the rest of creation, he insists on the idea of our communal destiny with all the rest of creation. This commonality is the sign that creation has meaning in the eyes of God. We, human beings as *imago Dei*, are called to "discover the action of God in the soul, but also to discover God in all things."[385]

If God did not make all the creation in his image, in whose image did He make it? In whose image does He allow then the first unicellular and the rest of the species during the evolutionary pathways to exist? But by making the rest of creation in his image, does He remove something from human beings as *imago Dei?* And if God can express Himself

[384] *Laudato Si,* 173. This idea of Francis happened on the night of 19 to 20 August, 2006, the Pobo Kaola ship of Trafigura company discharged 583m3 of toxic product in Abidjan, the Capital city of the Ivory Coast which has affected more than fifteen thousand (15,000) people and cost the death of 6 persons in the days after. Because it was in the city, people realized what happened, and it became a scandal. If it was not in the city, most probably people would not have noticed. Laurent d'Ersu and Marie Jansana, "Le scandale des déchets à Abidjan,'' *La Croix* (September, 13/2006), https://www.la-croix.com/Actualite/Monde/Le-scandale-des-dechets-a-Abidjan-_NG_-2006-09-13-516442 (accessed December 11, 2019).
[385] *Laudato Si,* 233.

in different ways, can God not create things in His image in different ways? God as the Trinity expresses Himself in different ways.

> The Father is the ultimate source of everything, the loving and self-communicating foundation of all that exists. The Son, his reflection, through whom all things were created, united himself to this earth when he was formed in the womb of Mary. The Spirit, infinite bond of love, is intimately present at the very heart of the universe, inspiring and bringing new pathways.[386]

By creating, God expresses Himself in different ways in creation. In different ways, He could make all creation in His image. Francis seems to affirm this when he states that "In union with all creatures, we journey through this land seeking God."[387] We are all "journeying towards the Sabbath of eternity, the new Jerusalem, towards our common home in heaven."[388] The conviction that all the creation is journeying towards the new Jerusalem is the reason why we found important the contribution of this encyclical *Laudato Si* of Pope Francis to the idea of applying *imago Dei* to other species. By insisting on the fact that all the creation is journeying together, Pope Francis helps our understanding of similarities between human beings and the rest of the creation. Additionally, Francis holds the conviction that stewardship does not have anything to do with taking advantage of creation, instead stewardship is adopting an integral ecology where human beings in their care for the rest of creation respect and recognize the value of other species, as God does. It is necessary, as Pope Francis proposes, to move toward a reconciliation between humanity and the environment.

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[386] *Laudato Si,* 238.
[387] Ibid., 244
[388] Ibid., 243.

3.2. Extension of *imago Dei* to other species from the perspectives of Denis Edwards, Oliver Putz, and Joshua Moritz

3.2.1. *Imago Dei* as interrelated to another imago Dei

Denis Edwards offers a reflection on ecology from a Christian view.[389] From the necessity of ecological conversion[390] and of a new perspective on Christian ecology,[391] Edwards emphasizes what it means to be human in the midst of creation, and then moves to the experience of spirit, before turning explicitly to consider the place of Jesus in ecological theology, which opens to the ecological theology of the Trinity, which leads to a reflection on the final transformation of all things in Christ, and on worship and practice.[392] Ecological theology seems to find support from scientific cosmology and evolutionary biology, according to Edwards. By assuming the Big Bang theory, the stardust[393] and the emerging evolutionary history of life, Edwards makes the remark that "we human beings share a common history of life with all the other creatures of Earth. We carry within us a story of life that goes back to our pre-human ancestors in Africa, back to

[389] *Ecology at the Heart of Faith: The Change of Heart that leads to a New Way of Living on Earth* (New York: Orbis Books, 2006).

[390] The ecological conversion is an important theme that Pope John Paul II has proposed because humanity has failed God in its abuse of the planet. The ecological conversion goes with the necessity of integrity of creation as a moral responsibility. These ideas are well emphasized in *Sollicitudo Rei Socialis: On Social Concerns,* 74; *Message for the Celebration of the World Day of Prayer for Peace* (January 1, 1990); in the encyclical *The Gospel of Life: Evangelium Vitae,* 80; also *Centesimus Annus: On the Hundredth Anniversary of Rerum Novarum,* 70-78.

[391] Denis Edwards argues that his intention is simply to point to a specific in which he takes a different approach. He proposes a theological response to the ecological crisis not in terms of bypassing central Christian traditions but in terms of going more deeply into them and seeking to reinterpret them in the light of the ecological issues that confront us. He argues that this Christian heritage, above all the living memory of Jesus as God-with-us bringing healing and liberation, is deeply connected to creation.

[392] Denis Edwards, 6.

[393] The fact is that it takes more than hydrogen to make a human being. We are a carbon-based life. The molecules of our bodies are composed of atoms of carbon, hydrogen, oxygen, and nitrogen with small amounts of other elements. Collections of atoms make up molecules, which makes up the chromosomes which carry the genetic code. While the hydrogen atoms come from the early universe, the carbon, oxygen, and nitrogen all come from the stars. And while some organisms are single-celled, a human being is made up of about 50 trillion cells specialized to perform an enormous variety of tasks. In Denis Edwards, 10 &79.

the trilobites of the Cambrian seas, and ultimately back to the first bacterial forms of life 3.5 billion years ago."[394]

Edwards addresses the question of the *imago Dei*, seeing it as the "foundation for a Christian view of the radical value of each person before God. It is the basis for the Christian commitment to equal and mutual relations between women and men."[395] But the *imago Dei* in reference to human beings can become dangerous. He states, "This concept of the human as image of God becomes dangerous when it used to set humans up in opposition to other creatures, above all when it is used to suggest that humans have absolute and unlimited rights over other species."[396] Against the use of the *imago Dei* as a destructive distortion, Edwards proposes that "it is possible to retrieve this powerful biblical idea in an ecological theology that situates human beings in relationship to other creatures, and that understands each creature as in its own way reflecting and imaging God."[397]

Using the same logic, Edwards remarks that "while the Bible and the Christian tradition use the language of image of God specifically of the human, they also see the whole of creation, and the diversity of life on Earth, as the self-expression of God and, in this sense, as imaging God."[398] In addition, he affirms that "an eagle in flight, a wildflower in its delicate beauty, an ecosystem, and the biosphere of Earth can each in its own way be seen as a self-expression of the Creator, and thus as an image of God."[399] Here, Edwards proposes the extension of the *imago Dei* to all life, because everything is the self-expression

[394] Edwards, 13.
[395] Ibid.,14.
[396] Ibid.
[397] Ibid.
[398] Ibid.
[399] Ibid., 15.

of God and, in this sense, is imaging God. It seems like Edwards proposes that humans and nonhumans share the same *imago Dei.* And he believes that even Jesus as the true and perfect image of God in his universal meaning is not just image of God "for human beings but for all creatures. In him the reconciliation of all things has begun."[400]

Despite this universal role of Christ which is unanimous among Christian theologians, "the Christian community has usually used the image language for human beings to bring out the uniqueness of humans before God."[401] Instead of defining the *imago Dei* by one aspect of humankind like the capacity for reason, or free will or self-consciousness,[402] Edwards claims that "what makes us unique before God is not any one capacity we possess or any partial aspect of the human."[403] For him, "it is the whole human being understood as *personal and as interpersonal.* Being created as the *imago Dei* means that God creates human beings as persons in order to embrace them in *interpersonal* love."[404] It is clear for Edwards that "human beings are made in the image of God in the sense that they are made for interpersonal love."[405]

Additionally, the human being as *imago Dei* is invited to care for and to respect the distinctiveness and otherness of the rest of creation. But if the whole creation shares the same *imago Dei*, someone can ask why human beings should care for the rest of creation? However, Edwards explains the necessity for human beings to care for the rest of creation by the fact that the precise specificity of human beings, which is personal and interpersonal,

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[400] Edwards, 15.
[401] Ibid.
[402] Friedrich Ernst Schleiermacher is undeniably one of the major theologians of the nineteenth century with his contribution of self-consciousness. Even Karl Rahner shares the view of self-consciousness, as a means to be able respond to the Creator in freedom and love.
[403] Edwards, 16.
[404] Ibid.
[405] Ibid., 17.

makes human beings relate to other creatures as God does. "While all creatures are held in the creative love of God at every moment, human beings are embraced by this love in an interpersonal way. They are creation come to personhood, and as persons they can thank and praise God on behalf of the rest of creation."[406] It is then because of this specificity of personal and interpersonal love that human beings are called to love and respect the Earth as God loves it.

Concerning the relationship between human beings and the rest of creation, Edwards enumerates five models (kinship with creation;[407] domination of nature;[408] ecological egalitarianism;[409] kinship within a community;[410] and cultivating and caring for creation[411]), and among them, the cultivating and caring model is the one that he supports in his ecological theology. Instead of calling this model the functional or stewardship model as it could be, Edwards prefers to call it the cultivating and caring for creation model, because when the stewardship model is used "to characterize the human stance before others creatures, it can run the risk of suggesting an inflated view of the human as a necessary intermediary between God and other creatures."[412] It seems that the stewardship

[406] Edwards, 17.
[407] The kinship with Creation, God creates each creature, sustains its existence; and human beings as part of the Creation are called to act responsibly before God. This model is fundamentally about God-centered (theocentric), rather than a human-centered (anthropocentric). It is the biblical interpretation where the functionality is put in exergue and God centrality is respected.
[408] Domination is the pretention that the nature is simply for the exploitation for human beings. It was based on Genesis 1: 28-30 when God gives to men and women the dominion on fish of the sea, the birds…
[409] Ecological egalitarianism is simply in opposition with the domination of nature, and then in opposition of anthropocentrism. With this model, the other creatures have an intrinsic value which the human beings are supposed to respect.
[410] The kinship within a community is a model which is based on Genesis 1:31 when God looked at everything he had made and found it very good. Also, it is based on Genesis 9: 12-16 when God embraced everything, He has created in the covenant love. Francis of Assisi is traditionally associated to this model because of his understanding of the variety and diversity of God's creatures as expressing the beauty and the abundance of the Trinitarian life of God.
[411] The five models are from the book *Ecology at the Heart of Faith*, Denis Edwards presents the five models from pages 18 to 26.
[412] Edwards, 25.

model suggests that other creatures do not have their own relationship with the living God or their own integrity. The cultivating and caring for creation model seems to allow "human beings to see themselves as interrelated in a community of life with other creatures, a community in which each creature has its own unique value before God."[413] With the cultivating and caring model, human creativity stands humbly before other creatures, respects their right to exist and to flourish, and commits itself to their conservation and flourishing. In this model of caring, wisdom and humility from human beings are crucial, because with them, we can recognize our finitude before the mystery of God and we will not seek to grasp or control the rest of creation. With this model, human beings "are intimately linked to the life-forms of our planet, and to the atmosphere, the soil, and the oceans. Our existence is encompassed by the mystery of God revealed in all the variety of creatures that surround us. We are part of them and they are of us."[414]

Edwards emphasizes that the diversity of creatures are not only the self-expression of God, as imaging God, but they are "part of a wider pattern of relationships in nature and that these relationships can be understood as grounded in the Trinitarian relations of mutual love."[415] The Trinitarian radical interrelationship is used to explain the interconnectedness or interrelatedness of the *imago Dei.* As at every stage during the evolutionary process, something new occurs. At each of these stages, the new species depend on what goes before, even if each represents something new, and the "entities emerge in our universe in patterns of interrelationship. Things are constituted by relationship."[416] The theological insight that the Trinity is relational provides a basis for a relational view of the universe.

[413] Edwards, 26.
[414] Ibid., 26.
[415] Ibid., 79.
[416] Ibid.

"While science tells us that each creature exists in nested pattern of constitutive relations, theology grounds this in the Trinitarian relationships of mutual love. Trinitarian theologians argue that if the Creator's being is radically relational, then this suggests something about the nature of created reality itself."[417] The interrelatedness or interrelationship of all creatures based on the divine communion in love makes every creature important and supports the idea that every creature is the self-expression of God, and in this sense has the image of God proper to their species.

Even with the Eucharist, which is the sacrament of the risen Christ and which is profoundly Trinitarian, the interrelatedness is defended. "Our Eucharist communion, our communion with each other in Christ, is always a sharing in and a tasting of the divine communion of the Trinity, in which all things will be transfigured and find their eternal meaning and their true home."[418] And, "this Trinitarian communion which we share is the source of all life on Earth; it is what enables a community of life to emerge and evolve […] it is what will be the fulfillment of all the creatures of our planet."[419]

For Christians, the moment of communion with God in the Eucharist is also the moment of communion with all creation. "By being taken up into God, we are caught up into God's love for creatures of our planetary community."[420] With this communion, we are all interconnected in the self-expression of God to all the creation. By creating, God creates everything as the self-expression of Himself, which means everything is the image of God, according to Edwards. But instead of agreeing with him that God creates everything in His one own image, we think that God, who allows speciation during the

[417] Edwards, 80.
[418] Ibid., 105.
[419] Ibid.
[420] Ibid.

evolutionary pathways, allows every species to have one of His specific images, so that we can all share in our common future the fullness of God's action in us.

3.2.2. Humans and Apes as *imago Dei*

Oliver Putz by admitting evolutionary biology and ethology's suggestions that humans are not the only species capable of empathy and possibly morality and that nonhuman animals are recognized as a free moral agent, argues that "apes and some other mammals have moral agency and that a traditional interpretation of the *imago Dei* is incorrectly equating specialness with exclusivity." [421] He proposes that "the concept of the *imago Dei* could be extended to accommodate moral species other than our own."[422] Putz begins by confronting himself with the question of whether morality could have evolved by means of natural selection, and whether species other than our own also have moral agency. He affirms that the "answer to both questions are of enormous relevance for theology, especially for theological anthropology."[423] As he claims, "if animals possess the necessary and sufficient mental conditions enabling them to make moral decisions, it means not only that they have to be considered "persons" but also that they too are created in the image of God."[424] Putz argues that great apes are indeed capable of self-reflection and thus of moral decision-making. Therefore, he proposes that the doctrine of *imago Dei* has to be broadened to accommodate moral animals.

The ethological data relevant to animal morality is based on the phylogenetic continuum which is "the fact that evolutionary biology on earth is a continuum extending from the earliest organism through diverse phylogenetic branches to the great variety of

[421] Oliver Putz, "Moral apes: Human uniqueness and the image of God" *Zygon* 44 no.3 (Sep 2009): 613.
[422] Ibid.
[423] Ibid., 614.
[424] Ibid.

species alive today."[425] Instead of emphasizing the differences between humans and nonhuman animals like gorillas, bonobos and chimpanzees, Putz focus on the similarities, like "most biologists [who] agree that humans and great apes share many behaviors."[426] Regarding animal morality, empirical evidence suggests that apes are capable of cognitive achievements which seem to be reserved to humans. Using different intellectual sources, Putz remarks that apes make and use tools, have culture, use plants for self-medication, have complex emotions, are empathic, show altruistic behavior not only to conspecifics, and great apes seem to show signs of self-cognizance and ability to employ symbolic processes that operate on the basis of mental images rather than direct sensory-motor phenomena.[427]

To the question if these capabilities constitute moral agency in non-humans, Putz argues that the moral capacities of decision means the free capacities of choice. After admitting that "the moral agency presupposes self-consciousness,"[428] Putz clarifies that the characteristic of self-consciousness is first and foremost "the fissure of self into reflecting subject and reflected object."[429] And "this divisions results in an internal self-symbolization in which the objective self symbolizes to the subjective self the undivided self as a whole. This internal self-symbolization is the foundation for all moral judgment because it enables free self-reflection."[430] In self-reflection, language, representation and intentionality are important. Even if chimpanzees are not capable of symbolic or complex language as humans are, they are capable of communication or incipient language. Apes

[425] Putz, 614.
[426] Ibid.
[427] Ibid., 615.
[428] Ibid., 616.
[429] Ibid.
[430] Ibid.

and chimpanzees are involved in some altruistic behavior or empathy which is a crucial aspect of morality. The self-recognition in the mirror by adult chimpanzees is, according to Putz, a recognition of self and not necessarily self-consciousness. He states that,

> I think the case can be made that the cognitive processes underlying mirror self-recognition require a notion of self that goes beyond merely perceptual consciousness. In es-sence, an animal recognizing itself in the mirror externalizes its internal self-symbolization, in which the objective self symbolizes the self to the subjective self and transfers it to its mirror image.[431]

In summary, the argument of Putz is that "moral agency presupposes self-consciousness, comprehension, and representation, and that both observational and empirical studies suggest strongly that apes possess these mental traits. Consequently, empathic and altruistic behavior, but also fairness in games as observed in bonobo play, can result from moral decision-making."[432] Every animal capable of recognizing itself in a mirror, every animal capable of self-recognition, has, according to Putz, the capacity to receive God's image, because the image of God is the mode or channel of God's self-revelation of Godself to us, and thus to every animal capable of self-recognition. With this view, the *imago Dei*, according to Putz, cannot be exclusive or unique or special to human beings.

Against the three traditional interpretations of the *imago Dei* (functional-Relational-Structural) which all "insist that human beings are the only species created special, […] capable of the divine image,"[433] Putz advocates for a more inclusive interpretation of the *imago Dei* because of his interpretation of "ethological data concerning mental abilities of great apes."[434] Putz proposes clearly that "it is not humanity

[431] Putz, 618-619.
[432] Ibid., 619.
[433] Ibid.
[434] Ibid., 620.

alone that is wanted by God for its own sake, but rather the diversity of self-conscious expressions that emerge from an evolutionary process and in which the universe, to say it with Karl Rahner comes to itself while God's self-communication be-comes realized."[435] And sharing with the great apes the notion of *imago Dei* is not going to remove us human beings from our special relationship with God nor release us from our special responsibility toward the earth as a highly technological species. In fact, it is only "an expression of the abundant presence and richness of God's self-communication in the world."[436] However, it is important to mention that the inclusion of the great apes in the *imago Dei* by Putz is not extended to every living thing that God creates. Not everything in creation, according to Putz, is made in the image of God. Also, for Putz, the *imago of Dei* in human beings and in great apes is the same image of God.

3.2.3. Oneness of *imago Dei* for all flesh

Joshua Moritz,[437] argues that doctrines of the Incarnation and Christological doctrine should be applied to creation beyond the sphere of terrestrial human beings, and emphasized that the *imago Dei* concerned all flesh because "the *imago Dei* is a proclamation of truly cosmic scope declaring God's radical solidarity with all *creatures* in Christ."[438] Moritz begins his article with the question "Does the Christian message of the incarnation—and Logos Christology in particular—rule out God's loving concern for creation beyond the sphere of terrestrial human beings?"[439] For some space researchers,

[435] Putz, 620.
[436] Ibid.
[437] Joshua Moritz has developed his theory of Election of the *imago Dei* in "One *Imago Dei* and the Incarnation of the Eschatological Adam?" In *Astrotheology: Science and Theology Meet Extraterrestrial Life*, but also in "Human Uniqueness, The Other Hominids, and Anthropocentrism of the Gaps in the Religion and Science Dialogue." *Zygon* 47, also "Evolution, the End of Human Uniqueness, and the Election of the Imago Dei." *Theology and Science* 9.
[438] Joshua Moritz, "One *Imago Dei* and the Incarnation of the Eschatological Adam," Kindle.
[439] Ibid.

such as Paul Davies, "Jesus Christ is called the Savior precisely because he took on human flesh to save humankind. He did not come to save the whales or the dolphins or the gorillas or the chimpanzees, or even the Neanderthals, however noble or deserving those creatures may be (or were). Jesus Christ was the savior of Homo sapiens, specifically; one planet and one species."[440] According to Moritz, the reason why scholars like Davies believes this is because Davies alleges that Christian theology is exclusively anthropocentric: "he wants to show that traditional Christology would require by implication a planet-hopping Christ. He believes that Christian theologians, to be consistent with previous commitments, must posit the apparently absurd view that God would need to become incarnate multiple times."[441]

Moritz assesses the claim "If multiple societies of extraterrestrial intelligent beings on exoplanets exist, we can predict that God will or already has provided a species-specific incarnation for each planet parallel to God's incarnation in Jesus Christ on Earth,"[442]and responds that Jesus[443] did not come to save only human beings on this one planet. Moritz insists on the fact that "the Advent event, when understood within the context of Early Jewish conceptions of the Messiah as the renewal and fulfillment of the *imago Dei*, is a proclamation of truly cosmic scope declaring God's radical solidarity with all creatures in

[440] Paul Davies, *Eerie Silence*, 188. Cf. Joshua Moritz, "One *Imago Dei* and the Incarnation of the Eschatological Adam," Kindle.
[441] Joshua Moritz, "One *Imago Dei* and the Incarnation of the Eschatological Adam," Kindle.
[442] Ibid.
[443] This question is related to the question of One or Many Incarnations, where Ted Peters stands for the Oneness and Robert Russell defends the argument of Many Incarnations, if multiple societies of extraterrestrial intelligent beings on exoplanets exist. While Russell believe in the multiplicity of incarnation between extraterrestrial life and us, he makes sure for our terrestrial context, there is only One Incarnation. Robert Russel finds in Deep Incarnation of Henrik Gregson some possible solutions to the problem of One or Many Incarnations. Peters and Russel have two wonderful chapters in the book *Astrotheology: Science and Theology Meet Extraterrestrial Life*, edited by Ted Peters.

Christ."[444] For him, this applies to all living creatures on Earth and elsewhere, if there be there a living creature.

Also, the incarnation of Jesus is not only for the redemption of humanity, but rather the redemption of all biological life, all flesh. For Moritz, "God's creation subject to God's redemptive action in Jesus Christ is inclusive of all life forms here on Earth; and it includes any and all living creatures elsewhere in our expansive universe."[445] Using the same logic, he claims that "the one incarnation of God in Christ in Earth's history is efficacious for all sentient creatures wherever and whenever they live."[446]

Beside the many interpretations which have sought to understand the *imago Dei* in light of specific unique qualities or capacities that human beings alone possess and that non-humans lack, Moritz emphasizes that "a close examination of the sacred texts themselves reveals that the *imago Dei* is never defined according to one characteristic or a specific collection of qualities that set humans apart from other creatures."[447] He also says that "in the Bible, the image and likeness of God is never said to be about exceptional capacities or traits that humans alone have which qualify them (and disqualify other creatures) for inclusion in the *imago Dei* category."[448] As contemporary theologians agree in general, the biblical narrative remains silent about any qualities of human beings which might account for their special standing as *imago Dei.* It is not because of morality, rationality, sexuality, language, technology, culture, cognitive fluidity, or possession of immortal soul. The evolution of science helps also to realize that we share a lot of the same

[444] Joshua Moritz, "One *Imago Dei* and the Incarnation of the Eschatological Adam," Kindle.
[445] Ibid.
[446] Ibid.
[447] Ibid.
[448] Ibid.

genes and that there is less than 10 percent of what we can label uniquely humans' genes. As for many contemporary theologians, for Moritz, the *imago Dei* does not refer to any quality or capacity that human beings have and nonhuman animals lack. He disagrees with Robert John Russell who "identified the *imago Dei* with rationality; and with this criterion in mind he could attribute the *imago Dei* to rational creatures on other planets. In contrast to Russell, I do not associate the *imago Dei* with rationality or any other similar creaturely capacity or quality."[449]

Contrary to the structural, functional or stewardship, and relational or communal understanding of the *imago Dei*, Moritz views the "image and likeness of God as God's historical choosing or election of human beings from among the animals and setting them apart for the sake and fulfillment of the divine purposes."[450] By viewing the *imago Dei* from the early Jewish and early Christian concept of historical or biblical election, Moritz insists on the fact that "those who are elected are not chosen because they are 'the greatest' or inherently more worthy than others, but rather they are elected as a result of mysterious acts of divine love and grace."[451] Indeed, "election in the biblical understanding relates to a people (and often a lineage) whom God has chosen in the midst of history for a special purpose within the wider context of God's design. This purpose of historical election is furthermore defined not in terms of privilege (or even individual salvation), but rather for the sake of service."[452] In other words, "within the historical biblical or Hebrew concept of election, the choosing of people groups and representative individuals is not for their own sake, or for the purpose of individualistic final salvation, but rather for the sake of and in

[449] Joshua Moritz, "One *Imago Dei* and the Incarnation of the Eschatological Adam," Kindle.
[450] Ibid.
[451] Ibid.
[452] Ibid.

the service of others."[453] And the non-elect are called to be blessed in and through their relationship with the elect. In that case, "the concept of election was never assumed to be only for the benefit of the elect, but it was always about God's plan for the whole world, the elect and the non-elect alike."[454]

Moritz holds, that rather being a matter of exclusivism, the historical concept of election is inclusive and universalistic. And the horizon of the particularism of election is universal. In fact, "the particularism of the love of God for the elected one is to be related to the more comprehensive horizon of God's love for all."[455] In this way, the chosen one "is assigned a function for that wider context. He is elected in order to serve as God's agent in relation to a more comprehensive object of God's love."[456] When God elects, it is to "proclaim the righteous will of God to the nations. In this view, the election of Israel is not an end in itself. It serves the will of God on *behalf of* the human race as a whole."[457] As the election of Israel or of Abraham holds a place of honor among the races, so human beings occupy a place of honor among the rest of the creation. However, as "the election of Israel neither signaled YHWH's renouncement of the other nations nor involved their rejection in any way, so the election of humans in no way indicates God's rejection or lack of concern for non-human creatures."[458] For Moritz, it is without doubt that the human being, as elected as both king and priest, bears God's image, authority, sacredness, healing, and atoning salvation to the whole non-human creation.

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[453] Joshua Moritz, "One *Imago Dei* and the Incarnation of the Eschatological Adam," Kindle.
[454] Ibid.
[455] Wolfhart Pannenberg, *Human Nature, Election, and History* (Philadelphia: Westminster Press, 1977), 49.
[456]Ibid.
[457] Wolfhart Pannenberg, *Systematic Theology,* Vol:2, (Michigan: William B. Eerdmans Pub Company, 1994), 322.
[458] Horst Dietrich Preuss, *Old Testament Theology* (Louisville, Ky.: Westminster John Knox Press, 1995), 2:285.

Using the same logic, the election of Jesus seems for Moritz to bring salvation to all those who are flesh. He states, "Jesus came to save the whales, the dolphins, the gorillas, the chimpanzees, the Neanderthals, and even extra-terrestrial biological life. As one man from one species on one planet is elected as the telos of the *imago Dei,* so the entire cosmos is brought into God's salvific endeavor."[459] In the same way, he stands with those who claim that the "one incarnation of God in Christ is efficacious for all sentient creatures wherever and whenever they live."[460]

While Denis Edwards extends the notion of *imago Dei* to all creation because of God's self-expression in every creature, Oliver Putz extends *imago Dei* only to great apes because of their capacity for self-reflection and moral decision-making, and Joshua Moritz extends *imago Dei* to all flesh based on the election of human beings. Despite their differences, Edwards, Putz, and Moritz each argue against the idea of *imago Dei* as exclusively for human beings and against the idea of *imago Dei* as a proof of human superiority over the remaining creatures. They articulated these critiques because of the challenging contribution Evolutionary theory posed to traditional biblical literalism. With the ecological crisis, the evolutionary establishment of similarities and divergences between human species and apes, chimpanzees, and other species, and even because of the debate of the possibility of extraterrestrial life, the question of the *imago Dei* gained some new understandings. None of the contemporary intellectuals that we have referred to reject the idea of *imago Dei* for human beings, but they extend it at some point or in some way to other living species. For our concern, we agree with them when it is matter of extending

[459] Joshua Moritz, "One *Imago Dei* and the Incarnation of the Eschatological Adam," Kindle.
[460]Ibid.

the *imago Dei* to other living species with the idea that the many ways of self-expression of God can be the basis for the many ways of the *imago Dei* in creation.

In the similarity and divergence of species during the evolutionary pathways may reside the extension of the image of God in different ways. Every time there is similarity, there is the image of God, and every time there is a divergence, there is an image of God in a different way. The similarity shows, then, that both are made in the image of God, and the divergence shows that each species is made in the image of God in different way. And that does not mean that one species can have many images of God. Every species has only one image of God. And that one image of God is the same for every entity of the species, and different from every one of other species.

However, someone can offer the critique that because we are all different among the human species, does it mean that we humans are all made in the image of God in different ways? No, the divergence is not only being different, it is the difference of species. The divergence is the speciation which made one initial species be separated in two different species. So, the divergence is not just the difference, but it is the difference at speciation level. And it is at that level that human and chimpanzees and gorilla, and any kind of living species, is made in the image of God in a different way. The similarity of genetic sequences, cultural patterns, use of tools, language, etc., the similarity at all these levels makes possible the extension of the image of God to other species, starting from Chimpanzees, bonobos and great apes. However, the divergence between the species makes possible that each species is then *imago Dei* in different ways.

Another way to explain our idea of being created in the image of God in different ways can maybe come from some specifics or unique characteristics that some

contemporary evolutionists recognize in human beings. For example, the symbolic reference of Terrence Deacon, which is unique to human's language and which is lacking in chimpanzees and the rest of creation, can demonstrate that humans and chimpanzees are evolved as the image of God in different ways. For instance, the image of God shows up in the presence of language in both species, but different images of God show up through the different depths of language ability of these two species. The same can even be said about the Epistemic evolution of Renn where he emphasizes that during the cultural evolution, humans are already distinct from the rest of the biosphere. From that distinction, we can see that each species of the biological evolution has evolved as the image of God in a different way, while the human species too has evolved in his different way as the image of God. When we say evolve, we don't mean that the different species are not created, we want just to insist on the fact that they evolve in the process of evolution.

Perhaps another example is the difference between knowing and knowing that one knows (consciousness, which is the activity of mind). For instance, theology is done with the mind, in the way that it takes into consideration the consciousness of the one who is doing it. It is only with the mind that we realize that we are not beings unto ourselves. In that case, the mind, which made it possible for someone to be conscious about what he knows, is also one of the constituent elements which separates the human's species from the other primates' species, because animals also do have mind but seem not be conscious of their knowledge. This ability to know that we know is perhaps what makes us aware that we are not our own Creator, but that we are created in the image of the one who creates us. Other animals seemingly are conscious but not self-conscious, while the human is both conscious and self-conscious. The similarity of having a mind is an

indication of being made at the image of God and the difference between being able to know and being able to know that one knows is an indication of being made a different image of God. At this point, then, what can be said about the value and purpose of the *imago Dei*?

3.3. The purpose and value of the *imago Dei*

When purpose is not defined as the reason for which something is done or created or for which something exists, it is defined as the intention or the objective that someone has when he or she is doing something. According to Merriam-Webster, purpose means "something set up as an object or end to be attained, or a subject under discussion or an action in course of execution or an aim to oneself."[461] Examples of purpose as the object toward which one strives or for which something exists, an aim or a goal are many and obvious. By writing this thesis, my purpose is to deepen my understanding of the mystery or doctrine of *imago Dei,* or by being a student in the Jesuit School of Theology my purpose is to learn more about theology. It can also happen that someone is qualified as a man of purpose, in the sense that he is determined in his action or he strives for the resolution. Purpose can then be a personal goal, a personal achievement which gives a person purpose whether it be a good or bad one. However, purpose can also refer to something which goes beyond an individual or personal goal; it can be the purpose of the clan, tribe, nation, world, human life, or all life. From a Biblical perspective, there is a universal purpose[462] of human

[461] "Purpose" *Merriam Webster,* https://www.merriam-webster.com/dictionary/punctuated%20equilibrium (accessed February 12, 2020).

[462] Because as He said in Isaiah 43:10, before Him, there is no other God, He is the universal purpose of every life. Even in John 15: 9-11 ; 16-17, by making reference to the fact that He is the one who chose and appoint the disciples to go to bear fruits, so that the Father can listen to them and give them joy, Jesus is affirming to us that knowing or be aware of the work of God within us and enjoying His presence is the general or universal purpose. Made at the image of God means that we are not purposeless, but that we are

life, and there is also an individual purpose[463] in life. Purpose can then refer to individual life or all human life, from the biblical perspective.[464] While the individual purpose is the purpose that God has individually for our lives, the general purpose is to know and enjoy God, who is the *terminus* and *telos* of every life.[465] Purpose then goes beyond our single life.

From the *theistic evolutionism*,[466] which affirms both "Christian faith and evolutionary science as secular scientists present it,"[467] the purpose, value, and direction of the *imago Dei* is a divine purpose, which means the value or purpose of the *imago Dei* is not located within itself but is located in God. In fact, it is Peters and Hewlett who, when

called to know and enjoy Our Creator, to witness in Him, so that other *imago Dei* may come to know and enjoy Him.

[463] Individually, God has called some for a specific mission, some like Abraham, Noah, Joseph, Moses, Samuel, Joshua, Ruth, Isaiah, Jeremiah, Ezekiel… He has called them and continue call each one of us for some particular purpose. As in the 1 Corinthians 12: 12-31 where Paul talks about the many gifts and one body of Christ, each member of the Church as the body of Christ has a different purpose, like each portion of the body is used for different things. To every *imago Dei*, there is a unique purpose that God has for us, and there is also a universal purpose which God has for all for us.

[464] "Compelling Truth" https://www.compellingtruth.org/life-purpose.html (Mar 23, 2020).

[465] Beliefs about God's plans for our individual lives vary. Some believe that God has given us certain gifts and talents to steward, but does not have a specific job, specific direction for us. Others believe that God has a detailed plan for every moment or aspect of life. One thing is certain: God has placed a call on each on of us. Whether it is His general call to all believers, the gifts He has given us, or a more specific plan, God has a purpose for our lives. And, by praying, we can discover the purpose of our lives. *Compelling Truth* https://www.compellingtruth.org/life-purpose.html (Mar 23, 2020).

[466] Add to the *theistic evolutionism*, there is atheistic materialism (The ontological materialism believes like any materialist that only matter is the fundamental substance in nature. This belief is shared in the contemporary period by thinkers like Richard Dawkins, William Provine, Thomas Huxley, Peter Atkins), *Scientific Creationism* (It is an effort to demonstrate scientifically Creationism. The defenders of this theory will think that they are doing science, but strict *Evolutionary scientists* and *atheistic materialists* think that they are doing theology. The scientific creationist needs just to pay attention to what is really scientific and what is really theology, without forcing the harmonization of the two sides of understanding of the realities.), and the theory of Intelligent Design (where every complexity is the action of the Intelligent Design). The *theistic evolutionism* affirms both "Christian faith and evolutionary science as secular scientists present it." The theistic evolutionists approve that science can tell us about ourselves and our world but nevertheless theology can tell us something deeper and fundamental. The theistic evolutionism is generally open to eschatology rather than entelechy, to God as Creator and Co-Creator of the *imago Dei*, to the divine action at the beginning and in the course of evolution, to the purpose for nature and not in nature, to the theology of the Cross and Resurrection, and to proleptic ethics where ethics is the call for transformation of the world. In their intellectual contributions, these thinkers who agree both with Evolution science and the Christian faith have in one way or another impacted considerably the comprehension of theological anthropology.

[467] Peters and Hewlett, *Can You Believe in God and Evolution?* 6.

accepting the Darwinian interpretation of nature in relation to the revelation of God in Jesus Christ, affirm as *theistic evolutionists* that they "will not attempt to locate purpose or direction or even value *within nature.* Instead, as Christians, (they) affirm a divine purpose *for nature.*"[468] Recognizing purpose or value as divine means it belongs in God. To have a divine purpose means that we are valuable and meaningful in the eyes of the creator who opened nonbeing to be and to continue to be.

Being *imago Dei* is then not being purposeless, like some evolutionary psychologists posit with their atheistic materialism (Richard Dawkins, William Provine, Thomas Huxley, or Peter Atkins), but being *imago Dei* shows us that our purpose and value are in our God, and that purpose will be revealed eschatologically.[469] It is that our lives matter in the eyes of God, and that we are worthy people with dignity. Just because we evolved during evolutionary pathways does not mean our lives can be understood as purposeless or mechanistic or deterministic. As *imago Dei*, we have purpose and our purpose is universal and divine.

Considering the example of a long straight stick that has fallen from a tree, Peters and Hewlett make the observation that we might not think of it immediately as possessing an inherent purpose. But if it happens that a member of the Masai tribe in Kenya or in Tanzania were to happen upon this stick, it might be picked up. And later, it might become the shaft of a spear. A young Masai warrior might use it to kill his first lion and establish his manhood. He might even keep the wooden pole for years as a remembrance. The purpose of the fallen stick would not be found in the stick itself; rather, the Masai warrior

[468] Ibid., 120.
[469] Peters and Hewlett, *Can You Believe in God and Evolution?* 6.

will have found a purpose for that piece of wood. In the same way, when it comes to Christian theology, purpose within the created order comes from God.[470]

Like in the case of the example of the stick, where the purpose is revealed at the end, in the case of *imago Dei*, the purpose is fully going to be revealed in God, in whose image we are all made in different ways. The purpose is not at the beginning, it is at the end. "Purpose comes from what is final looking backward, not from potential lying in wait at the beginning."[471] Peters and Hewlett state that "in fact, the Greek word for end, *telos,* means 'end' both as final state and as purpose or goal. God has a *telos* for nature, even if we can't see it within nature. It is the future act of redemption that determines what previous creation will have meant, and this can be discerned only eschatologically." The purpose is then at the end. Since the purpose is at the end, this may be the reason that Peters, in "The *Imago Dei* as the End of Evolution,"[472] developed the idea of human beings becoming *imago Dei* at the end (*terminus* as conclusion and *telos* as goal or purpose) in *imago Christi*. In that logic, the purpose for the present creation resides then in God's promised new creation.

In Genesis 1:31, "God saw everything that he had made, and, behold, it was very good," and in Revelation 21:1, "I saw a new heaven and a new earth," it becomes obvious that "we do not have to limit the concept of creation to a single act back at the beginning, back at the big bang, or back in Genesis 1. […] (we believe that) God's creative act of imparting an open future is an ongoing one."[473] By giving to nature the possibility for a future, God gives it two things: openness and purpose as fulfilment. God gives openness

[470] Ibid., 120.
[471] Peters and Hewlett, *Can You Believe in God and Evolution?*120.
[472] Peters, "The *Imago Dei* as the End of Evolution" 92-106.
[473] Peters and Hewlett, *Can You Believe in God and Evolution?* 122.

in the way that *creation ex nihilo* is possible, so that from nonbeing the big bang could happen and could continue (*creatio continua*) by the creative power by which God brought being out of nonbeing and continues to sustain the world today. And God gives purpose in the way that a new creation will emerge as a whole which is greater than the sum of the parts and cannot be reduced to its parts.[474] This new whole refers to the new heaven and new earth, which will "transform, yet preserve, the entire history of cosmic creation."[475] "Where we find ourselves today is looking back to alpha, to *creatio ex nihilo,* and looking forwards to omega, the new creation *ex vetere,* out of what has come before. The new creation will emerge from what God's Spirit does to the present creation."[476] It is in the emergence of the new creation that the fulfillment of the act of creation will happen. It is there too that resides the purpose of the current *continua creatio.* Peters and Hewlett suggest "the future consummation to be the crowning conclusion of God's act of creation. Creation will then turn out to be a single inclusive divine act whereby what comes into existence is perfected in its existence. God will say, as the book of Genesis predicts God will say, 'Behold, it is very good,' and it will become eternally good."[477]

With the awareness of having purpose and value comes openness to others and the improvement of relationships in *imago Dei.* And in this context, we think that solidarity and sincerity are among those things which allow human beings as *imago Dei* to improve their relationship between themselves and with the rest of creation. Solidarity is defined traditionally as unity or agreement of feeling or action, especially among individuals with

[474] Ibid., 123.
[475] Peters and Hewlett, *Can You Believe in God and Evolution?* 124.
[476] Ibid.
[477] Ibid., 131.

a common interest, objectives, and standards.[478] However, in Catholic Social Teaching,[479], solidarity is not a feeling about helping other people. Solidarity is a way of life that recognizes that we are all brothers and sisters regardless of race, creed, or ethnic background. And with the global crisis of Coronavirus that we are facing in the world right now, it is clear that every *imago Dei* is in this journey of life together.

When we say that we are in this journey together, we really mean *all* because a very recent article indicated to us that, "Coronavirus could be catastrophic for Great apes, experts warn,"[480]. As Saplakoglu wrote in his article, "Great apes are our closest relatives, and the species that make up this group — including bonobos, gorillas, orangutans and chimpanzees — are endangered. Though we don't share the same language or society, we share about 98% of our DNA with chimpanzees. And, it seems, we have another unfortunate similarity: our susceptibility to the same respiratory illnesses."[481] Because of the similarities between these unfortunate species and human species, they are also at risk

[478] "Solidarity" https://www.merriam-webster.com/dictionary/solidarity (Mar 23, 2020).
[479] Catholic social teaching is a central and essential element of our faith. Its roots are in the Hebrew prophets who announced God's special love for the poor and called God's people to a covenant of love and justice. It is a teaching founded on the life and words of Jesus Christ, who came "to bring glad tidings to the poor . . . liberty to captives . . . recovery of sight to the blind"(Lk 4:18-19), and who identified himself with "the least of these," the hungry and the stranger (cf. Mt 25:45). Catholic social teaching is built on a commitment to the poor. Catholic social teaching emerges from the truth of what God has revealed to us about himself. We believe in the triune God whose very nature is communal and social. God the Father sends his only Son Jesus Christ and shares the Holy Spirit as his gift of love. God reveals himself to us as one who is not alone, but rather as one who is relational, one who is Trinity. Therefore, we who are made in God's image share this communal, social nature. We are called to reach out and to build relationships of love and justice. Catholic social teaching is based on and inseparable from our understanding of human life and human dignity. Every human being is created in the image of God and redeemed by Jesus Christ, and therefore is invaluable and worthy of respect as a member of the human family. Every person, from the moment of conception to natural death, has inherent dignity and a right to life consistent with that dignity. Human dignity comes from God, not from any human quality or accomplishment. Cf. *Sharing Catholic social teaching: Challenges and Directions: Reflections of the U.S. Catholic bishops* (Washington, D.C.: United States Catholic Conference, 1998) http://www.usccb.org/beliefs-and-teachings/what-we-believe/catholic-social-teaching/sharing-catholic-social-teaching-challenges-and-directions.cfm (accessed Mar 23, 2020).
[480] Yasemin Saplakoglu, "Coronavirus could be catastrophic for Great apes, experts warn," *LiveScience* (Mar 26 2020) https://www.livescience.com/great-apes-coronavirus-risk.html (accessed Mar 27 2020).
[481] Ibid.

to be contaminated, and so the expert warns us so that it does not happen. No matter how we want to emphasize our differences, we are all together in this life, all together in this journey. Living in solidarity and sincerity is definitely the way that we are supposed to relate to each other, because every creature is interconnected. And this solidarity does not have anything to do with pity or charity. Like in the case of poor people most of the time, what they need is not pity or charity but justice, a system which is just and people who live in justice. Solidarity and sincerity among *imago Dei* is not then an act of pity or charity that some fortunate ones will do in favor of other unfortunate *imago Dei,* but solidarity is a right that all *imago Dei* deserve.

In paragraphs 1939 to 1942, *The Catechism of the Catholic Church* develops the idea of solidarity as part of the Church's social teaching. Quoting Pope Pius XII, it states that "An error, today abundantly widespread, is disregard for the law of human solidarity and charity, dictated and imposed both by our common origin and by the equality in rational nature of all men, whatever nation they belong to. This law is sealed by the sacrifice of redemption offered by Jesus Christ on the altar of the Cross to his heavenly Father, on behalf of sinful humanity."[482] There are also other official Catholic documents[483] which emphasize solidarity, documents like *Rerum Novarum*[484] by Pope Leo XII in 1891,

[482] Pius XII, *Summi pontificatus*, Oct.20, 1939; AAS 31 (1939) 423.

[483] In fact, the Catholic Church's teachings on social justice have been formed from a rich foundation of Scripture, papal writings, and encyclicals as well as episcopal conferences, pastoral letters and documents. Taken as a whole, these teachings provide a cohesive body of thought to guide the faithful in addressing modern social concerns.

[484] This groundbreaking social encyclical addresses the dehumanizing conditions in which many workers labor and affirms workers' rights to just wages, rest, and fair treatment, to form unions and to strike if necessary. Pope Leo upholds the individual's right to hold private property, but also notes the role of the state in facilitating distributive justice so that workers can adequately support their families and someday own property of their own. He notes that poor "have a claim to special consideration" Leo XIII criticizes both capitalism for its tendency toward greed, concentration of wealth, and mistreatment of workers, as well as socialism, for what he understood as a rejection of private property and an under-emphasis on the dignity of each individual person.

Quadragesimo Anno[485] by Pius XI in 1931, *Mater et Magistra*[486] by John XXIII in 1961, *Populorum Progressio*[487] by Paul VI in 1967, *Sollicitudo Rei Socialis*[488] by John Paul II in 1987, *Deus Caritas Est*[489] and *Caritatis in Veritate*[490] by Benedict XVI in 2005 and 2009,

[485] Pius XI begins *Quadragesimo Anno* by honoring and summarizing Leo XIII's *Rerum Novarum* (1891). He writes that *Rerum Novarum* had encouraged many Christian leaders to reflect on social issues within a Christian framework. After summarizing *Rerum Novarum*, Pius clarifies and updates four issues that Leo had addressed: church authority, private property, just wages, and worker associations. Benefiting from the forty years of discussion that had followed *Rerum Novarum*, Pius writes that private property has a twofold character: individual and collective. Workers should have a right to attain private property, but the fruits of the land ought to be distributed for the benefit of the common good. Pius's discussion of the just distribution of wealth provides a transition to his discussion of just wages. He indicates that many factors ought to be considered in determining the appropriate wage for employees. He gives four considerations attention: the needs of the worker and his family, the condition of the business, the public economic good, and the relation of wages to those of other workers as well as the goods being sold.

[486] The Pope notes the world's global interdependence and expresses profound concern about the arms race and the growing inequalities between rich and poor nations, noting that gains in science and technology should not lead to economic disparity, but should instead benefit the common good. He also expresses concern about the plight of small farmers and rural areas, calls for greater participation of workers in industry and new forms of agricultural support, and notes that respect for culture must be emphasized in the Church's missionary activities. Intervention by governments is needed to address global problems, he says, but should also respect the principle of subsidiarity (allowing the people closest to a problem to help resolve it with social support as needed). Finally, he proposes that Christians should engage in a process of observing, judging, and acting to put the Church's social doctrine into practice.

[487] In response to the worsening situation of the poor around the world, the Pope criticizes unjust structures that have led to inequality and underdevelopment, including the inequalities of the market system, the effects of colonialism, economic domination and exploitation of poor countries by rich ones, and the prioritization of military spending and the arms race over development. Pope Paul VI challenges the nations of the world to focus on the integral human development of the poorest nations. This type of development includes much more than economic growth, requiring a true commitment to solidarity (the idea that we are one human family) and genuinely human values.

[488] In Sollicitudo Rei Socialis, Pope John Paul II celebrates the 20th anniversary of Populorum Progressio by updating the Church's teaching on the "development of peoples" and changes that took place in the preceding two decades. The Pope points out that despite some progress in the two decades since Populorum Progressio's publication, the gap between developed and developing countries continued to widened in a variety of areas, including the production and distribution of goods, hygiene, health and housing, availability of drinking water, and working conditions (especially for women).

[489] The Pope writes that the human person's ability to love is rooted in the Father's love for humankind and the person's identity as created in the image of God. Benedict XVI locates love for the poor at the center of Catholic life, noting that the "exercise of charity" is one of the Church's three "essential activities, along with the administration of the sacraments and the proclamation of the word." 6 He writes that the Church must form the consciences of the laity so that they can work for just ordering of society. Their political activity should be lived as "social charity" infused with the light of faith and love.

[490] Pope Benedict identifies justice as the primary way of charity and notes the obligation of "every Christian" to take a stand for the common good and work for institutional change. The values of love, truth, and solidarity, he writes, must inform all aspects of economic life, such as finance, trade, and globalization, which must be humanized and re-oriented to the common good. Business owners, investors, and consumers all have a role to play in guaranteeing that businesses operate to benefit the common good. Benedict XVI criticizes modern society's appeal to right without acknowledging corresponding duties, and he emphasizes the international community's duty toward solidarity, which should be realized in many ways, such as attention

and *Lumen Fidei*,[491] *Evangelium Gaudium*, and *Laudato Si* by Francis in 2013, 2013, and 2015, respectively.

Solidarity, according to *The Catechism of the Catholic Church*, "is manifested in the first place by the distribution of goods and remuneration for work. It also presupposes the effort for a more just social order where tensions are better able to be reduced and conflicts more readily settled by negotiation."[492] Solidarity between the poor among themselves, between rich and poor, between workers themselves, between employers and employees in a business, solidarity among nations and peoples,[493] and even solidarity between *imago Dei* seem a solution to so many problems that our society is facing, like the socio-economic problems, the systemic injustices of the global geopolitics and geo-economics, and the exclusion of others because of their differences. "The virtue of solidarity goes beyond material goods. In spreading the spiritual goods of the faith, the Church has promoted, and often opened new paths for, the development of temporal goods as well."[494] Solidarity helps people to see other people as people of dignity, i.e., to see other *imago Dei* as *imago Dei*, and not just as instruments or objects to be used.[495] Solidarity is then the sentiment from the soul of the Church which impels human beings as *imago Dei*

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to the needs of workers and immigrants and development assistance to poor countries implemented in a way that prioritizes respect for life and the authentic human development of the person. He links concern for life with the duty to care for creation, emphasizing environmental concerns more than in any past encyclical.

[491] Pope Francis' first encyclical builds on the work of his predecessor, Pope Emeritus Benedict XVI, completing a trilogy of encyclicals on the theological virtues-faith, hope, and love. This encyclical, "written by four hands," intends to encourage the People of God to embrace their faith more fully. A continuation of Pope Benedict XVI's encyclical letters on charity and hope, Lumen Fidei addresses the gift of faith that God has extended to us and how the light of faith needs to be nourished and reinforced so that it can guide us on our collective and individual faith journey.

[492] *The Catechism of the Catholic Church,* 1940.

[493] Ibid., 1941.

[494] Ibid., 1942.

[495] In Kantian philosophy, there is a notable distinction between price and dignity. Something has a price when it has a relative value. For example, the vehicle is a means of transport, it has a price. But something is worthy, when it has value in itself. It cannot therefore be sold in compensation for anything, since it is an end. Man being an end, he is worthy.

to work for social conditions that are capable of offering to everyone a life worthy of someone made in the image of God. And solidarity is not just among human beings as *imago Dei* but solidarity is also between human beings and other species made also in the image of God in a different way. At the end, solidarity calls us to be people of sincerity, so that we can trust each other in what we think, say and do.

Conclusion

This chapter has, first of all, developed our constructive proposal which considers the various understandings of the *imago Dei* in relation to the contribution of Evolutionary science about the emergence of the anatomically modern human (AMH). We emphasized the possible extension of the *imago Dei* to other species. In order to do so, we started by exploring the care that human beings are supposed to have in regard to the rest of creation. It is with the encyclical *Laudato Si,* by Pope Francis, that we addressed the question of an "integral ecology." Francis draws our attention to the entirety of ecology, insisting that humans must stop thinking of themselves as being separate from the rest of creation, because today everything is closely interrelated. He argues that our care for the rest of nature does not have anything to do with domination. Without extending the idea of the image of God to the rest of the creation, Pope Francis strongly raises awareness about the rest of creation being part of the next life.

From there, we emphasized the extension of the *imago Dei* to other species with the contributions of Denis Edwards, Oliver Putz, and Joshua Moritz. These three contemporary scholars develop a theology of *imago Dei* which rejects the exclusivity and particularity of *imago Dei* to human beings. Each one, in his own way, has proposed an inclusivist approach of the *imago Dei* to non-human species. Edwards emphasizes the self-

expression of God in creating all creation, which therefore images God. He helps to clarify the interrelationship between human beings and the rest of creation in a cultivating and caring way. Oliver Putz extends the notion of *imago Dei* to both human beings and apes because of the capacity for empathy and morality in both. Joshua Moritz argues from his theology of election that the human being as elected shares the grace of that election with all nonhuman creatures, in the same way that Jesus as elected saved all flesh on earth and outside of earth. While, we agree totally with *Laudato Si'* and with the necessity of the inclusive approach to the *imago Dei*, we agree also with Edwards, Putz and Moritz when it is matter of extending the *imago Dei* to other living species. We think that the many ways of self-expression of God can be the basis for the many ways of the *imago Dei* in Creation, so that each species is made in the image of God in a different way. And with our understanding of the similarities and divergences between modern humans and other species, we proposed the idea of the *imago Dei* in all living species in different ways. Because of the similarity between species, each species can be considered as made in the image of God, and because of the divergence between species, each species is made in the image of God in a different way.

In the last part of this third chapter, we focused on the purpose and at the very end we talk about the sincerity of every *imago Dei.* We emphasized the purpose of *imago Dei* because even when, with the evolutionary science, we explain how living species evolve, that does not mean that they can only be explained scientifically. Beyond atheistic materialism, where nature and living species are considered as purposeless, we believe that by allowing every species to evolve, God has indicated a purpose for each one of them. There is not only an individual and self-centered purpose but, as *imago Dei*, there is a

universal and divine purpose, which is not located within the *imago Dei* but in the One in whose image we are made. The divine purpose is then going to be revealed eschatologically. Our lives do not have their entire meaning and goal in this life. Our purpose is not yet completely known. All our individual and self-centered purposes must not overshadow the divine purpose for which we are made in the image of God. The divine purpose does not reside at the beginning or during the *creatio continua* but it resides in the future, when Creation will then turn out to be a single inclusive divine act, and there, what God said will then carry all its meaning, that all Creation is effectively good.

Because we are all made in the image of God and we are journeying together toward our divine purpose, we proposed that it is wise for us to live in solidarity and sincerity. Solidarity is not a feeling about helping other people but is a way of life that recognizes that we are all brothers and sisters regardless of race, creed, or ethnic background. Our differences are not bigger than our similarities. Even with other species, which are made in the image of God in different ways, we are in this journey together. With the case of COVID-19 (or Coronavirus) in this recent time, we all have plenty of examples to see that human beings are all treated equally by the virus, regardless of our cultures, religions, occupations, or financial situations. Living in solidarity and sincerity with other *imago Dei,* even those which are *imago Dei* in different ways, seems the wisest thing that we can do as people made in the image of God because undeniably, we are interconnected.

General Conclusion

In conclusion, we would like to recapitulate some of the major points of the three different chapters. We started with an analysis of the various understandings of the notion of *imago Dei* in the history of Christianity, and demonstrated that the concept has had a fluid content that depended on the social, historical, and conceptual frameworks in which they were articulated. That provided the justification for exploring further elaboration of the concept. We then emphasized the contributions of contemporary evolutionary science on the emergence of the modern humans, and argued how the similarity and divergence between modern humans and other species helped us to elaborate a proposal of an extension of the notion of *imago Dei* to other species. We concluded that every species could be recognized as made in the image of God in a different way.

We are also aware that the theological anthropological perspective explains the human person in consideration of our faith, in light of Revelation and the Christ event. This perspective has often been readjusted when a new scientific discovery has been made. Because of the knowledge that our ancestors in the faith had about the human species, it was obvious for them that the human person was created in his actual form and was very separate from the other species. From the understanding of those times, the notion of *imago Dei* could only be applied to the human person.

Therefore, for much of Christian history, being made at the image of God referred uniquely to the human person. This was true from the biblical perspective, where the human being as *imago Dei* was understood as undivided and relational, from the Eastern patristic view where the human person could have a likeness or the image of God, from the Western patristic and medieval view where the human person was characterized by one of

his/her features or capacities like reason or intellectual ability, from the functional or stewardship model where the responsibility of the *imago Dei* was emphasized, and from the communal or relational approach where the human person was understood as a person of relation. It was clear from all these perspectives that only human beings were the *imago Dei*.

The knowledge that we have about ourselves can determine considerably what we say about our being made in the image of God. The development of the new understandings of the human species as an entity which has emerged in the process of evolutionary pathways challenges the idea of our uniqueness in the world, which was based on our being created separately from other species or on our capacity for having some features which belong uniquely to the human race.

Despite challenging the idea of our uniqueness based on our being created in our actual form and separate from other species, the evolutionary contributions, especially consideration of the cultural and epistemic evolutions, recognize some distinctive characteristics in modern humans, like the theoretic culture of Donald, the symbolic reference of Deacon, and the scientific knowledge of Renn.

These distinctive characteristics or attributes, which are only for modern humans, are also the proof of the modern humans as *imago Dei* in a different way than other species. Despite the recognition of our distinction as a species because of our ability for theoretic culture, for symbolization, and for scientific knowledge, contemporary evolutionary science has proven the abundant similarities between humans and nonhuman species that not only do we share a common ancestor with nonhumans animals, but also that there is a

similarity between the genetic sequences, brains, language, culture, and tool-use of the different species, humans and nonhuman animals.

As it is now difficult to build the notion of the *imago Dei* on some unique characteristic or on our being created separately from other species, by considering our belief in the eschatological gathering where everything will be reunited in God, and by using the contributions of some contemporary scholars like Denis Edwards, Oliver Putz, and Joshua Moritz, we extended the notion of the *imago Dei* to other species.

However, considering the divergences between species, we construed the notion of the *imago Dei* in each species in a different way. Because of our similarity, every species is *imago Dei* and because of our divergence, every species is *imago Dei* in a different way. As we all are all created and evolved as the expression of God, we are not then without purpose; instead, our purpose is a divine one. Having divine purpose shows that the fullness of who we are will happen eschatologically, and therefore, living in solidarity with other *imago Dei*, even those who are *imago Dei* in a different way, is no longer an act of pity or charity but a right that every *imago Dei* has because of their inalienable value in the eyes of the Creator.

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