

Theology, Philosophy, and Biology: An Interpretation of the Conception of Jesus Christ

JUAN EDUARDO CARREÑO
Universidad de los Andes
Santiago, Chile

Introduction

A large body of literature and a vigorous academic establishment—university chairs, foundations, societies, and journals—focus on an interdisciplinary field variously described as “science and religion,” “science and faith,” or “science and theology.”¹ “Philosophy” is a recent occasional addition which turns these dyads into triads.² However, not only the terms themselves but also the ways their relationship are understood have generated debate. Indeed, Ian Barbour’s well-known typology defining four canonical modes of the science-religion relationship—conflict, independence, dialogue, and integration—has played an organizing role but has not satisfied everyone.³ Although our purpose here is not to recapitulate these discussions, it might be helpful to mention an issue that frequently arises within them: whether Barbour’s classification is necessarily exhaustive, and in particular, if what he understands by “integration” is really the perfect culmination of a link that could connect science and faith. Thus, some authors prefer to speak of

¹ For an up-to-date presentation of the field, see Alister E. McGrath, *Science & Religion: A New Introduction* (Hoboken, NJ: John Wiley & Sons, 2020).

² See, for example, Albert Bagood, “Presentation: Science, Philosophy and Theology: What Can We Say about Them?,” *Angelicum* 86, no. 1 (2009): 9–11.

³ See Ian Barbour, “On Typologies for Relating Science and Religion,” *Zygon* 37, no. 2 (2002): 345–60.

“interaction,” “compatibility,” or “articulation” to describe this relationship, either replacing or superimposed upon Barbour’s integration modality.⁴

We believe that at least part of this series of controversies results from the lack of fundamental definitions and distinctions. “Science” is not univocal but an analogous term, since it can be predicated both from extremely diverse disciplines and also from a cognitive act, a habit, or a *corpus* of knowledge.⁵ On the other hand, “faith,” “religion,” and “theology” have neither identical meanings nor even an analogous epistemic scope in different religious traditions. All this outlines a problem whose many edges cannot be enclosed within the margins of a categorization, however nuanced.

This article aims to illustrate the complexity of the relationship between science, philosophy, and theology, using as a case study the contribution of contemporary embryology and developmental biology to theological reflection on the Incarnation of Jesus Christ. We begin by examining some theological hypotheses that, using the biological knowledge and speculations of their time, attempt to deepen our understanding of the mystery of the incarnate Word. Next, we propose an interpretation of the conception of Jesus Christ, in which the facts contributed by biology could enrich, and perhaps illuminate, certain aspects of theological reflection. As we will argue, this encounter does not fit the *integration* model described in Barbour’s typology, because, among other reasons, the discourses at stake—theological and biological—neither belong to the same epistemological plane nor play an equivalent role in this relationship.

Some Hypotheses about the Conception of Jesus

Interestingly, from as early as its antecedents in ancient Egypt, the genesis and development of mankind inevitably intersects with religious beliefs. This trend is projected in Judaism and reaches its greatest realization, for reasons partly understandable, in the Christian tradition. Of course, an authentic religious worldview cannot avoid at least some mention of human

⁴ For a glimpse of this controversy, see Geoffrey Cantor and Chris Kenny, “Barbour’s Fourfold Way: Problems with His Taxonomy of Science-Religion Relationships,” *Zygon* 36, no. 4 (2004): 765–81; Taede A. Smedes, “Beyond Barbour or Back to Basics? The Future of Science and Religion and the Quest for Unity,” *Zygon* 43, no. 1 (2008): 235–58; Ian Barbour, “Taking Science Seriously without Scientism: A Response to Taede Smedes,” *Zygon* 43, no. 1 (2008): 259–69; Smedes, “Taking Theology and Science Seriously without Category Mistakes: A Response to Ian Barbour,” *Zygon* 43, no. 1 (2008): 271–76.

⁵ For more details, see Juan Eduardo Carreño, *La filosofía tomista ante el hecho de la evolución del viviente corpóreo* (Santiago, Chile: RIL, 2017), 339–56.

ontogenesis, but belief in the factual basis of the Incarnation elevates the matter to a new and original plane. This is how it is understood by a number of believers who, from the first centuries of our era, and until recent times, advance hypotheses and models where biological and philosophical knowledge about human conception are combined, in different proportions, with Christological notions and doctrines. The account offered here is not intended to be exhaustive; our interest is only in outlining certain theological interpretations that have arisen in the course of history, as precursors to those discussed in the next section.

The Conception of Jesus and the Incarnation of the Word

Origen's position regarding preexistence of the soul (*proyparxis*) and its union with the human body as a result of a fall attracted many philosophical and theological objections in the centuries following.⁶ Once this alternative was rejected, however, several paths remained open to account for human generation. The "translationist" hypothesis (according to which the human soul, like the body, derives from the parents through the act of natural procreation) had its Eastern adherents but seemed to find itself at home in the West. This reception was undoubtedly influenced by the plausibility the Bishop of Hippo, Augustine, albeit hesitantly assigned to translationism as a way of explaining the inheritance of Adam's sin.⁷ However, the creationist doctrine (conceiving of the soul as the fruit of a special act of God's creation) soon claimed primacy, ending up definitively imposed in Scholasticism.⁸ But this option did not completely settle the issue of human conception either, as attested by the great controversy unleashed between creationists, defending the thesis that the creation of the human soul is simultaneous with conception (*synyparxis*), and those postulating the infusion of a human soul

⁶ The harsh terms in which Jerome refers to this thesis are well attested; see Joseph Needham, *A History of Embryology*, 2nd ed. (Cambridge: Cambridge University Press, 1959), 77. On the condemnation of this thesis at the Second Council of Constantinople in 553, see Evgenia Tzouramani and Christos Terezis, "The Origenic Doctrine of the Pre-Existence of Souls in Relation to the Christian Canon," *Florentia Iliberritana* 18 (2007): 421–31.

⁷ See Roland Teske, "Augustine's Theory of the Soul," in *The Cambridge Companion to Augustine*, ed. Eleonore Stump and Norman Kretzmann (Cambridge: Cambridge University Press, 2001), 116–23.

⁸ See Ralph Hennings, "*Disputatio de origine animae* (CPL 623,37) or the Victory of Creationism in the Fifth Century," in *Studia Patristica* 30, ed. Elizabeth A. Livingstone (Leuven: Peeters, 1997), 260–68; A. W. Argyle, "The Christian Doctrine of the Origin of the Soul," *Scottish Journal of Theology* 13, no. 3 (1965): 273–93.

occurring at some later stage of development, that is when some organicity already exists (*methyparxis*).⁹

As Dirk Krausmüller has shown, these positions intertwine in the great Christological debates of the sixth to tenth centuries between Chalcedonians, Nestorians, and Monophysites; they appeal, unsurprisingly, to both the embryology of the time and the authority of the Holy Scriptures.¹⁰ Indeed, the Aristotelian theory of delayed hominization—according to which the human being, in its development, possesses first a vegetative soul and then a sensitive one, and only in a third phase, when ready, does it receive a human soul—was an authority explicitly cited by adherents of *methyparxis*. But it is remarkable that authors such as Tertullian, Clement of Alexandria, Irenaeus of Lyons, Ignatius of Antioch, Justin Martyr, Gregory of Nyssa, and Maximus the Confessor were already openly defending its rival.¹¹ This discussion would continue for centuries, but less on the Christological than the embryological level. This is clearly the case with St. Thomas Aquinas,¹² who, regarding the first phases of human development, resolutely follows the Aristotelian theory of delayed hominization, and not the proposal of his teacher, St. Albert the Great.¹³ But the model of *methyparxis* is explicitly

⁹ See Dirk Krausmüller, “When Christology Intersects with Embryology: The Viewpoints of Nestorian, Monophysite and Chalcedonian Authors of the Sixth to Tenth Centuries,” *Byzantinische Zeitschrift* 113 (2020): 853–78.

¹⁰ See Krausmüller, “When Christology Intersects with Embryology,” 854–55.

¹¹ For some famous Aristotelian passages on this issue, see *De generatione animalium* 2.3.736a24–737b6; *Historia animalium* 7.3.583b10–20; *Politica* 7.16.1335b20–27. For the idea of human conception in the Fathers, see Michael Gorman, *Abortion and the Early Church: Christian, Jewish and Pagan Attitudes in the Greco-Roman World* (New York: Paulist Press, 1982).

¹² For the works of Aquinas: any quotations from the *Summa theologiae* [ST], the *Summa contra gentiles* [SCG], the commentary on the *Physics* [*In I–VII phys.*], *Quaestio disputatae de anima* [*Q.D. de an.*], *Quaestio disputata de spiritualibus creaturis* [*De spir.*], *Quaestiones de quodlibet* [*Quodl.*], *Compendium theologiae* [CT], and *De principiis naturae* (*De princ.*) are original translations from the Leonine edition; original translations from the commentary on Peter Lombard’s *Sentences* [*In I–IV sent.*] are done from *Scriptum super libros sententiarum*, 4 vols., ed. P. Mandonnet and M. Moss (Paris: Lethielleux, 1929–1947); translations of *Quaestiones disputatae De potentia* [*De pot.*] are done from vol. 2. of *Quaestiones disputatae*, ed. P. Pession (Turin: Marietti, 1965); translations from the commentary on John (*Super Ioan*) are from *Commentary on the Gospel of John, Chapters 1–8*, ed. The Aquinas Institute, Latin–English Edition of the Works of St. Thomas Aquinas 35 (Lander: The Aquinas Institute for the Study of Sacred Doctrine, 2013).

¹³ For some relevant text in Aquinas, see *Q.D. de an.*, q. 11, ad 1; *De pot.*, q. 3, a. 9, ad 9; *ST I*, q. 76, a. 3, ad 3; q. 118, a. 2, ad 2; *SCG II*, ch. 89; *CT*, ch. 92; *De spir.* III, ad 13. For some discussions on this point in contemporary Thomism, see John Haldane

discarded by Aquinas when formulating the mystery of the Incarnation; for him, the conception of the Son of God is an exception, not only on the ontological plane and on that of grace, but also, and in close connection, on the strictly organic. Jesus does not go through merely vegetative or sensitive phases before receiving a human soul: He is fully man—and fully God—from the moment of conception.¹⁴

As a result of the debates raised by the question of abortion, the magisterium of the Catholic Church has repeatedly and consistently defended the belief that the life of the human person begins at the moment of conception,¹⁵ which of course also applies to the case of Jesus Christ. The Word assumes a complete human nature—soul and body—at the same instant in which that nature is generated under the action of the Holy Spirit.¹⁶ From this follows the infeasibility of introducing chronological differences between the generation of the organicity of Christ, the creation of his soul, and the Incarnation of the Word.

The Work of the Holy Spirit in the Conception of Jesus Christ

The faith of the primitive Church in the virginal motherhood of Mary and the early rejection of the adoptionist doctrine are two clear testimonies that, for the first Christian communities, the humanity of Jesus Christ could not be conceived as the result of an ordinary generative act, if by such we mean one in which a male and a female procreate.¹⁷ But on the other hand,

and Patrick Lee, “Aquinas on Human Ensoulment, Abortion and the Value of Life,” *Philosophy* 78, no. 2 (2003): 255–78; Jason Eberl, *Thomistic Principles and Bioethics* (New York: Routledge, 2006), 23–42; Craig Payne, *Why a Fetus is a Human Person from the Moment of Conception: A Revisionist Interpretation of Thomas Aquinas’s Treatise on Human Nature* (New York: Edwin Mellen, 2010); Fabrizio Amerini, *Aquinas on the Beginning and End of Human Life*, trans. M. Henninger (Cambridge: Harvard University Press, 2013).

¹⁴ See *ST* III, q. 33, a. 2, ad 3: “What the Philosopher says is true in the generation of other men, because the body is successively formed and disposed for the soul: whence, first, as being imperfectly disposed, it receives an imperfect soul; and afterwards, when it is perfectly disposed, it receives a perfect soul. But Christ’s body, on account of the infinite power of the agent, was perfectly disposed instantaneously. Wherefore, at once and in the first instant it received a perfect form, that is, the rational soul.” See also *In III sent.*, d. 3, q. 5, a. 2; *SCG*. IV, ch. 44; *CT*, ch. 218; *In Ioan* 1, lec. 9.

¹⁵ See *Catechism of the Catholic Church* [CCC], 2nd ed. (Washington DC: United States Catholic Conference of Bishops, 2019), nos. 2270–75; Congregation for the Doctrine of the Faith, *Donum Vitae*, I.1–6; III; Second Vatican Council, *Gaudium et Spes* §51; *Codex Iuris Canonici*, cans. 1314, 1398.

¹⁶ See notes 59 and 60 below.

¹⁷ For the virginity of Mary in early professions of faith, see Heinrich Denzinger,

the ancient pagan model of *theogamy*, where divinities fertilize women in a physical (i.e., sexual) or quasi-physical way, did not fit well either with what revelation teaches about the Incarnation of the Word. The reason for this discrepancy is not to be found in some kind of taboo, and even less in any alleged disregard for corporeality. In the context of an authentically Christian understanding, the luminous glory of the shadow of the Holy Spirit that has fallen on Mary, precisely because of its transcendent character, goes far beyond the categorical plane that belongs to second causalities, including of course that of sexuality.¹⁸ God is truly the Father of Jesus Christ, but in a sense whose depth infinitely exceeds—and ultimately founds—the reality of biological fatherhood.¹⁹ Seen thus, the conception of Jesus Christ overflows all the Old and New Testament prophetic figures, including that of his cousin, John the Baptist, in whose miraculous generation the power of God certainly intervened, but with the assistance of a man and an elderly and sterile woman (see Luke 1:5–25). The only begotten Son, by contrast, becomes flesh with God as the immediate, direct, and transcendent cause and Mary as the ever-virgin mother.

This is true, as we said, for ancient images that depict gods copulating with women, but also for those who, in our day, are tempted to introduce the idea of a divinity that manipulates certain second causes—sperm, pronucleus, chromosome endowment, or whatever—to bring about the fertilization of Mary and Incarnation of the Word.²⁰ Faced with such conjectures, it must be emphasized that God truly acts in his creation, while transcending the type of causality that belongs to his creatures. And, for this reason, the paternity of God seen in the person of his eternal Son definitely exceeds not only the limit of biological generation, but also that of the causal efficiency proper to human intervention. In short, God has not sexually begotten Jesus Christ,

Enchiridion Symbolorum: A Compendium of Creeds, Definitions and Declarations of the Catholic Church, ed. Peter Huenermann, 43rd ed. [DH], English ed. Robert Fastiggi and Anne Nash Englund (San Francisco: Ignatius Press, 2012), nos. 10–64. Here we can also mention the testimony of Augustine, who points out that we do not have to look for examples in nature to explain the virginity of Mary (Epistle 162, no. 7).

¹⁸ As Gerhard Müller points out: “Sexuality is an expression of created causality. But Yahweh is not a creature. He acts on creatures, but not in a creaturely way” (*Dogmática: teoría y práctica de la teología* [Barcelona: Herder, 2009], 320; trans. mine); see also Müller, *Nato della Vergine Maria: Interpretazione teologica* [Brescia: Morcelliana, 1994]).

¹⁹ See Miguel Ponce, “María en la reflexión teológica,” in *Diccionario de teología*, ed. César Izquierdo et al., 3rd ed. (Pamplona: EUNSA, 2014), 628–29.

²⁰ See, for example, Roger J. Berry, “The Virgin Birth of Christ,” *Science & Christian Belief* 8 (1997): 101–10.

but neither has he operated a kind of *assisted fertilization*. Ultimately, these hypotheses perpetuate an error similar to that described of theogamy, namely to reduce divine causality to the plane of creaturely causality.

A variant of this categorical error is embodied in the hypothesis that appeals to parthenogenesis to show that Jesus Christ was conceived in the womb of Mary without male participation.²¹ Here, the oocyte of the Virgin would have self-fertilized. To explain the obvious sex difference between mother and child, those who introduce this idea are forced to add a number of assumptions. For example, they hypothesize that Mary would have been a carrier of the “histocompatibility factor Y,” which could explain why Jesus—genetically female—had the phenotypically masculine appearance assigned him by the Scriptures and Tradition.²² From this perspective, the miracle of the Incarnation of Jesus would have resided less in the fact of his conception than in being born male. Some critics have objected that parthenogenesis is a form of asexual reproduction that does not occur naturally in mammals.²³ This being an unnatural way of conceiving in humans, it would follow it could not have been so in the case of Jesus, who is truly man. Others—perhaps better focused—emphasize the incompatibility of this hypothesis with Christological dogma. Certainly, the idea that Jesus has a masculine appearance but carries a chromosomal abnormality (from which, according to some evidence, a testicular disorder would follow) seems to put force into the article of faith that declares the Savior perfect God and perfect man.²⁴

While it goes without saying how bizarre this conjecture can be in the light of the Christian faith, it seems, however, that truly significant in this whole discussion is not so much the hypothesis of parthenogenesis itself as the objections raised against it. We believe a fundamental blurring is operating here. First, that mammals, including man, do not usually reproduce by parthenogenesis is not an outright objection to their postulation as God’s chosen path to his Incarnation. As we specify later, the Church teaches that Christ is truly man, but also that the fullness of divinity resides in him,

²¹ See Edward Kessel, “A Proposed Biological Interpretation of the Virgin Birth,” *Journal of the American Scientific Affiliation* 35 (1983): 129–36.

²² The prophet Jeremiah has been cited to give biblical support to the model (see Jer 31:22). According to some, the passage in question states: “For Yahweh has presented a new thing on earth: a woman who must become a man.” In the translations we have in view, however, it can be read: “For Yahweh is creating something new on earth: the Woman sets out to find her Husband again.”

²³ See Giuseppe Benagiano and Bruno Dallapiccola, “Can Modern Biology Interpret the Mystery of the Birth of Christ?,” *The Journal of Maternal-Fetal & Neonatal Medicine* 28, no. 2 (2015): 240–44.

²⁴ See note 57 below.

something that cannot be said of any other human being. He is unique and exceptional from the moment of conception, which does not harm his humanity. As Aquinas shows, Jesus Christ being truly a man does not require his conception to be the same as that of other men; it is enough that the result of that conception is an individual possessing human nature, which certainly happens with Jesus.²⁵ Second, and as noted previously, the Christian proclaims his faith in an Almighty Father. Had the Father wanted to resort to parthenogenesis to perform the miracle of the Incarnation, he certainly could have done so. In this sense, objections pointing to the incompatibility of parthenogenesis with faith in Jesus Christ as perfect man attempt to safeguard a true point of doctrine without considering that God's action is not constrained by any biological process. In principle, because of his infinite active power, nothing prevents God causing a parthenogenetic process in a healthy woman—Mary—resulting in a healthy male embryo, Jesus.²⁶

With the above argument, we do not intend to support the idea of a parthenogenetic Incarnation, but to highlight, on the other hand, the inadequacy of the arguments used to reject it. The underlying problem is not the normality or otherwise of parthenogenesis as a biological reproductive process, but rather whether it respects a crucial aspect of the Christian faith, reiterated over the centuries: the conception of the human nature of Jesus Christ is the work of the Holy Spirit.²⁷ Now, the main characteristic of parthenogenesis, whether natural or artificially induced, is that the parent is the sole, or at least principal, cause of its offspring. In other words, if God had chosen this process for the Incarnation, the human nature of Jesus would have had as its immediate and main cause only the Virgin Mary. In such a setting, it can still be said that God had causally concurred in the process—facilitating it or preventing certain undesired results—but with a type of intervention approaching, at times, that of a technologist manipulating organisms in a lab. Such an image is undoubtedly inadmissible within Catholic orthodoxy.

If these considerations prevent us from reducing the causal role of God in the Incarnation to that of a mere creature, it is also possible to err in the

²⁵ For Aquinas, see *ST* III, q. 33, a. 4, ad 1 and *In II sent.*, d. 3, q. 2, a. 2 (see note 98 below).

²⁶ To be fair, Benagiano and Dallapiccola, in the article cited above, do not entirely rule out the possibility of a miraculous intervention employing the parthenogenetic process, but seem to argue this would close the way to a fruitful epistemological interaction between theology and biology. As we argue at the end of this article, we sustain a different position on this point.

²⁷ See notes 53–55 below.

opposite direction, something perhaps more frequent today. Without a rigorous assessment of the transcendent character of divine action in the Incarnation in its ontological status, one can go to the extreme of suppressing the effective reality of divine causality. Thus, the literature contains many testimonies of authors who empty the mystery of the Incarnation of Jesus and the virginal conception of Mary of any real foundation: These stories or myths can be regarded sacred insofar as they deal with primordial and fundamental realities, which provide support for a rituality and ethical normativity.²⁸ For example, in an article expressly intended to address the question of the birth of Jesus Christ, Ann Milliken Pederson and her colleagues state that what is really important is not the *how* but the *why* of the Incarnation, which they understand as a “redemptive narrative” or an expression of “the mystery and grace of God’s incarnation not only in human nature, but also in all of nature.”²⁹

For our part, we agree with these authors that the purpose of the Incarnation, as revealed to us, is much more important for the life of the believer than any rational inquiry about the way such a miracle could have happened. However, it does not follow that this last exercise is the idle result of a mere *curiositas*. As Aquinas teaches, the end has an indisputable ontological primacy over the other causalities, but it is still true that, without the exercise of those causalities, the end simply would not come to be.³⁰ An illustration of this truth is provided by Pederson and colleagues themselves when, despite statements to the contrary, they cannot but refer to the event that made possible the union of the human and the divine in the person of Jesus. Their words are quite expressive in this regard: “For theological and consequently, biological reasons, we believe that the birth of Jesus must be

²⁸ Just as an example, see Ernest Renan, *Vie de Jésus* (Paris: Calmann-Lévy, 1924); Alfred Loisy, *L’Évangile et l’Église* (Paris: Picard, 1902); *Histoire et mythe à propos de Jésus-Christ* (Paris: Librairie Emile Nourry, 1938); Martin Dibelius, *Jesus* (Philadelphia: Westminster, 1949); George A. Wells, *The Jesus Myth* (Chicago: Open Court, 1998).

²⁹ See Ann Milliken Pederson et al., “Fully Human and Fully Divine: The Birth of Christ and the Role of Mary,” *Religions* 6 (2015): 172–81.

³⁰ Following the Aristotelian antecedent, Aquinas teaches that the efficient is the cause of the thing that is the end, but it does not cause the end to be the end; conversely, the final cause does not give the efficient its efficiency, but it does give it its status as cause. Therefore, it can be said that the end is *causa causarum*, i.e., the cause of the causality of the other causes, including not only the efficient, but also the formal and material. (*De princ.*, ch. 4).

fully human—Jesus must have had a human mother and a human father. Otherwise, Jesus is not fully human.”³¹

These authors argue that a perspective focused on how the Incarnation could take place brings dissent and disunity, while one focused on its redemptive purpose produces the opposite effects.³² But, as we see, their reflection on the intention of the Incarnation already implies a position about the way it should be understood, and of course, the kind of agents intervening in it. We do not see how this position could provoke that longed-for union to which the authors appeal, not even on the margins of Protestantism. Later, we address the substantive argument these authors raise about the need for a biological father for Jesus; for now, we must insist that the affirmation of the transcendence of divine action in no way diminishes the effectiveness of its causation.³³ God truly acts in the world and, of course, in the Incarnation of the Word. The most obvious indication of this is the result of that action—not a narrative, myth, or exhortation, but a person of flesh and blood, named Jesus, who lived and walked in Palestine, and in whom, according to Scripture, “the whole fulness of deity dwells bodily” (Col 2:9).³⁴

The Participation of the Virgin Mary in the Conception of Jesus Christ

Diametrically opposed to the above are authors who, based on both contemporary biological knowledge and theological reasons, tend to minimize any causality Mary may have exerted in the conception of Jesus. As is known, a tradition that dates back to Aristotle in the West—and which, according

³¹ Pederson et al., “Fully Human and Fully Divine,” 176.

³² See Pederson et al., “Fully Human and Fully Divine,” 175.

³³ See Joseph Ratzinger, *Jesus of Nazareth: The Infancy Narratives* (London: Bloomsbury, 2012), 56–57: “Karl Barth pointed out that there are two moments in the story of Jesus when God intervenes directly in the material world: the virgin birth and the resurrection from the tomb, in which Jesus did not remain, nor see corruption. These two moments are a scandal to the modern spirit. God is ‘allowed’ to act in ideas and thoughts, in the spiritual domain—but not in the material. That is shocking. He does not belong there. But that is precisely the point: God is God and he does not operate merely on the level of ideas. In that sense, what is at stake in both of these moments is God’s very godhead. The question that they raise is: does matter also belong to him? . . . If God does not also have power over matter, then he simply is not God. But he does have this power, and through the conception and resurrection of Jesus Christ he has ushered in a new creation.”

³⁴ Thomas Joseph White lucidly shows the doctrine of the hypostatic union to be not mere theological abstraction, but on the contrary, the key to a correct understanding of the historicity of Jesus of Nazareth (*The Incarnate Lord: A Thomistic Study in Christology* [Washington, DC: Catholic University of America Press, 2015], 116–18).

to Joseph Needham, has an even older oriental background³⁵—held that the seed (*spérma; semen*) that originates the human embryo derives from the male. The man, therefore, would exercise the role of formal and active principle of the generative act. The woman, for her part, would provide the menstrual blood (which she stops losing during pregnancy), acting as the material and passive principle of the generation.³⁶ Although the alternative hypothesis of the two seeds (one derived from the male, the other from the female) boasted distinguished representatives in the Hippocratic school of ancient Greece, and despite Galen's decisive support in the second century AD, the theses classically associated with the Aristotelian theory of human generation—including not only the idea that the male is the formal principle of generation, but also the aforementioned theory of delayed hominization³⁷—remained present in biological, philosophical, and theological discussions related to human ontogenesis until the late seventeenth century.³⁸

The Aristotelian influence is strongly felt in the texts that Aquinas, the great Scholastic theologian, dedicates to the question of human embryological development. It is not our intention to offer a detailed account of the many conceptual and historical elements involved in this problem, but suffices to underline that the passive role Aquinas assigns to the Virgin in Christ's conception—which contrasts sharply with the active role assigned her by other thirteenth-century masters of theology³⁹—is undoubtedly influenced by the embryological scheme he receives from the Stagirite. Nonetheless, we think there is room here for a clarification that warns us against some distortions and caricatures that circulate today about the Thomistic understanding of human ontogenesis.⁴⁰ A careful review of

³⁵ See Needham, *History of Embryology*, 18–27.

³⁶ See Aristotle, *De generatione animalium* 1.2.716a5; 1.19.727b31; 1.20.729a9–12; 1.21.729b18–21; 2.4.738b20; 6.1.765b10. See also Needham, *History of Embryology*, 42–43.

³⁷ See note 11 above.

³⁸ Needham writes, in this regard: “If I have devoted such ample space to account of Aristotle's contributions to embryology, it is, firstly, because they are actually greater in number than those of any other individual embryologist, and secondly, because they had so profound an influence upon the following twenty centuries. Embryology from the third century B.C. to the seventeenth century A.D. is meaningless unless it is studied in the light of Aristotle” (*History of Embryology*, 54).

³⁹ See Alexander of Hales, *Summa universae theologiae* III, q. 8, m. 1, qa. incidens 3 (*Universae Theologiae Summa, Pars Tertia* [Venice: apud Franciscum Franciscum, 1576], 25–26); Bonaventure, *In III sent.*, d. 4, a. 3, qq. 1–2 (*Opera omnia*, vol. 3 [Quaracchi: Ex Typographia Collegii S. Bonaventurae, 1882], 110–14); Albert the Great, *In III sent.*, d. 3, a. 11 (*Opera omnia*, ed. Adolphe Borgnet, vol. 28 [Paris, 1894], 53–54).

⁴⁰ We refer to the decontextualized and distorted use that some make of the Thomist

Aquinas's doctrine regarding the Incarnation shows that his reception of the Aristotelian theory of human generation was in fact selective and critical, as seen in his explicit dismissal of the delayed hominization model in the context of Christology, and in part also in the subtle correction of Aristotelian embryology Aquinas introduces in relation to the Virgin Mary's participation in the conception of Jesus Christ. Undoubtedly, Thomas affirms that she disposes of a matter that the active *virtus* of the Holy Spirit informs to originate the human nature of Christ; that matter is not the menstrual blood itself (which, according to Aquinas is already contaminated by a concupiscence that had no place in the mother of Jesus Christ), but a blood actively purified by the organicity of the Virgin herself.⁴¹ As we aim to show in the next section, modern biological data offers room to underline further the active role of the Mother of God in the generation of her Son. But it is important to maintain, with Aquinas, the fundamental theological point: In the Incarnation, it is God who has the first initiative, and it is He who has an active role *simpliciter*.

It also seems that a theological agenda inspires a much more extreme theory regarding the Incarnation and Mary's role in it—the Christological doctrine of the Anabaptists in the sixteenth century. Ignoring the guidelines of the Council of Chalcedon, Menno Simons reissues the ancient monophysitism of Eutiques under his own categories. Jesus Christ, in this framework, possesses only a divine nature; Mary offers her womb for the development of the divine conceptus, but her nature is not assumed by the person of the Word.⁴² Joyce Irwin has shown convincingly that, while Simons resorts to the Aristotelian theory of biological generation to support his Christological interpretation, the role of the former in the latter is merely instrumental.⁴³ The authentic conceptual horizon in which Simons's position is inscribed is not that of the controversy between Aristotelians and Galenics regarding human generation (which indeed raged in Europe in the

doctrine to attack the Church's teaching on abortion, for example. As a good number of scholars agree, and as we underline for the question dealt with here, while Aquinas was indeed strongly influenced by Aristotle's biology, it seems more than probable that, had he been in possession of the knowledge we have today, his position regarding the status of the embryo would have varied dramatically. For relevant bibliography, see note 13.

⁴¹ See *ST* III, q. 31, a. 5, ad 3. See also *In III sent.*, d. 3, q. 5, a. 1.

⁴² See Menno Simons, "The Incarnation of Our Lord," in *The Complete Writings of Menno Simons*, trans. Leonard Verduin (Scottsdale, PA: Herald, 1956), 792–813.

⁴³ See Joyce Irwin, "Embryology and the Incarnation: A Sixteenth-Century Debate," *The Sixteenth Century Journal* 9, no. 3 (1978): 93–104.

sixteenth century),⁴⁴ but rather the discussions about the sinless conception of Jesus Christ, which in those years faced Anabaptists and other Protestant denominations. Undoubtedly, the faith in the Immaculate Conception of Mary, not yet then solemnly proclaimed by the Catholic Church despite its long history in Catholicism—was not popular in territories where the weight of the Reformation was felt. So, to ensure that Christ was not touched by Adam's sin, the option remained—in fact, explicitly defended by Melchior Hoffman—to resort to divine omnipotence, arguing that God exempts his Son from that inheritance associated with human nature. But in the eyes of some, like Simons himself, that alternative seemed suspiciously close to Catholicism. After all, both required an exception to sin, differing only on the generational level—that of the Mother or of the Son—in which such an exception had been worked by God.⁴⁵

However, the relevant point for Simons and his followers is that Mary's role in the Incarnation is little more than a biological incubator. The Virgin receives in her womb the fruit of the work of the Holy Spirit, but only to offer him a favorable environment for his development, since she contributes nothing of her own to the human nature of Christ. Also today—albeit in a different theological and cultural framework—there are some inclined to suggest this kind of solution. For example, Joseph Thomas has conjectured that the Holy Spirit may have intervened in creating a totipotent cell, with a complete human genome ready to replicate. The author admits (seemingly without seeing any drawbacks) that, in this scenario, Mary would be the *birth* but not the *biological* mother of Christ.⁴⁶ But the truth is that hypotheses like those of Simons and Thomas end up posing more difficulties than they supposedly solve. One of the most obvious relates to the possibility of reconciling these interpretations with the messianic prophecies that speak of a mediator (king, priest, prophet) who comes from the people of Israel.⁴⁷ Indeed, if Jesus did not have any blood relationship with Mary—nor, therefore, with any human—it is not at all obvious how he could be an authentic

⁴⁴ See Roberto Lo Presti, "Scientific Evolution and Embryology: Rejection or Transformation of Antiquity? A Comparison between the Procreation Teachings of Cesare Cremonini, William Harvey and René Descartes," *Sudhoffs Archiv* 98, no. 1 (2014): 1–27.

⁴⁵ See Irwin, "Embryology and the Incarnation," 94–95.

⁴⁶ See Joseph Thomas, "If Not Parthenogenesis Why Not 'In Vivo Embryogenesis' with Mary as a Birth Mother," *The Journal of Maternal-Fetal & Neonatal Medicine* 28, no. 15 (2015): 1850.

⁴⁷ See, for example: Gen 12:7; Deut 18:15; 2 Sam 7:12; Gen 3: 15; Isa 40–55; Jer 33:17–18. For the traditional teaching of the Church, see Pope Pius XII's *Divino Afflante Spiritu* (DH, nos. 3825–31).

descendant of Abraham, Moses, and David, and thus fulfill the Old Testament prophecies. On the other hand, the idea of a Virgin who only harbors Jesus seems to conflict with the condition of the Mother of God that the Tradition and the magisterium explicitly attribute to Mary; rather, it could be said, as Nestorius affirmed (although for reasons different from those of Simons), that she is Θεοδόχος, the one who receives God.⁴⁸

A Plausible Interpretation of the Conception of Jesus Christ

Without excluding other possible approaches, we adopt here as our theological framework the doctrine received, enriched, and transmitted within the Catholic Church, as formulated in the *Catechism of the Catholic Church*, the councils, encyclical letters, and other texts of canonical and magisterial rank. This is not intended to restrict the speculative scope of the intelligence of faith to the mere repetition of these truths; however, an effort to deepen the understanding of the mystery of the Incarnation, carried out within the framework of the Catholic faith, must respect at least certain points of doctrine, outlined in general below. This is followed by a brief recapitulation of the events described by current developmental biology and embryology. The third part outlines a potential interpretation of the Incarnation that remains sensitive to these biological facts while respectful of Catholic doctrine.

The Incarnation of the Word in the Light of the Catholic Faith

The *Catechism* places the mystery of the Holy Trinity at the center of Christian faith and life, the source and root of all other mysteries, including, of course, the Incarnation.⁴⁹ Indeed, the mystery of the “only Son of the Father” (John 1:14) makes sense only in the context of the Trinitarian faith, which confesses one God in three persons, Father, Son, and Holy Spirit, who differ strongly because of their reciprocal relationships, while being each identical to the fullness of the one and indivisible divine nature.⁵⁰ But the reverse is

⁴⁸ See Karl R. Hagenbach, *Compendium of the History of the Doctrines*, vol. 1, trans. Carl M. Buch (Edinburgh: T&T Clark, 1850), 297–98. It is telling that Joseph Thomas’s colleagues clearly perceive the obvious difficulty his suggestion implies; see Giuseppe Benagiano and Bruno Dallapiccola, “Authors’ Response to J Thomas: ‘If Not Parthenogenesis Why Not “In Vivo Embryogenesis” with Mary as a Birth Mother,’” *The Journal of Maternal-Fetal & Neonatal Medicine* 28, no. 16 (2015): 1917.

⁴⁹ See CCC §§234, 249.

⁵⁰ See *Compendio del Catecismo de la Iglesia Católica* (San Bernardo, Chile: Obispado San Bernardo, 2005), 34.

also true, because, if there is no lack of evidence of the Trinity in creation and in the Old Testament, this is ultimately “a mystery that is inaccessible to reason alone or even to Israel’s faith before the Incarnation of God’s Son and the sending of the Holy Spirit.”⁵¹ It is Jesus Christ who reveals the paternity of God, not only as creator of everything that exists but also, and above all, as eternally begetting the Word, “the reflection of God’s glory and bears the impress of God’s own being” (Heb 1:3). Already by the fourth century, the Nicene-Constantinopolitan Symbol recognizes and confesses Jesus Christ as “the Only Begotten Son of God, born of the Father before all ages. God from God, Light from Light, true God from true God, begotten, not made, consubstantial with the Father; through him all things were made.”⁵²

This same profession of faith adds that, for our salvation, and through the work of the Holy Spirit, the Word “was incarnate of the Virgin Mary, and became man.”⁵³ Some centuries beforehand, the Symbol of the Apostles proclaimed that the Lord “was conceived by the Holy Spirit” and “born of the Virgin Mary.”⁵⁴ These early texts testify that the Church has, from its origins, confessed that Mary, by virtue of a special choice of the Father, freely assented in “the obedience of faith” (Rom 1:5) to conceive in her womb “the Son of the Most High” (Luke 1:32) *absque semine concepisse ex Spiritu Sancto*, as stated in the classic formula of the Lateran Council of 649.⁵⁵ In support of this last point, we also quote the words that, according to Matthew, the angel of the Lord transmits to Joseph in dreams: “Do not be afraid to take Mary home as your wife, because she has conceived what is in her by the Holy Spirit” (Matt 1:20). Joseph obeys, and without his having known her, his wife gives birth to a son, “and he named him Jesus” (1:25).

The virginal conception of Jesus of Nazareth cannot be reduced to a myth without seriously damaging the integrity of the Christian faith in the Incarnation. Jesus is the eternal Son of the Father according to divine nature, but also the true Son of Mary according to human nature. Of these filiations, however, the first has the primacy that properly corresponds to the Lord for two reasons: Firstly, the conception of his human nature is the work of the Holy Spirit, as shown; secondly, as the Council of Chalcedon teaches that, although there are two natures in Jesus, they remain united,

⁵¹ CCC §237.

⁵² *Nicene-Constantinopolitan Creed*, in DH no. 150.

⁵³ *Nicene-Constantinopolitan Creed*, in DH no. 150.

⁵⁴ *Old Roman Symbol*, in DH, no. 30. For other similar but older formulas, see DH nos. 10–29.

⁵⁵ Lateran Council of 649, in DH no. 503.

without confusion, in the only person of the Word.⁵⁶ This conclusion rests on the Christological truth of the hypostatic union that the aforementioned Council expresses in a well-known formula: “We unanimously teach and confess one and the same Son, our Lord Jesus Christ: the same perfect in divinity and perfect in humanity, the same truly God and truly man, composed of rational soul and body; consubstantial with the Father as to his divinity and consubstantial with us as to his humanity.”⁵⁷ Everything in the humanity of Jesus—complements the *Catechism*—must be attributed to his divine person as its proper subject, who works through the human nature he has assumed, including “not only His miracles but also His suffering and even His death.”⁵⁸

As a divine person, Jesus Christ is always and above all the only begotten Son of the Father. But, on the other hand, and as the third ecumenical council meeting in Ephesus teaches, the Virgin Mary is truly called Θεοτόκος, “not that the nature of the Word or His divinity received the beginning of its existence from the holy Virgin, but that, since the holy body, animated by a rational soul, which the Word of God united to himself according to the hypostasis, was born from her, the Word is said to be born according to the flesh.”⁵⁹ Herein is already contained the truth—which the Church expressly teaches—according to which the Son of God has assumed human nature from the moment of conception.⁶⁰ Note that this is not an embryological subtlety, but a Christological thesis closely linked to the doctrine of the hypostatic union. Christ’s human nature certainly cannot be assumed except from his conception, because it is the person of the Son that gives him the ontological support necessary for effective existence. On the contrary, admitting that this nature could have developed before the Incarnation itself presupposes some hypostasis of its own, different from that of the Word,

⁵⁶ See Council of Chalcedon, in DH no. 302; CCC §467.

⁵⁷ Council of Chalcedon, in DH no. 301.

⁵⁸ CCC §468. See also Council of Ephesus, in DH no. 255. For an intelligent analysis of this doctrine in the thought of Aquinas, see Dominic Legge, *The Trinitarian Christology of St. Thomas Aquinas* (Oxford: Oxford University Press, 2017), 103–28.

⁵⁹ Council of Ephesus, in DH no. 251. It is interesting, in this regard, that the Greek word Θεοτόκος is frequently translated into Latin as *Deipara* or *Dei genetrix*. The word *genetrix* perhaps has a broader meaning than the original Greek term, since it alludes not only to the very act of giving birth, but to that of mother, begetter, producer. See, for example, Giuseppe Alberigo, *Conciliorum Oecumenicorum Decreta*, ed. Centro di Documentazione Istituto per le Scienze Religiose Bologna (Barcelona: Herder, 1962), 46, 48, 62, and throughout.

⁶⁰ See CCC §466: “Christ’s humanity has no other subject than the divine person of the Son of God, who assumed it and made it his own, from his conception.” For Aquinas’s thought on this point, see note 14 above.

a conjecture close to the Nestorian heresy and expressly discarded by the Council of Ephesus.⁶¹

It is significant that, in the event of the Annunciation and in response to the Virgin's question about how she could be a mother, "since I have no knowledge of man" (Luke 1: 34), the angel Gabriel alludes to the situation of Elizabeth, her cousin, also expecting a child at an advanced age, "for nothing is impossible to God" (Luke 1:37). His limitless power extends to all creation, which he has brought into being *ex nihilo*, but in a particularly diaphanous way, as the angel warns, in this unprecedented fact of the Incarnation and its culmination in the crucifixion, "to the Jews an obstacle they cannot get over, to the gentiles foolishness" (1 Cor 1:23). The admission of this point, as shown below, plays a fundamental role regarding that methodological strategy which, in our opinion, should underpin an approach to the problem of the biological dimension inherent in the Incarnation of the Word. God, as Aquinas teaches, can do everything that can be done, and therefore, no limitation or necessity constrains his actions.⁶² But neither should one fall into the opposite error of conceiving God as an arbitrary monarch.⁶³ As the

⁶¹ See the Council of Ephesus: "For he was not first begotten of the holy virgin, a man like us, and then the Word descended upon him; but from the very womb of his mother he was so united and then underwent begetting according to the flesh, making his own the begetting of his own flesh" (DH no. 251).

⁶² For some passages in which Aquinas expressly quotes the Luke 1:37, see *De pot.*, q. 1, a. 3, sc; *SCG II*, ch. 22, no. 7; *ST I*, q. 25, a. 3, sc. According to Aquinas, the inherent limits of every being cannot be ascribed to the power of God, because its essence is infinite; neither is it affected by the restrictions that constrain nature, since its power is the origin and exceeds all nature; finally, it is not legitimate to confine the divine power to a given, factual order, because that order depends on the will of God. Besides the passages cited above, see *De pot.*, q. 1, a. 2, corp.; *SCG II*, chs. 22, 23, 26–27; *In I sent.*, d. 42, q. 2, a. 2; d. 43, q. 1, aa. 1–2; q. 2, aa. 1, 2; d. 44, aa. 1–4; *ST I*, q. 25, aa. 2, 5–6.

⁶³ This image has its roots in a conceptual shift that took place between the thirteenth and fourteenth centuries, strongly influenced by the Condemnations of Paris of 1277 and the speculations of the canonists at the end of the thirteenth century. The bibliography available on this issue is vast. For some relevant studies, see Francis Oakley, *Omnipotence, Covenant, and Order: An Excursion in the History of Ideas from Abelard to Leibniz* (Ithaca, NY: Cornell University Press, 1984); Eugenio Randi, "La vergine e il papa: Potentia Dei absoluta e plenitudo potestatis papale nel XIV secolo," *History of Political Thought* 5, no. 3 (1984): 425–45; William Courtenay, "The Dialectic of Omnipotence in the High and Late Middle Ages," in *Divine Omniscience and Omnipotence in Medieval Philosophy*, ed. Tamar Rudavsky (Dordrecht: Kluwer, 1985), 243–69; Gijsbert van den Brink, *Almighty God: A Study of the Doctrine of Divine Omnipotence* (Kampen: Kok Pharos, 1993); Massimiliano Traversino Di Cristo, "The Classic Age of the Distinction between God's Absolute and Ordered Power: In, Around, and After the Pontificate of John XXII (1316–1334)," *Franciscan Studies* 76, no. 1 (2018): 207–66.

symbols of the Apostles' Creed and the Nicene-Constantinopolitan Creed confess, God is almighty but a Father Almighty.⁶⁴

What Biology Tells Us about Human Ontogeny

Speculation about human conception, development, and gestation has a long tradition, the many details of which lie beyond the scope of this paper.⁶⁵ It suffices to point out that, especially from the eighteenth century, a new approach to organic life has triggered a rapid advance in morphology, physiology, and taxonomy. Of course, the scientific approach to the early stages of human development is not exempt from this progress. With the 1759 publication of Caspar Friedrich Wolff's thesis, *Theoria generationis*, the epigenetic embryology of William Harvey (where adult structures are not preformed but emerge throughout development) took on a new force, becoming the dominant conceptual framework in the field to this day. The next great step lies in the intersection of embryology with the new genetic discipline already claiming its place on the scientific scene.⁶⁶ From this synthesis emerges a narrative whose general and most significant outlines—at least with regard to the subject of concern here—can be summarized as follows.

The sperm that comes into contact with glycoproteins in the zona pellucida surrounding the plasma membrane of the oocyte undergoes the so-called "acrosome reaction." Enzymes released allow penetration of the zona pellucida and membrane of the female gamete.⁶⁷ With this last event

⁶⁴ See *Old Roman Symbol*, in DH no. 30; *Nicene-Constantinopolitan Creed*, in DH no. 150. For a commentary, see Rémi Brague, *The Kingdom of Man*, trans. Paul Seaton (Notre Dame, IN: Notre Dame Press, 2018), 130.

⁶⁵ Besides the work of Needham, quoted above, see Frederick B. Churchill, "The History of Embryology as Intellectual History," *Journal of the History of Biology* 1, no. 3 (1970): 155–56; Richard M. Burian and Scott F. Gilbert, "Selected bibliography on History of Embryology and Development," *History and Philosophy of the Life Sciences* 22, no. 3 (2000): 325–33.

⁶⁶ See Pedro Laín Entralgo, *Historia de la medicina* (Barcelona: Salvat, 1978), 434–38. It should not be overlooked that the historical and conceptual link between genetics and embryology was not without difficulties and disagreements. See in this regard Garland E. Allen, "Heredity under an Embryological Paradigm: The Case of Genetics and Embryology," *The Biological Bulletin* 168, no. 5 (1985): 107–21.

⁶⁷ For an overview, see Noritaka Hirohashi and Ryuzo Yanagimachi, "Sperm Acrosome Reaction: Its Site and Role in Fertilization," *Biology of Reproduction* 99, no. 1 (2018): 127–33; Hanisha H. Bhakta, Fares H. Refai, and Matteo A. Avella, "The Molecular Mechanisms Mediating Mammalian Fertilization," *Development* 146, no. 15 (2019): 1–13; Karen K. Siu, Vitor Hugo B. Serrão, Ahmed Ziyat, et al., "The Cell Biology of Fertilization: Gamete Attachment and Fusion," *Journal of Cell Biology* 220, no. 10 (2021): 1–15.

begins the *activation* of the oocyte, which entails a coordinated sequence of phenomena including the hyperpolarization of its membrane, increases in intracellular calcium, exocytosis of the cortical granules (which in the case of the human, modify the zona pellucida to prevent the penetration of new spermatozoa), and termination of the second meiotic division with elimination of the second polar corpuscle.⁶⁸ At the same time, the sperm nucleus is incorporated into the cytoplasm of the oocyte in minutes, its envelope disaggregated, and the chromatin decondensed by contact with proteins and factors present in the cytoplasm of the oocyte. The release of the second polar corpuscle is accompanied by a recondensation of the sperm chromatin, which is enveloped in its respective pronucleus. On the opposite periphery, the female pronucleus becomes less dense and small. This is followed by the synthesis and duplication of the genetic material, the configuration of the mitotic spindle, the approach and disintegration of the pronuclei membranes, and the alignment of the chromosomes.⁶⁹

The zygote thus formed, unlike gametes, is already a diploid cell with a karyotype and genetic profile typical of its species.⁷⁰ Research in recent decades has shown that this zygote experiences accelerated metabolic activation, with early transcriptional activity; besides, the characteristic three-dimensional cytoplasmic arrangement of its various parts and structures, as well as other biochemical changes, constitutes a reservoir of biological information that, since not strictly dependent on its genes, is called *epigenetic*.⁷¹ All the cells, tissues, and organs that, a few months later, can be identified in a newborn, and years later in any of us, derive from this zygote through a fundamentally continuous process of development.

Approximately twenty-six hours after fertilization, the first cleavage occurs, beginning the segmentation process.⁷² This first division results in an embryo composed of two cells (blastomeres) whose phenotype and

⁶⁸ See Binyam Mogessie, Kathleen Scheffler, and Melina Schuh, "Assembly and Positioning of the Oocyte Meiotic Spindle," *Annual Review of Cell and Developmental Biology* 34 (2018): 381–403.

⁶⁹ See Thomas W. Sadler, *Langman's Medical Embryology*, 14th ed. (Philadelphia: Kluwer, 2019), 41–42.

⁷⁰ See Alejandro Serani, "El estatuto antropológico del embrión humano," in *El viviente humano* (Pamplona: EUNSA, 2000), 77–92; Jason Eberl, "Metaphysical and Moral Status of Cryopreserved Embryos," *The Linacre Quarterly* 79, no. 3 (2012): 304–15.

⁷¹ See Xudong Fu, Chunxia Zhang, and Yi Zhang, "Epigenetic Regulation of Mouse Preimplantation Embryo Development," *Current Opinion in Genetics & Development* 64 (2020): 13–20.

⁷² See Fernando J. Prados, Sophie Debrock, Josephine G. Lemmen, et al., "The Cleavage Stage Embryo," *Human Reproduction* 27, no. S1 (2012): 53.

final destination will be different. Thus, by the fifth day, the human embryo already has two differentiated tissues. Inside, there is a set of cells known as the *inner cell mass* (derived from the blastomere that carries the entry point of the sperm), from which will originate human body tissues. Surrounding this mass, it is possible to identify a layer of polarized cells (originating from the other blastomere), collectively referred to as a trophoblast.⁷³ On the sixth day, implantation of the embryo begins, with erosion of the endometrial tissue by the trophoblastic cells, triggering a complex process that lasts until the third or fourth month of pregnancy, the tangible result of which is the placenta. This organ, derived from the embryo and the mother, performs important nutritional, respiratory, excretory, endocrine, immunological, and protective functions.⁷⁴ During the second week of development, the cells that make up the inner cell mass additionally differentiate into two types, the epiblast and hypoblast, together comprising the bilaminar disc.⁷⁵ The germ layers of the ectoderm and endoderm then emerge from this disc, and during gastrulation (third week of development), an intermediate layer forms, the mesoderm, at which time, the embryo is already said to have a trilaminar arrangement.⁷⁶ During the embryogenesis phase (until the eighth week of development in the case of the human species), the tissues making up the body differentiate from these three germ layers.⁷⁷ In the third week of this phase in particular, the first identifiable anatomical structures of the

⁷³ See Subhadra Devi, *Inderbir Singh's Human Embryology* (London: Health Sciences Publisher, 2017), 53; Julie Firmin, Jean-Léon Maître, "Morphogenesis of the Human Preimplantation Embryo: Bringing Mechanics to the Clinics," *Seminars in Cell & Developmental Biology* 120 (2021): 22–31.

⁷⁴ See Emin Maltepe and Susan J. Fisher, "Placenta: the Forgotten Organ," *Annual Review of Cell and Developmental Biology* 31 (2015): 523–52; Martin Knöfler, Sandra Haider, Leila Saleh, et al., "Human Placenta and Trophoblast Development: Key Molecular Mechanisms and Model Systems," *Cellular and Molecular Life Sciences* 76, no. 18 (2019): 3479–96.

⁷⁵ See Anna L. Boss, Lawrence W. Chamley, and Joanna L. James, "Placental Formation in Early Pregnancy: How Is the Centre of the Placenta Made?" *Human Reproduction Update* 24, no. 6 (2018): 750–60.

⁷⁶ See William Hamilton, J. D. Boyd, and Harland Mossman, *Human Embryology—Prenatal Development of Form and Function*, 4th ed. (Cambridge, UK: Heffer, 1972); Tomonori Nakamura, Ikuhiro Okamoto, Kotaro Sasaki, et al., "A Developmental Coordinate of Pluripotency among Mice, Monkeys and Humans," *Nature* 537 (2016): 57–62.

⁷⁷ See Cathy Vaillancourt and Julie Lafond, "Human Embryogenesis: Overview," *Human Embryogenesis* 550 (2009): 3–7.

nervous and cardiovascular systems appear, derived from the ectoderm and mesoderm, respectively.⁷⁸

From the ninth week, the conceptus is already classified as a human fetus, a stage that lasts until birth. During this phase, no new organs or tissues form, but rather those already formed mature (which, in some cases, such as the nervous, urogenital, locomotor, respiratory, and digestive systems, remain incomplete until later in postnatal life), with intensive and sequential growth of body mass.⁷⁹ Although there is no formal and universally accepted staging of the fetal period, some relevant milestones exist from the biological point of view. Between weeks 9 and 12, the body begins to grow faster than the head, the mouth is formed, the palate is completed, the intestines enter the abdomen from the umbilical cord, and blood production shifts from liver to spleen. The fetus can produce urine and excrete it in the amniotic fluid. During subsequent weeks, the head becomes smaller in proportion to the body, and there is an active ossification of the fetal skeleton. Also, reflex responses and muscle activity begin. By week 21, myelination of the spinal cord is already underway, and until week 25, a significant increase in body mass is observed. At this stage, there are already startle reflexes and rapid eye movements, the eyebrows and eyelashes are fully formed, and from week 24, the lungs begin to produce surfactant. Between weeks 26 and 29, blood production shifts again, this time from spleen to bone marrow. The central nervous system is now mature enough to direct respiratory movements, and the available subcutaneous fat already allows some maintenance of body temperature. The eyelids begin to open. From week 30, and until birth, there is a rapid deposition of body fat, which increases at a rate of fourteen grams per day; the physiological systems, including the pulmonary, are already in their final stage of intrauterine maturation, the skin appears smooth, and a fine hair that covers it, called lanugo, gradually disappears, as is also the case with *vernix caseosa*, a greasy whitish substance produced by sebaceous glands to protect the fetal skin from amniotic fluid. At term, the typical fetus

⁷⁸ See Felicitas L. Lacbawan and Maximilian Muenke, "Central Nervous System Embryogenesis and Its Failures," *Pediatric and Developmental Pathology* 5, no. 5 (2002): 425–47; Adriana Gittenberger-de Groot, Margot M. Bartelings, Marco C. Deruiter, et al., "Basics of Cardiac Development for the Understanding of Congenital Heart Malformations," *Pediatric Research* 57, no. 2 (2005): 169–76.

⁷⁹ See David C. Mundy and Gustavo Vilchez, "Overview of the Normal Development of the Human Embryo and Fetus," in *The Diagnosis and Management of the Acute Abdomen in Pregnancy*, ed. Peter B. Greenspan (Cham, Netherlands: Springer, 2018), 25–39.

weighs approximately thirty-two hundred grams and is between forty-eight and fifty-two centimeters long.⁸⁰

*Integration of Biological Facts in an Interpretation
of the Incarnation of the Word*

The biological process described cannot be applied, without qualification, to the conception of Jesus Christ. In this, as noted, the material and auxiliary role that particular discipline plays with respect to the deposit of faith is illustrated. Only by considering the dogma is it possible to build a narrative that integrates, as far as possible—and always tentatively—the contribution of biology to our necessarily finite understanding of the mystery of the Incarnation of the Word. Considering these clauses, it seems reasonable to speculate, with all the caution the case warrants, that the immediate corporal disposition the Virgin could have offered with her acceptance consisted of an oocyte capable of fertilization. This gamete, as we said, has a series of peculiarities that distinguish it from other cells, including a haploid set of chromosomes (half of the chromosomes), abundant cytoplasmic organelles (especially mitochondria, from which all those of the future embryo derive), and a still partially known series of cytosolic, nuclear, and membrane elements and factors that make it suitable to generate, under the right conditions, a new organism of the human species.

We say that this is only the immediate organic disposition the Virgin has freely placed at the service of God, since an oocyte by itself, isolated from the whole of which it is a part, is completely unviable. Undoubtedly, the functional sexual cell the Virgin presumably provides for the conception of Jesus Christ is the corollary of a chain of physiological processes that, ultimately, involve the whole of her bodily economy.⁸¹ Mary, in other words, has put her entire body in God's hands, and does so because she has placed all her spirit and being at his service.⁸² This body constitutes the first environment—maternal, fully feminine, welcoming, protective, and sheltering—of the zygote generated from the oocyte by the transcendent and real action of

⁸⁰ See Keith L. Moore, Trivedi Vidhya Persaud, and Mark G. Torchia, *The Developing Human: Clinically Oriented Embryology* (Philadelphia: Saunders, 2018), 87–91; Sadler, *Langman's Medical Embryology*, 106–9.

⁸¹ See Ioannis E. Messinis, Christina I. Messini, and Konstantinos Dafopoulos, "Novel Aspects of the Endocrinology of the Menstrual cycle," *Reproductive Biomedicine Online* 28, no. 6 (2014): 714–22; Sadler, *Langman's Medical Embryology*, 34–38.

⁸² See Joseph Ratzinger, "Et Incarnatus Est de Spiritu Sancto ex Maria Virgine," *Theotokos* 3 (1995): 291–302; Vincenzo Battaglia, "Umanità/corporeità e sensibilità affettiva di Gesù di Nazaret. Prospettive di ricerca per 'ri-dire' l'evento dell'Incarnazione," *Carthaginensia* 35, vol. 67 (2019): 53–79.

the Holy Spirit. This zygote is, from a strictly biological viewpoint, a fragile and tiny unicellular organism, but this little living being already has a name: He is called Jesus—God saves—because in him is fulfilled the promise made by God to Adam and to all mankind.⁸³ He is the one expected, the one that, a few months later, the old Simeon will recognize in the Temple as “a light of revelation for the gentiles and glory for your people Israel” (Luke 2:32). That cell, like all of its class and species, is already a person. What distinguishes it from all the others that have existed and will exist, however, is that in it resides the fullness of divinity. This zygote is the only begotten Son of God, since in him the second person of the Holy Trinity has assumed human nature. A whole God in a single cell, sheltered and nourished by the organic tissues provided by his virginal mother, an anticipation of those others with which Mary will clothe her Son and the shroud with which she will cover him after death on the Cross. Here is the most amazing, wonderful realization of God’s tenderness.

After a few hours, the zygote undergoes a first division, followed by others. About a week later, the human body of Jesus goes through the embryonic phase of a blastocyst and implants itself in Mary’s uterus, already modified and prepared by the action of the hormones of pregnancy. As noted previously, this milestone marks the beginning of the formation of the placenta, an organ to which the tissues of the mother, Mary, and of the unborn person, Jesus, contribute, in close and intimate cooperation. With gastrulation and the formation of the trilaminar embryonic disc, a vigorous phase of organogenesis begins, lasting about two months. During this period, as we said, the organic tissues that make up the true human body of Jesus Christ will originate and continue to develop in the fetal and postnatal stages. At approximately twenty weeks of pregnancy, the Virgin Mary can already feel the fetal movements of her Son, already about twenty-five centimeters in the caudad direction and weighing a little less than half a kilogram. At this time, the heart, kidneys, liver, spinal column, genitals, and intestine of Jesus Christ already have their near final shape, although they will continue to grow in size and mature physiologically. His brain is also reasonably developed, but there remains a long maturation phase ahead, which will not be completed for some years. In the epidermis of the fingers, palms, and soles, grooves begin to appear in a characteristic and unrepeatable pattern, a correlate of that unique individuality that corresponds to each person, and

⁸³ See Gen 3:15. For other relevant passages, see Isa 53:7–12; John 8:34–36; Matt 20:28; Luke 24:25–27; 24: 44–45; Acts 3:13–14; 7:52; 8:32–35; 13:29; 1 Cor 15:3; 15:21–22; Rom 5:19–20. See also CCC §§410, 412, 599 and following.

from which the incarnate Word cannot be exempt. Under this skin, adipose tissue increasingly accumulates, and from this moment, the body of Jesus is covered with lanugo and *vernix caseoso*.

In time—at thirty-eight weeks of gestation assuming an uneventful pregnancy—the Virgin gives birth to a full-term newborn, probably roughly three kilograms in weight and fifty centimeters in length. This neonate inaugurates extrauterine life with a characteristic cry, allowing him to mobilize secretions present in a newly opened airway; the Mother hugs and tucks him in, knowing that newborn babies get cold easily (what modern medicine describes as a still immature thermoregulatory capacity). Upon coming into contact with the warmth of the maternal body, Jesus eagerly seeks food, that colostrum that Mary's body produces to satisfy the special needs of her Son in these first hours. This helpless child is the Lord of the universe, come to redeem and save the world. This is recognized by some wise men and local shepherds, who, guided by a star and alerted by angels, respectively, worship him as God and Savior (Matt 2:1–12; Luke 2:8–20). The developmental story of Jesus Christ does not end here, of course. In the following years, this child grows “in wisdom, in stature, and in favor with God and with people” (Luke 2:52), until, when aged thirty, he begins his public ministry to announce the Good News: “The time is fulfilled, and the kingdom of God is close at hand” (Mark 1:15).⁸⁴

Assumptions and Scope of this Integration

The story proposed is based on certain assumptions. The first is that of the mystery that involves the action of God in Jesus's conception. Indeed, the interpretation advanced here does not intend to suppress the fog that shrouds this action, nor could it do so without incurring the categorical error that threatens some of the hypotheses examined in the second section of this article. The action of the Holy Spirit in the Incarnation escapes those empirical findings from which natural human knowledge originates and with which it is closely linked—also in its experimental dimension—that subtype of knowledge now generically classified as natural science.⁸⁵ This

⁸⁴ Among many other passages, see Matt 4:12–25; 5:13; 8:11; 10:5–7; 22:1–14; 25:31–46; 28:19; Mark 4:1–34; 13:44; Luke 4:18; 7:22; 17:20–37; 1 Tim 1:15. See also CCC §541 and following; García-Moreno, “Reino de Dios,” in *Diccionario de teología*, 848–54.

⁸⁵ For a pertinent passage from Aquinas, see *In II phys*, lect. 3, no. 8. For a commentary, see Jacques Maritain, *Filosofía de la naturaleza*, trans. J. Román Delgado (Buenos Aires: Club de Lectores, 1967), 51–53.

divine action is real, but its reality is accessible only in and by faith.⁸⁶ This does not preclude, however, consideration of the participation of the Virgin Mary in the Incarnation and the effects such participation may have had on his human nature. Mary is unquestionably conceived, in the Catholic tradition, as the highest of creatures in the order of grace, but she is a creature after all. Therefore, our understanding of her role in the miracle of the Incarnation of God can be enriched with the contributions of philosophy and biology about natural human conception.⁸⁷ In the conclusion, we return to the methodological significance of this point.

A second pillar of our integration, partly derived from the first, can warn against the typically mechanistic bias that frequently distorts current conceptualizations of the corporeal living being.⁸⁸ Undoubtedly, God does not operate as a craftsman, adding pieces to those the Virgin has contributed, to “assemble” a *conceptus*. The Word has not come to “pilot” an organic-molecular machine especially suitable for its mission; he has truly assumed a complete human nature, including not only an organicity but also the informing, actualizing, and life-giving principle that allows such organicity in the first place. Explicitly stated by the Council of Chalcedon in a passage already quoted, it was also affirmed by Aquinas when pointing out that the human nature of Christ includes a soul and a body, and that indeed God assumes the body by means of the soul of Jesus Christ.⁸⁹ The Catholic

⁸⁶ See Gerhard L. Müller, *Dogmática*, 491.

⁸⁷ See Müller, *Dogmática*, 320: “The transcendental cause of the origin of the life of Jesus in Mary without male intervention does not admit of comprobation or verification with empirical means. The only thing that can be verified is its impact on the creature, in that a conception has occurred without the intervention of a man” (trans. mine).

⁸⁸ Mechanistic philosophy may have played a heuristic role in the maturation of experimental biology, and very especially of biochemistry and molecular biology, two subdisciplines that have claimed a leading role in recent decades. But whatever its relationship with modern biology, we share Hans Jonas’s diagnosis regarding the partial and impoverishing nature of the idea of life and living being the materialistic mechanism advances; see *The Phenomenon of Life. Toward a Philosophical Biology* (New York: Harper & Row, 1966), 7–13; see also Juan Eduardo Carreño, *Vivere viventibus est esse: la vida como perfección del ser en la obra de Tomás de Aquino* (Pamplona: EUNSA, 2020), 263–295.

⁸⁹ See note 14 above. It should be emphasized that, when Aquinas says the Word assumes the body through the soul, this does not imply a chronological order, but an order of nature, derived from the greater dignity that corresponds to the soul in comparison with the body, and from the causality this soul exercises as a formalizing, actualizing, and vivifying principle of the corresponding body. See *ST* III, q. 6, a. 1; a. 4, ad 3; q. 50, a. 2, ad 2; *In III sent.*, d. 2, q. 2, a. 1; d. 21, q. 1, a. 1, qc. 1, ad 1; *SCG* IV, ch. 44; *De spir.*, a. 3, ad 5.

Church teaches, in this regard, that the soul of each man, by its spiritual nature, cannot come from matter, but only from a direct creative act of God. There is no problem, then, in admitting that this is also true, and with much greater reason, for Jesus, the only begotten Son of God.

This also helps clarify a third assumption implicit in the narrative proposed, in agreement with the Tradition and magisterium of the Church: the Incarnation of the Word is simultaneous with the conception of Jesus.⁹⁰ We differ, therefore, from the model of *methyparxis*, and of course all forms of adoptionism. The conception of the human nature of Christ, with his soul and body and the act by which that nature is assumed by the second person of the Holy Trinity, although different *secundum rem et rationem*, are nevertheless absolutely simultaneous events. Although, as noted, the resolution of this point is ultimately a matter of faith and doctrine, we cannot miss the opportunity to underline the indirect support provided by biological data properly interpreted in the light of the *philosophia perennis*. The panorama science offers today regarding human ontogeny—when uncontaminated by prejudices unrelated to science itself⁹¹—reveals a chain of events that connect one to another in a fundamentally continuous sequence, from the conception of the zygote until the death of the individual. This means any break point inserted in that sequence will always be conventional. The reason for this continuity is not to be found in the genetic identity of the developing organism; while that identity certainly exists, it is not the *cause*, but rather the *consequence* of another ontologically more fundamental permanence: the subject or *suppositum*. In the case of Christ, it is the second person of the Trinity who provides the ontic support for the human nature assumed

⁹⁰ Müller writes about this: “God does not unite, at a later moment, with a man who already possesses a hypostasis created by virtue of a natural generation. In his will to humanize himself, God himself is, immediately and by virtue of his creative action (without mediation, therefore, of natural generation and the created causality of the origin of a man), the foundation that sustains the human existence of Jesus in the uncreated hypostasis of the divine WORD” (*Dogmática*, 491; trans. mine).

⁹¹ We refer here to the images used by those who defend the moral licitness of abortion. Those who hold this position assign, explicitly or implicitly, a substantial status to a specific ontogenetic landmark—for example, the appearance of some structure of the nervous or cardiovascular system. Only once that milestone occurs are we in front of a human person. Before that, the subject in question is something else (a set of cells or an individual of the human species, but in no case a person) which could be disposed of without moral fault. For our part, it seems the only ontogenetic milestone with substantial significance is not to be found in the ontogenetic development itself, but in its origin, namely, conception. Therefore, any act that has the direct and explicit purpose of ending the life of an embryo or fetus, regardless of its stage of development, will always and necessarily be illicit. About this question, see note 70 above.

with Incarnation, and correspondingly, the movements and changes that constitute, as a whole, the process of morphogenesis.⁹² Seen from this perspective, it is coherent—although not absolutely necessary—that the Incarnation coincides with the only milestone that involves a substantial change, namely, conception.

A fourth assumption operating in our interpretation is potentially more controversial if misunderstood—Mary's role in the conception of Jesus Christ. Contemporary biological description of the early stages of human development clearly seems to follow, at least regarding the parents' roles, a line much closer to Hippocratic and Galenic biology than to the Aristotelian scheme. That the woman brings a *spérma*—that is, a gamete, or more specifically, an oocyte in metaphase II—and not only the substrate or conditions for the growth of the embryo can be considered, at this point, as a universally accepted biological fact supported by innumerable empirical results.⁹³ On the other hand, we know the mother is not merely a passive receptacle for the embryo or fetus. She collaborates both genetically and molecularly, biochemically, physiologically, and morphologically in the gestation of her child, with the placenta, an organ that derives from both mother and child, a tangible correlate of this participation. All this shows a woman who, in contrast to the passive reception attributed to her in the Aristotelian scheme, has a truly active role in the generation and gestation of the *conceptus*.

Is there any need to project this situation onto the conception of Jesus Christ? From a biological viewpoint, no. Divine action, being transcendent, is not constrained by any regularity, be it biological or any other kind, so nothing prevents the Virgin Mary's role in the conception and development of Jesus being completely different from that of other mothers. The conjecture that she played an active role in the conception and gestation of her Son, on the other hand, has to do with the very contents of revelation. Indeed, the angel announces to Mary that Jesus will inherit "the throne of his ancestor David" (Luke 1:32), and moreover, the Apostle asserts that the Lord "in terms of human nature was born a descendant of David" (Rom 1:3,4). Note this goes beyond the content of the article of faith that confesses the true and perfect human nature the Word assumed in the Incarnation. To clarify, recalling the situation imagined by Simons: By virtue of his omnipotence, God could certainly have created the human nature he assumes with the Incarnation without assistance from the Virgin, so we could still say that Christ is true God and true man, since he possesses a human nature but has

⁹² See note 56 above.

⁹³ For more details, see the previous section.

received that nature exclusively and directly from God, without intervention from anyone linking him genealogically with the people of Israel, and hence, the rest of humanity. Could one speak in such a case of Jesus as a descendant of Adam and David? It does not seem clear this is the case.

In arguing in this way, we do not mean to posit our interpretation as the only one available for God's action, but merely suggest that affirming the Virgin Mary's active participation in the conception of Jesus Christ provides greater consistency with current knowledge of how human conception occurs, without damaging the mystery of divine action. We are aware that both Aquinas and some relevant Gospel passages emphasize the passive role of Mary when she accepts the divine proposal transmitted by the angel: "You see before you the Lord's servant, let it happen to me as you have said" (Luke 1:38). But, as indicated before, Aquinas himself is careful to add that, for the conception of Jesus, the Virgin does not limit herself to disposing of menstrual blood, as Aristotle taught, but actively generates a purified blood.⁹⁴ Certainly, the reasons Aquinas makes this clarification relate to considerations beyond the scope of our discussion, but the very fact he allows himself to do so is already significant. Aquinas unequivocally affirms the passivity of Mary regarding the action of the Holy Spirit, and we fully subscribe to this assertion. In relation to God, who is a pure act and infinite active potency, every creature behaves like the potency to act. From this, however, it does not follow that the Virgin lacks any activity of her own; such activity in no way diminishes the primacy and initiative of God. As First Cause, divine action is not only transcendent but also immanent to the action of his creatures, since he acts in and for second causes: "It is God who, for his own generous purpose, gives you the intention and the powers to act" (Phil 2:13).⁹⁵

As noted, the pagan model of theogamy is satisfied with substituting the role of the male for that of the divinity in the generation. In such a scheme, god and woman are progenitors and causes of the begotten being, since they work on the same ontological plane. The Gospel is completely different. Faced with the legitimate question of Mary, the angel affirms that the Holy Spirit will come upon her, and the power of the Most High will envelop her with his shadow (Luke 1:35). This emphasizes not only the mystery and transcendence of divine action but also the fact that, however relevant Mary's participation in the conception of Jesus, a parallel cannot be established between the causality she exercises and that belonging to God in

⁹⁴ See note 41 above.

⁹⁵ See *Gaudium et Spes* §36. See also CCC §308. For a commentary, see Enrique Colom, *Fe y razón: el nexo entre la fe y la ciencia* (Pamplona: EUNSA, 2021), 116–24.

the Incarnation of the Son. As Miguel Ponce observes, “it is not Mary who makes Christ her Son, but it is the Word who chooses her as His Mother. For this reason, she appears as the one who *receives*, albeit actively, God’s initiative to incarnate in her womb.”⁹⁶ In our opinion, this active reception of Mary is manifested initially in the acceptance of God’s plan by faith. It is with and through that faith that she also places her corporality at the service of the Holy Trinity.

The objections against faith in a virginal conception are neither new nor original.⁹⁷ Faced with the argument of Pederson and her colleagues, it is sufficient to point out that a conception of Jesus Christ not involving a man does not threaten his true humanity, as Aquinas observed in the thirteenth century. Aquinas affirms that Christ is the Son of Man because he has a human nature, regardless of its provenance. Surely, one thing is the generation of the human nature of Jesus, undoubtedly supernatural because it is caused by the Holy Spirit without the help of man, and another is its result, a true and real human nature. Thomas illustrates the point through the example of a blind man miraculously regaining his sight: the recovery itself exceeds the realm of nature, but once it has happened, the operation of seeing occurs naturally in that man.⁹⁸

One might ask, however, what we gain from such an interpretation,

⁹⁶ See Ponce, “*María*,” 629. Italics are from the original.

⁹⁷ See Javier Ibáñez and Fernando Mendoza, *La Madre del Redentor* (Madrid: Palabra, 1988), 46–48.

⁹⁸ See *ST* III, q. 33, a. 4, ad 1. For a parallel passage, see *In II Sent.*, d. 3, q. 2, a. 2. In support of Aquinas’s thesis, we can add that the admission of an argument such as that of Pederson et al. would lead to certain absurdities. For example, we would have to deny the true humanity of Adam and Eve, since they lack parents, for obvious reasons. More closely, we should also question the anthropological status of those persons conceived by artificial means (i.e., by *in vitro* fertilization). Of course, in this case, there are parents, but the way their generative power is instrumentalized to generate the conception itself escapes the natural process. Although the moral admissibility of this class of interventions can be questioned, it is clear that what is generated is a complete human person. And in passing, it should be noted that the psychological and moral development of Jesus—who experienced like every true man—does not suffer from the lack of a human father figure. First, because Jesus Christ is the Word, the eternal and consubstantial Son of the Father. Everything in him—also the human nature he assumes, above all the work of God—refers to his divine filiation. Second, because, in his infinite wisdom, God arranged for Jesus to grow up in a family with a mother and also a human father. Joseph is not the biological father of Jesus, but this does not prevent him being truly a father. From him and Mary, Jesus receives the loving care a human should experience in an authentic family; he learns obedience, piety, and the customs of his people. And with Joseph, Jesus learns a craft and the value, not only human but also supernatural, of work. See John Paul II, *Guardian of the Redeemer*

since generations of Christians have professed and lived a perfectly coherent and mature faith without ever hearing of calcium waves, mitochondria, or trophoblasts. Here we believe it necessary to distinguish between the essential and the relevant. What biology—or any other science for that matter—can contribute to a formulation or understanding of the Incarnation of Jesus Christ, at least within the framework of the Catholic faith, cannot modify what the magisterium has solemnly defined. But this does not mean such inquiries are useless or sterile. In principle, a critical and cautious assimilation of facts described by particular sciences can illuminate aspects of dogma that would otherwise remain unspoken or only partially outlined. In the case of the narrative proposed, this could be the case with the causal role the Virgin Mary plays in the conception of her Son. While biology is unable to show that the *Mater Dei* actively received what the Holy Spirit worked in her, the data this discipline provides regarding natural human conception, interpreted in the light of the Christian faith, certainly support the idea that a humble young Jewish woman was chosen from all eternity and invited by God to be an active instrument of the central event in human history.

The deep theological background behind all this discussion, nonetheless, is the tension between exceptionality and true humanity manifested in the person of Jesus Christ. According to his human nature, he is distinguished from each one of us only by the total absence of sin. This includes the morphogenetic development of this nature, which must have gone through the stages every human experiences. That, however, is not valid for the actual generation of that nature, undoubtedly unique and exclusive to him. This observation is not, of course, unprecedented in the history of theology, but we think biological facts allow us better to underline and *embody* this truth. The humanity Christ assumes is generated *absque semine ex Spiritu Sancto*, but once that Incarnation has occurred, it submits to the natural dynamisms of which he is, ultimately, the Author.

Final Remarks

Finally, we would like to return to the methodological point raised in the introduction. As noted above, one of the most obvious features of the academic field now known as “science and religion” is its manifest conceptual and epistemological heterogeneity. Despite this, a large proportion of the problems addressed in this body of literature begin by contrasting two types

[*Redemptoris Custos*] (Boston: Pauline Media & Books, 2014). See also Frère Ephraïm, *Giuseppe di Nazaret: Il mistero del Padre* (Rome: Ancora, 1998).

of discourse. The first generally comprises the results of particular sciences in a specific subject (cosmic origin, chance, determinism, evolution, knowledge, human behavior, etc.). The second considers what can be said about this issue from the viewpoint of some dominant philosophical tradition. A relationship is then established between these perspectives, which can take very different paths. Regardless of whether it is exhaustive or not, in this matter, Barbour's typology has the undeniable merit of introducing order and clarity. However, a point usually unnoticed in these categorizations is the evident asymmetry of the discourses thus linked. In this relationship, the epistemic priority belongs to philosophy. Indeed, the physiognomy this relationship finally acquires (in Barbour's terminology: conflict, separation, contrast, or integration) does not ultimately depend on scientific knowledge, but on the philosophical framework from which the exercise is carried out. The question that fundamentally motivates this class of disquisitions is philosophical, and it is from a specific philosophical setting, including a range of metaphysical, cosmological, anthropological, and epistemological principles, that it acquires its meaning and distinctive configuration. This is true even for those positivistic authors willing to discard or correct a considerable part of historical philosophical thought in the name of superior scientific knowledge. After several decades of Auguste Comte, and fewer but enough of Otto Neurath and Rudolf Carnap, we know that positivism is not a scientific doctrine but a philosophical one.⁹⁹

Other approaches included under the heading of "science and religion" go further and explicitly consider specific religious beliefs in their analyses. What has been said before about the role of science in all this also applies here, *mutatis mutandis*. The topic addressed in these pages, the Incarnation of Jesus Christ, requires the clarification of a doctrinal framework that gives meaning and relevance to the question of the possible contribution of biology. In the case of Catholicism, this framework includes the professed articles of faith, their revealed sources (Sacred Scripture and Tradition), the exegetical canons used and accepted by the authority (magisterium), the main lines of theological speculation, and a number of philosophical notions and propositions known collectively as *preambula fidei*.¹⁰⁰ From this

⁹⁹ For a historical perspective on the fates of logical positivism, see Oswald Hanfling, "Logical Positivism," in *Routledge History of Philosophy*, vol. 9, *Philosophy of Science, Logic and Mathematics in the Twentieth Century*, ed. Stuart. G. Shanker (New York: Routledge, 2004), 193–213.

¹⁰⁰ For a recent review of this question within the framework of Thomistic philosophy, see John F. Wippel, *Metaphysical Themes in Thomas Aquinas III* (Washington, DC: Catholic University of America Press, 2021), 73–97, 142–73.

basis, it is worth asking how biology can contribute to our understanding of the mystery of the Incarnation. This is clearly not a formally biological or philosophical question, but a theological one, and the role played by biological fact is subordinate to and defined in the light of the aforementioned doctrinal framework. To illustrate this, consider how superfluous our interpretation may be to a subscriber of an adoptionist or docetist Christology. For the first, the conception of Christ differs in no way from that of any other human; for the second, biology simply has nothing significant to say about an Incarnation that, strictly speaking, is no more than an appearance of such.¹⁰¹

The fundamental reason for this epistemological asymmetry now becomes evident. If the Christian faith professes an Almighty and Creator God, then it is not he who is subject to its work, but vice versa. Therefore, neither philosophy nor the natural sciences can invoke a natural “legality” to limit divine action in the world. If the considerations provided by these disciplines have value for theology, this is only to the extent that revelation itself informs us of certain courses of action God has freely chosen.¹⁰² Evidently, he could have created and redeemed everything differently or created nothing, without affecting his infinite goodness and happiness at all.¹⁰³ This being the case, the rationalist approach comes across as fundamentally misguided when, confusing convenience with necessity, it tries to deduce the event of the Incarnation of Jesus Christ from certain premises evident to human reason. Of course, human reason, supported by revelation, can provide some indications of the divine salvific plan, but we must never lose sight of the fact that the ultimate source of his designs lies in the unfathomable wisdom and goodness of the one and triune God. The Word made flesh is a surprise—perhaps the most astonishing of all—for angels, demons, and men, then and today. N·V

¹⁰¹ For a historical perspective of this heresy and its origins, see Michael Slusser, “Docetism: a Historical Definition,” *Journal of Early Christian Studies* 1, no. 3 (1981): 163–72; Ronnie Goldstein and Guy G. Stroumsa, “The Greek and Jewish Origins of Docetism: A New Proposal,” *Zeitschrift für antikes Christentum* 10, no. 3 (2006): 423–41.

¹⁰² See Javier Sánchez Cañizares, “Prólogo,” in Colom, *Fe y razón*, 14–15.

¹⁰³ See *CT*, chs. 200–201; *In III Sent.*, d. 4, q. 3, a. 1, ad 3; *IV*, d. 10, a. 1, ad 3; *ST I*, q. 25, a. 6, ad 3; *III*, q. 1, a. 2, corp.; *SCG IV*, chs. 54–55.