The Church's Dialogue with Science after Galileo and Darwin
Overcoming Cultural Myths

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In a Press Conference held at the "Vatican Press Office" on the 27th of January this year, Archbishop Gianfranco Ravasi, President of the Pontifical Council for Culture, presented the initiatives promoted by the Vatican institutions for the Year of Astronomy. During his speech, he declared that, thankfully, after 400 years, the time had come for a new dialogue with the natural sciences, as the conflicts which had in the past placed science and religion in opposition as two radically incompatible visions, had finally been overcome. The following day, commenting on this statement, Spain's second largest newspaper *El Mundo* published an article titled: "*The Vatican discovers America*"[1]. The author, journalist David Torres, commented bitterly that it had taken 400 years for the Vatican to discover what everyone else knew, that Galileo was right. And he added, in the same harsh tone: "we will have to wait until the 400th anniversary of the Beagle trip (in 2231) to see some illuminated clergyman confessing that, well, yes, Darwin was right. But it is one thing to talk about heavens and stars and a very different one is to suggest that the Garden of Eden was actually a puddle of bacteria, and Adam and Eve were just a couple of chimpanzees" [2].

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[1] D. Torres, «El Vaticano descubre América», *El Mundo*, viernes 20 de enero de 2009.
[2] Ibid.

The paper is sarcastic and violently anti-catholic. It also contains some evident mistakes: it ascribes to Cardinal Belarmine the responsibility of having initiated the trial against Galileo, which is completely false: Belarmine was already dead when Galileo was tried; it also states that Darwin was condemned by the Church, which never happened. But it is significant because it reflects a widely spread vision of the history of science: just as Galileo was condemned by the Church, and eventually, she had to acknowledge her mistake, so too, the story goes, Darwin's revolutionary ideas which are rejected today by religious fundamentalism will finally find their vindication. The article shows clear evidence of this shared mentality which considers Galileo and Darwin as the great heroes of mankind´s two most important cultural revolutions, and, at the same time, as the victims of religious persecution.

The celebrations for the Darwin and Galileo anniversaries offer a suitable occasion to reflect on the issues that the Galileo Affair and Darwin's Theory still pose for a better understanding between the Church and science, and also to draw some lessons of what happened, and how to accept the challenges that sciences poses theology.

Darwin and Galileo, cultural icons

The year 2009 celebrates the fourth centenary of Galileo's first astronomic discoveries with the telescope, the bicentennial of the birth of Charles Darwin, as well as the 150th anniversary of the publication of his famous work "*The Origin of the Species*". At first, it seems a coincidence. Nevertheless, it is more probable that the celebration in the same year of these two characters has been somehow forced.

The fact is that the names of these two characters appear together frequently in a simplified vision of the history of science. This association does not appear only on a popular level, but also in some important writings. It is well known, for example, that Freud gives a history of successive scientific revolutions in his *Introduction to Psychoanalysis*. In his 18th lesson, speaking about the discovery of the unconscious, Freud sets himself and his discovery of

the unconscious in the wake of illustrious predecessors such as Galileo and Darwin.

> Humanity —he writes— has, in the course of time had to endure from the hands of science two great outrages upon its naïve self-love. The first was when it realized that our earth was not the centre of the universe, but only a tiny speck in a world-system of a magnitude hardly conceivable; this is associated in our minds with the name of Copernicus […]. The second was when biological research robbed man of his peculiar privilege of having been specially created and relegated to a descendent from the animal world […] This transvaluation has been accomplished in our own time upon the instigation of Charles Darwin, Wallace and their predecessors, and not without the most violent opposition from their contemporaries. But man's craving for grandiosity is now suffering the third and most bitter blow from present-day psychological research, which is now endeavoring to prove to the *ego* of each one of us that he is not even a master in his own house, but that he must remain content with the various scraps of information about what is going on unconsciously in his own mind[3].

Freud, quite immodestly was very interested in introducing his work as a continuation of the process of "dethronement" of man in order to explain the social refusal of his revolutionary ideas regarding the unconscious. Freud's narrative has proven to be quite successful, and has been largely divulgated in our times by one of the most prolific and best-selling authors, the eminent paleontologist Stephen J. Gould. In his writings, no less than ten times he draws extensively on Freud's account of the history of science[4]. Gould affirms that Freud was right to claim that humanity had repeatedly been defeated, first by Copernicus and Galileo, then by Darwin and finally by Freud. Even better, according to Gould, this great revolution, begun by Copernicus and Galileo must be brought to its extreme consequences: it is high time we recognize we are nothing but a mere accident in the evolution of life, a meaningless being, appeared in a completely casual way in the last instant of the biological clock. If we replay the tape of the history of life on Earth from the beginning, the course, story and final result will be completely different.

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[3] SIGMUND FREUD, *A General Introduction to Psycho-Analysis*: «Eighteenth Lecture: Fixation upon Traumas: The Unconscious», in *Freud*, Great Books of the Western World, vol 54, Encyclopaedia Britannica, Chicago 1984, p. 562..

[4] Cfr. K. GIBERSON- M. ARTIGAS, *Oracles of Science. Celebrity Scientists versus God and Religion*, Oxford University Press, Oxford 2007, p. 69 ss.

Darwin, Galileo and the Catholic Church

According to Freud and Gould, Darwin and Galileo share the honor of being leaders of the revolution that has progressively decentralized man. Yet at the popular level, the two scientists are seen mostly as victims of the Church's persecution. It is beyond dispute that Galileo had been convicted and condemned. But was it the same story for Darwin? Let us see how things developed and look at the whole history more carefully. We will discover an unusual factor that tied these two figures together.

From the second half of the nineteenth century, Darwin's evolutionistic ideas started to spread progressively, mainly in the English-speaking world. Very soon some Catholic theologians tried to integrate the new scientific theories into own their works, particularly concerning creation and the origin of man. Among the pioneers of these ideas[5] were Fr. John A. Zahm, of Notre Dame University in the United States, John Hedley and George J. Mivart in England, Mgr. Geremia Bonomelli and Fr. Rafael Caverni in Italy, and, a Domincan Father, Dalmace Leroy in France. Accordingly, some problems began to emerge with the Holy Office. These new theories were generally seen with strong suspicions by some ecclesiastical authorities. The Jesuit and semi-official Vatican journal "*Civiltà Cattolica*" as well as most textbooks of the time harshly criticized these evolutionist ideas. But they could not invoke any official statement of the Church's Magisterium, apart from some isolated quotations, simply because there were not any[6]. The indisputable fact, as shown in a recent research conducted in the archives of the Holy Office, is that the Vatican authorities never condemned the theory of evolution—even if some works were on the Index of Prohibited Books. And the Vatican seemed to be in no hurry to do this. Rather, we can say that, the shadow of Galileo played a notable role in this mild attitude the Congregation of the Index.

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[5] For this section, I have used the work of M. ARTIGAS – TH. GLICK – R. MARTÍNEZ, *Negotiating Darwin. The Vatican Confronts Evolution 1877-1902*, The Johns Hopkins University Press, Baltimore, 2006. For the reception of evolution theories in the Catholic Church, see A. PIOLA, *Non litigare con Darwin. Chiesa ed Evoluzionismo*, Paoline, Milano 2009.

[6] *Negotiating Darwin*, pp. 2 ss.

It is undeniable there are some similarities between the Galileo Affair and the reception of Darwinian ideas. The first point of contact is that neither of these two new theories—heliocentrism and the origin of species, including mankind through natural selection—were sufficiently supported by scientific evidence or had the approval of the majority of the scientific community at the time. On the contrary, both the new theories were completely opposed to the commonly accepted theories. Regarding this topic, it is important to remember that, when in 1616 the Holy Office asked a group of experts their opinion on the Copernican propositions, —that "the Sun is firm" and "the Earth stirs around it"— the experts judged both of them to be "philosophically absurd"[7], because they were not proven neither seemed likely to be proven[8]. Certainly, these propositions also received more serious censorship: the thesis of the immobility of the Sun was, according to such experts, "formally heretical". The Congregation of the Index eventually reduced it only to being "completely contrary to the Sacred Scriptures"[9].

In the case of the reception of evolution, in examining writings by Darwinian-influenced theologians, the experts from the Holy Office sustained their theological criticisms with *scientific* objections regarding the origins of mankind, affirming that the scientific bases of the Evolution theory were weak.

In both cases, as history shows, as soon as the scientific arguments grew stronger, theological resistance decreased[10].

The greatest difference between the two cases can be found in the way authorities proceeded and in the final result. In the Galileo case, firstly there was

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[7] «Omnes dixerunt stultam et absurdam in Philosophia», «Altre censure dei proposizioni galileiane», 24 febbraio1616, in *I Documenti Vaticani del processo di Galileo Galilei* (1611-1741), Edited by S. PAGANO, Archivio Segreto Vaticano, Città del Vaticano 2009, n. 19, p. 42.

[8] At Galileo's times, skepticism regarding human capacity to obtain true knowledge of the superlunar world was very common. This world was considered mysterious because of its closeness to God, and therefore, beyond human reason. Pope Urban VIII and with him many others retained that a demonstration of Earth's movement would never arrive. Galileo, on his turn, firmly believed that man could attain certain knowledge of the super-lunar world because it was similar to Earth. On astronomical skepticism at Galileo's time, see A. FANTOLI, *Galileo. Per il Copernicanesimo e per la Chiesa*, Specola Vaticana / LEV, Città del Vaticano 1997^2, p.301ss.

[9] Decree of the Congregation of Index, 5 march 1616. *I Documenti Vaticani del processo di Galileo Galilei* n. 22, p. 46ss.

[10] *Negotiating Darwin*, 282. See also A. PIOLA, *Non litigare con Darwin.*

the censorship of Copernicanism in 1616, and then in 1633 a regular trial because Galileo had disobeyed the injunction of 1616 which forbade him to teach or to defend Copernicanism. Galileo was condemned to a house-arrest and his work, the *Dialogo*, was put on the Index. On the contrary in the case of the Darwinian theories, "theological opposition to evolution lasted for decades and despite its ardor, it led to no public condemnation of evolution"[11]. Rather, there was a gradual and timid acceptance at first that led to a cautious recognition of the legitimacy of evolution as a hypothesis in the Encyclical *Humani Generis* by Pius XII in 1950[12]; then, in April 1996 in an official discourse to the Pontifical Academy of Science, John Paul II recognized that evolution is more than a mere hypothesis[13]. We can also add now the Document issued by the International Theological Commission *Communion and Stewardship* (2004), which deals with the matter of evolution in numbers 62-70[14].

As the documentation of the Archives of the Holy Office demonstrates, initially "opposition to evolution prevailed in the Congregation of the Index, but there were notable differences in the stances of individual members. It was generally recognized that the official Magisterium of the Church took no position on evolution, and it was even suggested that the Holy Office be asked for an opinion, as a leading doctrinal authority. But such an opinion was never sought, nor did the Holy Office pronounce"[15]. It is true that some theologians, who had defended the compatibility of evolutionism and Catholic doctrine, were "invited" to retract their statements, or, like Fr. Zahm, professor at Notre Dame University, saw their books put onto the Index. There was some strong opposition also in a few local churches. The Provincial Synod of Koln (1860), declared — using a

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[11] *Negotiating Darwin*, 282.

[12] «Per queste ragioni, il magistero della chiesa non proibisce che in conformità dell'attuale stato delle scienze e della teologia, sia oggetto di ricerche e di discussioni, da parte dei competenti in tutti e due i campi, la dottrina dell'evoluzionismo, in quanto cioè essa fa ricerche sull'origine del corpo umano, che proverrebbe da materia organica preesistente (la fede cattolica ci obbliga a ritenere che le anime sono state create immediatamente da Dio)», PIO XII, Enc. *Humani Generis*, n. 574, in Denzinger-Hünermann, 3895, EDB Bologna 1995.

[13] JOHN PAUL II, *Discourse* to the Pontifical Academy of Sciences, 23 October 1996.

[14] The Document can be found in the Holy See's Official Web Page. Printed also in *La Civiltà Cattolica* 2004, IV, 254-286.

[15] *Negotiating Darwin*, 282.

formulation similar to that of the censorship of Copernicanism—that "the opinion of those who dare to affirm that man — in what regards the body — has appeared on Earth because of a spontaneous mutation, that from a more defective nature has uninterruptedly led at the end to a more perfect human nature" is "completely contrary to the Sacred Scriptures"[16]. Although the text refers to the creation of man and not to evolution as a scientific theory, the reference to Darwin is clear. One thing we can be sure of, the Holy Office never declared the scientific theory of evolution to be contrary to the Sacred Scripture, despite the insistent claims which requested a formal pronouncement. This reticence to condemn a scientific theory clearly reveals that: "Whatever other motives there may have been, the desire not to compromise the authority of the Church in an issue related to science was one of the reasons for the blandness of the measures adopted"[17]. This is partially explained by the fact that during the last decades of the nineteenth century, thanks to the opening of the Vatican Secret Archives by Pope Leo XIII, the documents concerning Galileo had been published, and the details of the trial were known. It is understandable that the authorities of the Church tried to avoid by all means a new conflict with the natural sciences. It might be said that when Darwin entered the Holy Office, he had the protecting shadow of Galileo to mitigate the consequences.

Nevertheless, the Church's attitude depended not only on political or strategical factors but also on theological issues. In Galileo's case the main problem was that of the competence of the Magisterium when it has to judge a matter whose borders belonged to the natural and supernatural orders. The same problem arose again with Darwin's work regarding man's descent from the animal species.

The problem in the background

In order to adequately understand the question, we need to remember the traditional principle that the authority of the Church limits his area of

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[16] Tit. IV, *De homine*, caput XIV, pace A. Piola, *Non litigare con Darwin. Chiesa ed evoluzionismo*, p. 20.

competence to matters "*de fide et moribus*", that is, those matters related to faith in its cognitive and practical dimensions. Both Galileo and his judges agreed completely on this point. Nevertheless, the judges thought the question about the immobility of the Sun and the motion of Earth was primarily not a matter of the natural order but that it concerned directly the interpretation of the Sacred Scriptures.

Actually the situation was not new. In the past, the Church Fathers had had to face a similar problem of natural philosophy regarding sphericity and the antipodes, that is claims that the earth is not flat, but a sphere, and how and whether people could live down under. The sphericity of the Earth, —already demonstrated by Greek mathematicians—, seemed to contradict some affirmations of the Sacred Scripture. The Antiochean Fathers, according to their typical literal interpretation of the Bible, denied that the Earth was a sphere. The same problem was faced by Saint Augustine: when he finally was convinced by the cogency of the rational arguments matters supporting sphericity, he resolved the matter affirming that the inspired authors of the Bible had known the truth, but that the Holy Spirit who inspired them had not taught them what was not necessary for our salvation, particularly those truths that can be known through the use of reason[18]. Hence the famous sentence by Cardinal Baronio used by Galileo during the Copernican controversy: "it is the intention of the Holy Spirit […] to teach us how to go to Heavens and not how the heavens go"[19], since the second part is not necessary for our salvation. Saint Augustine drew from here an important general hermeneutical principle: although the literal sense of the Bible

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[17] *Negotiating Darwin*, 282.

[18] PIERRE-NOËL MAYAUD, S.J., *Le conflit entre l'Astronomie Nouvelle et l'Écriture Sainte aux XVIe et XVIIe siècles. Un moment de l'histoire des idées. Autour de l'affaire Galilée*, Bibliothèque Littéraire de la Renaissance, LV, Honoré Champion Éditeur, Paris 2005, 6 vol. See also «Lettera a Madama Cristina di Lorena Granduchessa di Toscana (1615)», in *Edizione Nazionale delle Opere di Galileo Galilei*, edited by A. FAVARO. G. Barbèra Editore, Firenze 1932, vol V, p. 318 e ss, in which Galileo quotes Augustine: «breviter dicendum est, de figura caeli hoc scisse autore nostros quod veritas habet, sed Spiritum Sanctum, qui per ipsos loquebatur, noluisse ista docere nomine, nulli saluti profutura», Augustine, *De Genesi ad litteram*, lib. II, c. 9.

[19] «Io direi quello che intesi da persona ecclesiastica costituita in eminentissimo grado [Cardinal Baronio, secondo la nota a margine del Favaro], ciò è l'intenzione dello Spirito Santo essere d'insegnarci come si vadia al cielo e non come vadia il cielo», Galileo GALILEI, «Lettera a Madama Cristina di Lorena Granduchessa di Toscana (1615)», in *Edizione nazionale delle Opere*, vol. V, p. 319.

is the first to be retained, in the presence of a demonstrated natural truth, we will need to look for the allegorical or spiritual sense of that text.

Galileo exposed these Augustinian principles in two small exegetical treaties, the Letters to Father Benedetto Castelli (1613) and to Lady Cristina of Lorena, Grand Duchess of Tuscany (1615). In those letters, he affirms that, "although the Holy Scripture cannot err, nevertheless some of their interpreters and expositors could err in various ways"[20]. And also that, "given that the nature is inexorable and immutable, and that nature never overcomes the limits of the laws imposed on it", once we have known it through "sensible experience and necessary demonstrations", "[…] the natural effects that our sensible experience sets us in front of the eyes or the necessary demonstrations makes us to conclude, ought not to be revoked as dubious neither condemned" [21]. Facing with a demonstrated truth, such as the movement of the Earth and the stability of the Sun, it was necessary to modify the traditional interpretation of the Sacred Scripture[22]. The problem is that neither Copernicus nor Kepler nor Galileo were able to offer an incontestable evidence of the Earth´s movement, which arrived only in 1740, thanks to the discovery of the aberration of light by James Bradley. Galileo believed he was able to give the necessary demonstration, but it is very different being personally convinced of a theory and being able to demonstrate it. The history of science is paved with eccentric ideas spread with zeal by people convinced of their truth. In such circumstances, dealing with an undemonstrated theory, the decision of the judges to maintain the traditional interpretation of the Bible was cautious, since it tried to protect the faith of common people, incapable

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[20] "se bene la Scrittura non può errare potrebbe nondimeno talvolta errare alcuno de' suoi interpreti ed espositori, in vari modi", Galileo GALILEI Lettera al P. Benedetto Castelli, 21 dicembre 1613, in *Edizione nazionale delle Opere di Galileo Galilei*, vol. V, p. 282.

[21] "essendo la natura inessorabile ed immutabile, e mai non trascendente i termini delle leggi impostegli", una volta conosciuta da "sensate esperienze e dalle dimostrazioni necessarie", "...che quello degli effetti naturali che o la sensata esperienza ci pone dinanzi a gli occhi o le necessarie dimostrazioni ci concludono, non debba in conto alcuno esser revocato in dubbio, non che condennato", Galileo GALILEI, «Lettera a Madama Cristina di Lorena Granduchessa di Toscana (1615)», in *Edizione nazionale delle Opere*, p. 316-317.

[22] «…ne i libri de' sapienti di questo mondo si contengono alcune cose della natura dimostrate veracemente; … quanto alle prime, sia ofizio de' saggi teologi mostrare che le non son contrarie alle Sacre Scritture», Galileo GALILEI, «Lettera a Madama Cristina di Lorena Granduchessa di Toscana (1615)», *Edizione nazionale delle Opere*, p. 327.

of conceiving the movement of the Earth. This was clearer, since, without Newtonian physics to explain the movement of the Earth, the traditional interpretation of the Bible, which sees the Sun moving from East to West, was supported by common sense. This stance was cautious, but it does not mean to say that it was the right attitude, much less, that it was correct. It is rightful, however, to recognize the good faith of the actors in the trial.

But it also must be said that while the movement of the Earth was not sufficiently proven, the judges of Galileo did not waste too much time in examining the astronomic arguments in favor of the movement of the Earth. Simply they liquidated the matter saying it that it was opposed to the Bible. Galileo, on his part, although he had effectively shown the Ptolemaic system to be erroneous, was aware of not having demonstrated the movement of the Earth[23]. But he was right when he asked the theologians not to condemn as contrary to faith a matter of natural order, which could in the future prove to be true, as would happen, although later than he thought. In other words, Galileo claimed that a "natural" —scientific— proposition should not be theologically condemned if it first had not rationally been confutated—or falsified, to put it in Popper's terminology—, since with time it could prove to be true[24].

In a hand-written note contained in the manuscript of the *Dialogo* extant in the library of the Seminary of Padua, Galileo launches, with a pinch of bitter irony, this warning to the theologians:

> "Be aware, theologians that wanting to make a subject of faith the propositions concerning the motion and the quietness of the Sun and the Earth, perhaps you expose yourselves to the danger of having to condemn as heretics those who

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[23] See below note n. 25: «col tempo, dico, quando sensatamente o necessariamente si fusse dimostrato la Terra muoversi e 'l Sole star fisso»: queste parole mostrano la sua consapevolezza che tale movimento non fosse ancora dimostrato.

[24] «… havendo imparato da Santo Agostino e da altri Padri quanto grave errore sarebbe il dannare una propositione naturale che non sia prima convinta, per necessarie dimostrationi, di falsità, anzi che tardi o per tempo si potrebbe dimostrar vera, mi offerisco in voce e in scrittura, di produr quelle ragioni che hanno persuaso me». Galileo GALILEI, Carta a Dini, febrero 1615, *Edizione Nazionale delle Opere di Galileo*, XII, p. 185. See also: « Se, dunque, le conclusioni naturali dimostrate veracemente, non si hanno a posporre a i luoghi della Scrittura, ma sì ben dichiarare come tali luoghi non contrariano ad esse conclusioni, adunque, bisogna, prima che condannare una proposizione, mostrar ch'ella non sia dimostrata necessariamente» , Galileo GALILEI, «Lettera a Madama Cristina di Lorena Granduchessa di Toscana (1615)», *Edizione nazionale delle Opere*, p. 327.

affirmed the Earth is firm and the Sun stirs: with time, I say, when sensibly or necessarily would be shown the Earth to stir and the Sun to be quiet"[25].

The parallelism with the evolutionistic theories is clear: they were also innovative revolutionary theories with notable gaps and when they started to appear towards the half of the XIX century. As in the case of Galileo, the acceptance of the new theory forced a reinterpretation of Scripture. However, while in the case of Copernicanism changes concerned only the allegorical reading of some passages of the Psalms (Ps 19, 7) and the famous text of the book of Joshua (Josh 19, 7) when he ordered the Sun to be still, in the case of the evolution it was necessary to reinterpret in an allegorical way the first 3 chapters of Genesis, that up to that moment unanimously had been held as historical by the Judeo-Christian tradition[26]. Therefore, it is quite surprising that, when dealing with a matter of greater importance, since it directly concerned man, the Holy Office refrained from condemning the theory of evolution, despite all of the difficulties the theory presented.

The study of the parallels and connections between Galileo and Darwin now allows us to reach a first conclusion. The theologians, and with greater reason the Magisterium of the Church, should not be quick to condemn a scientific theory on the grounds of a lack of scientific proofs. History teaches us that Galileo was right, even if he committed several, sometimes important, errors: Galileo thought that the existence of the tides was due to the motion of the earth's rotation and orbit and, therefore, they were the proof of the movement of the Earth. He never accepted the laws of Kepler on the elliptic orbits, and remained convinced that only a circular motion was suitable to the planets. Besides, Copernicanism, understood as a system, was also wrong in holding the sun immovable at the center of the universe. Nevertheless, to forbid the teaching of a scientific theory only because it is not proven and to declare it contrary to

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[25] "Avvertite, teologi, che, volendo fare materia di fede le proposizioni attenenti al moto ed alla quiete del Sole e della Terra, vi esponete a pericolo di dover forse col tempo condennar d'eresia quelli che asserissero la Terra star ferma e muoversi di luogo il Sole: col tempo, dico, quando sensatamente o necessariamente si fusse dimostrato la Terra muoversi e 'l Sole star fisso", GALILEO GALILEI, *Dialogo sopra i due massimi sistemi del mondo*, riproduzione anastatica, Leo S. Olschki, 1999, p. 25.

the Sacred Scriptures was an error, even though partially excusable in the spirit of that time.

In the same way, Darwinian Theory had notable weak points, and even mistakes. Darwin did not know about the mechanisms of the inheritance of acquired characteristics, which arrived only with Genetics, discovered by the Augustinian monk Gregor Mendel. Even today, inside the general frame of the synthetic theory of the evolution, there are many open questions. Nevertheless, the general picture remains valid as a theory so that, on the bases of the present scientific knowledge, to refuse evolution would certainly be irrational today. In this sense, I find significant the remark made by Ernan McMullan, philosopher of Science at Notre Dame University.

> If the scientific claim falls short of proof, theologians should not foreclose the issue by committing themselves (and the Church) to a view which later scientific advances could possibly show to be a mistake[27].

To illustrate this stance with a non problematic example, we could speak about life in space, beyond the Earth, the new field of astrobiology. We do not know if there is life elsewhere, even less if there is any intelligent life. In any case, it is not a matter for theology to decide on the existence or not of life in the universe. Since there is not a metaphysical impossibility, and since it is a question of pure fact and observation, it cannot be excluded that one day we could discover forms of extraterrestrial life. Theology should explore the consequences of such discovery for Revelation. What would the presence of living beings existed in other galaxies mean for Salvation History?

The necessary synthesis

Very often, however, the issues that ignite debate between science and the Church are not as harmless as the existence of extraterrestrial life. When press and media invoke “a new Galileo Affair”, it is because the Church opposes euthanasia and experimentation with human embryos. The Church is accused

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[26] See the Rescriptum of the Pontifical Biblical Commission, 30 June 1909, on the historicity of the first 3 chapters of Genesis, Denzinger-Hünermann 3512-3519.

then of opposing science, like in the Galileo case, and of invading a field which is not hers. But in the case of euthanasia and experimentation with human embryos, we are dealing with a person, who cannot be reduced to the category of a pure object. Man is and remains a *subject*.

Let us use another example. In the last decades, there has been a shift in the scientific approach to ascertaining death from the traditional cardio-respiratory signs to the so-called *"neurological" criterion*, that is, the verification of the cerebral death[28]. It is a criterion largely used following well-defined parameters in the scientific community. According to what we have said, the Church should not enter into the scientific debate. But death is not merely a physical-biological issue. The death of a person "is a single event, consisting in the total disintegration of that unitary and integrated whole that is the personal self. It results from the separation of the life-principle (or soul) from the corporal reality of the person. […] Understood in this primary sense, is an event which *no scientific technique or empirical method can identify directly*". Nevertheless, it is possible to determine the effects that such event has on the body. And in this sense, "the 'criteria' for ascertaining death used by medicine today should not be understood as the technical-scientific determination of the *exact moment* of a person's death, but as a scientifically secure means of identifying *the biological signs that a person has indeed died*".[29]

In a similar way, it seems to me that the determination of the personal status of the human embryo is not a matter of purely embryological research. Just because we talk about a *human* embryo and therefore, about the person, there is a spiritual dimension that transcends matter, and is not, by definition, empirically

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[27] Ernan MCMULLIN, personal communication to Sir Brian Heap, Pontifical Gregorian University, May 2009.

[28] "Specifically, this [criterion] consists in establishing, according to clearly determined parameters commonly held by the international scientific community, the complete and irreversible cessation of all brain activity (in the cerebrum, cerebellum and brain stem). This is then considered the sign that the individual organism has lost its integrative capacity", John Paul II, *Discourse to the 18th International Congress of the Transplantation Society*, 29 August 2000. Web Page of the Holy See.

[29] JOHN PAULII, *Discorso in occasione del XVIII Congresso Internazionale della Società di Trapianti*, cit.

observable, even if its effects can be tracked down in nature[30]. When the Church proclaims the sacred and inviolable character of every human life, from conception to natural death, and defends the personal status of the embryo even in the pre-implantation phase, She does not make scientific but anthropological and metaphysical claims.

With the case of death and the beginning of life, we are not, as happened in the Galileo Case, in front of a theoretical problem, but in front of issues that concern the totality of man as person, with immediate consequences of an ethical nature. It is legitimate, therefore, that along with the voice of science, other reflections are added[31].

All of this brings us to suggest the demand of an authentic synthesis, that is, of a reliable integration with the results and the methods of the natural sciences in the intellectual work of the theologians. To say that the Church should not intervene in scientific matters and that, vice versa, science should not invade the field of the Church, is a good starting point. But it would mean to remain satisfied with something like a non-belligerency declaration. Pope John Paul II, in his Encyclical *Fides et ratio*, invited all of us to look for a "unified and organic vision of knowledge" (n. 85), where different perspectives are harmonized, not excluded.

In this regard, Prof. Tanzella-Nitti, an astronomer and theologian, speaking of the importance of the natural sciences in the work of theologians, affirms that theologians cannot limit themselves to reassure the faithful that there is no contradiction between science and faith, or use some isolated pieces of science here and there, as if they were the scientific proofs of creation. On the contrary, the theologians of the twenty-first century,

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30 See *The Human Embryo before Implantation. Scientific Aspects and Bioethical Considerations*. Proceedings of the XII Assembly of the PAV (27 February - 1 March 2006), Edited by Elio Sgreccia and Jean Laffitte, Libreria Editrice Vaticana, Vatican City 2007

31 Benedict XVI talked about "complexity of the epistemological problems that concern the relationship between the discovery of facts at the level of the experimental sciences and the consequent, necessary anthropological reflection on values", BENEDICT XVI, *Discourse to participants at the XII General Assembly of the Pontifical Academy for Life,* 26 February 2006.

> must look for a new synthesis between theology and the natural sciences, respectful of the great traditions of thought that have forged and strengthened the understanding of faith during the centuries. But also a synthesis where science is to be taken seriously. In doing this, theologians should refuse the idea that the compatibility between theology or religion and science is possible only when it affirms the existence of two uprooted and completely independent fields[32].

Theologians have to accept that the sky and the earth created by God are the same ones the scientists study. Hence the challenge of using natural sciences as sources of true knowledge in order to elaborate a theology able to integrate wisely and coherently the legitimate and factual results of science.

In the specific case of evolution, it is not enough to protect oneself behind generic declarations of non-incompatibility or lack of inconsistency between scientific theories and revelation. With these affirmations we have not yet resolved the true problem. What is asked of theologians, what the faithful ask, is a new synthesis able to integrate the picture that the natural sciences offers of a universe in continual evolution today—from subatomic particles to the apparition of the conscience on the cosmos, an evolutionary process that seems to advance without direction and subjected to unpredictable and casual events— with the message of the revelation of a Creator and Provident God. We would like to see in the same picture the slow emergence of awareness, the moment in which humanity crosses the Rubicon of the conscience and opened itself to a relationship in communion with God and men, and the way in which this relationship was broken: and to do this without applying an easy concordism, or ignoring the data of the paleoanthropologist and evolutionary biology.

These are some of the challenges that science sets to theologians today. The double celebration of the year of astronomy and the birth of Darwin, could become a providential opportunity to give new strength to the desire formulated by the Council Vatican II in the Constitution *Gaudium et spes*, when it affirmed that "The recent studies and findings of science, history and philosophy raise new questions which effect life and which demand new theological investigations" and prompted theologians "to collaborate with men versed in the other sciences

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[32] G. TANZELLA-NITTI, «The Natural Sciences in the Work of Theologians. Is Scientific Knowledge Relevant to Theology? », in *Culture e fede*, 17 (2009) 8-17. 17.

through a sharing of their resources and points of view" (62). Later, John Paul II, in his Letter to Fr. George V. Coyne, Director of the Vatican Observatory, remembering how the arrival of Aristotelianism in the thirteenth century posed a challenge for theology, which came out strengthened by the arrival of a new system, traced the parallel with today's situation:

> Just as Aristotelian philosophy, through the ministry of such great scholars as St Thomas Aquinas, ultimately came to shape some of the most profound expressions of theological doctrine, so can we not hope that the sciences of today, along with all forms of human knowing, may invigorate and inform those parts of the theological enterprise that bear on the relation of nature, humanity and God? [33].

In conclusion: Galileo and Darwin teach us that the theologians should refrain from condemning scientific theories as "contrary to the Scripture", nor tightly bind the message of Revelation to theories that could be in the future be proven not to be true. On their part, scientists are asked to understand that some scientific theories and their application include an ethical and anthropological dimension. That is why other disciplines, such as the theology, can legitimately pronounce on these matters, without expressing a refusal toward scientific progress. Of scientists, the same prudence is demanded as to theologians, especially when human dignity is concerned.

In any case, for all, the teaching of the Second Vatican Council remains valid:

> In order that they may fulfill their function, let it be recognized that all the faithful, whether clerics or laity, possess a lawful freedom of inquiry, freedom of thought and of expressing their mind with humility and fortitude in those matters on which they enjoy competence.[34].

As we remember an episode which originated in a failure to respect this liberty, the invitation seems particularly pertinent.

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[33] JOHN PAUL II, *Letter to Fr. George V. Coyne SJ*, Director of the Vatican Observatory, 1 June 1988.
[34] Pastoral Constitution *Gaudium et spes*, n. 62.