

Distinguish two distinct meanings of "evolution":

1. **Micro-evolution:** tiny series of changes that help a species adapt better to its environment but that do not create a new species. Think, for example, of the various breeds of dogs, cats, cattle, and horses or the various human races. One species can come in many flavors! In social theory, people sometimes talk about "evolution rather than revolution" when trying to make changes for the better in political structures. This *kind* of "evolution" is easy to see and is abundantly confirmed in countless examples of selective breeding. It produces variation in secondary characteristics. One might say that the modern airplane "evolved" from the Wright brothers' first successful aircraft.
2. **Macro-evolution:** establishment of a *radically new species* from a parent species such that the members of the new species cannot interbreed with the old or with other descendent species. Humans and apes share a common ancestor, but the ancestor has disappeared and the descendent species cannot interbreed with each other. No amount of selective breeding (*micro-evolution*) can turn dogs into cats or cats into canaries. The record presented by fossils is incomplete--it does not track exactly how new species emerge from old species. The Wright brothers used skills developed by their production of bicycles to produce the world's first motor-powered aircraft, but the aircraft is an entirely different species from bicycles (same genus: mechanical transportation).

Over and above these distinctions, we must also distinguish (as the Pope does below) between two broad **theories** of evolution:

1. **Atheistic interpretation** (shared by some atheist scientists and creationists [*biblical literalists*]): if evolution takes place, then there is no God; if there is a God, then there is no evolution. On this view, religion and science are radically and necessarily opposed to each other.
2. **Theistic interpretation** (the Catholic view expressed below): if science shows that life comes from life, we must conclude that **God created an evolving universe**. *Science studies what God created*. The truths discovered by science cannot contradict truths known from Revelation (*see below*). In this letter, the Pope accepts that "evolution is more than just a hypothesis"--that one form of life comes from preceding forms is a *matter of fact*: the **"human body takes its origin from pre-existent living matter"** (5). The big issue is whether this *fact* must be given an atheist interpretation; Saganists say "yes" but the Church says "no."

Papal Letter on Science and Evolution (excerpts)

His Holiness Pope John Paul II
To the Pontifical Academy of Sciences

October 22, 1996

Truth cannot contradict truth

2. . . . We know, in fact, that truth cannot contradict truth (cf. Leo XIII, encyclical "Providentissimus Deus").

*[The truth from revelation that "one God created all things" does **not** contradict the truth from biology that each new form of life develops from a prior form of life.]*

3. . . . In his encyclical "Humani Generis" (1950), my predecessor Pius XII had already stated that there was **no opposition between evolution and the doctrine of the faith about man and his vocation**, on condition that one did not lose sight of several indisputable points.

For my part, when I received those taking part in your academy's plenary assembly on October 31, 1992, I had the opportunity with regard to Galileo to draw attention to the need of a **rigorous hermeneutic [method of interpretation] for the correct interpretation of the inspired word**. It is necessary to determine the proper sense of Scripture, while avoiding any unwarranted interpretations that make it say what it does not intend to say. *[What he is saying is that Catholics do NOT have to treat the Bible as if it were a science or history book.]* In order to delineate the field of their own study, the exegete and the theologian must keep informed about the results achieved by the natural sciences (cf. AAS 85 1/81993 3/8, pp. 764-772; address to the Pontifical Biblical Commission, April 23, 1993, announcing the document on the "The Interpretation of the Bible in the Church": AAS 86 1/81994 3/8, pp. 232-243).

4. Taking into account the state of scientific research at the time as well as of the requirements of theology, **the encyclical "Humani Generis" [1950] considered the doctrine of "evolutionism" a serious hypothesis**, worthy of investigation and in-depth study equal to that of the opposing hypothesis. Pius XII added two methodological conditions: that **this opinion should not be adopted [1] as though it were a certain, proven doctrine** and **[2] as though one could totally prescind from revelation** with regard to the questions it raises. He also spelled out the condition on which this opinion would be compatible with the Christian faith, a point to which I will return. Today, almost half a century after the publication of the encyclical, new knowledge has led to the recognition of **the theory of evolution as something more than just a hypothesis**. It is indeed remarkable that this theory has been progressively accepted by researchers, following a series of discoveries in various fields of knowledge. The convergence, neither sought nor fabricated, of the results of work that was conducted independently is in itself a significant argument in favor of this theory.

What is the significance of such a theory? **To address this question is to enter the field of epistemology** [*the study of how we know what we know*]. A theory is a **metascientific elaboration**, distinct from the results of observation but consistent with them. By means of it **a series of independent data and facts can be related and interpreted in a unified explanation**. A theory's validity depends on whether or not it can be verified; it is constantly tested against the facts; wherever it can no longer explain the latter, it shows its limitations and unsuitability. It must then be rethought.

Furthermore, while the formulation of a theory like that of evolution complies with the need for consistency with the observed data, it borrows certain notions from **natural philosophy**.

And, to tell the truth, rather than the theory of evolution, **we should speak of several theories of evolution**. On the one hand, this plurality has to do with the different explanations advanced for the mechanism of evolution, and on the other, with the various philosophies on which it is based. Hence the existence of **materialist, reductionist and spiritualist interpretations**. What is to be decided here is **the true role of philosophy and, beyond it, of theology**.

5. The church's **magisterium** [*teaching authority*] is directly concerned with the question of evolution, for it involves the conception of man: Revelation teaches us that he was **created in the image and likeness of God** (cf. Gn 1:27-29). The conciliar constitution "Gaudium et Spes" [*Vatican II, 1965*] has magnificently explained this doctrine, which is pivotal to Christian thought. It recalled that man is "the only creature on earth that God has wanted for its own sake" (No. 24). In other terms, **the human individual cannot be subordinated as a pure means or a pure instrument**, either to the species or to society; he has value per se. He is a person. With his intellect and his will, he is capable of forming a relationship of communion, solidarity and self-giving with his peers. St. Thomas observes that man's likeness to God resides especially in his speculative intellect, for his relationship with the object of his knowledge resembles God's relationship with what he has created (Summa Theologica I-II:3:5, ad 1). But even more, man is called to enter into a relationship of knowledge and love with God himself, a relationship which will find its complete fulfillment beyond time, in eternity. All the depth and grandeur of this vocation are revealed to us in the mystery of the risen Christ (cf. "Gaudium et Spes," 22). It is by virtue of his **spiritual soul** that the whole person possesses such a dignity even in his body. Pius XII stressed this essential point: **If the human body takes its origin from pre-existent living matter, the spiritual soul is immediately created by God** ("animas enim a Deo immediate creari catholica fides nos retinere iubet"; "Humani Generis," 36). **Consequently, theories of evolution which, in accordance with the philosophies inspiring them, consider the spirit as emerging from the forces of living matter or as a mere epiphenomenon of this matter, are incompatible with the truth about man. Nor are they able to ground the dignity of the person.**

6. With man, then, we find ourselves in the presence of an **ontological difference**, an ontological leap, one could say. [*"Ontology" = Greek, "study of being"; "ontological difference" = a difference in the KIND of being, that is, from purely material to a union of spirit and matter. In other words, the Pope does not think that purely material causes can explain the spiritual powers of human nature.*] However, does not the posing of such **ontological discontinuity** run counter to that **physical continuity** which seems to be the main thread of research into evolution in the field of physics and chemistry? Consideration of the method used in the various branches of knowledge makes it possible to reconcile two points of view which would seem irreconcilable. The sciences of observation describe and measure the multiple manifestations of life with increasing precision and correlate them with the time line. **The moment of transition to the spiritual cannot be the object of this kind of observation, which nevertheless can discover at the experimental level a series of very valuable signs indicating what is specific to the human being. But the experience of metaphysical knowledge, of self-awareness and self-reflection, of moral conscience, freedom, or again of aesthetic and religious experience, falls within the competence of philosophical analysis and reflection, while theology brings out its ultimate meaning according to the Creator's plans.**

7. In conclusion, I would like to call to mind a Gospel truth which can shed a higher light on the horizon of your research into the origins and unfolding of living matter. The Bible in fact bears an extraordinary **message of life**. It gives us **a wise vision of life** [*a Gestalt, an interpretation, a worldview, a comprehensive insight*] inasmuch as it describes the loftiest forms of existence. This vision guided me in the encyclical which I dedicated to respect for human life, and which I called precisely "Evangelium Vitae" [*"The Gospel of Life"*].

It is significant that in St. John's Gospel life refers to the divine light which Christ communicates to us. We are **called to enter into eternal life**, that is to say, into the eternity of divine beatitude. To warn us against the serious temptations threatening us, our Lord quotes the great saying of Deuteronomy: "Man shall not live by bread alone, but by every word that proceeds from the mouth of God" (Dt 8:3; cf. Mt 4:4). Even more, "life" is one of the most beautiful titles which the Bible attributes to God. **He is the living God**.

I cordially invoke an abundance of divine blessings upon you and upon all who are close to you.

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