

## Science Meets Biblical Exegesis in the Galileo Affair

George V. Coyne, S.J.

Le Moyne College

Key words: Aristotle, Augustine, authority, evolution, exegesis, cosmology, Galileo, Scripture, tradition

### Abstract

Although Galileo's venture into theology, as discussed by McMullin, is limited to Galileo's exegesis of Scripture, it can be seen as an important element in a broader role in theology, namely in ecclesiology and in the development of doctrine. From the Council of Trent, the Reformation Council, until today there has been a development in the Church concerning the manner in which Sacred Scripture should be interpreted and as to whether it can be said to be in conflict with our scientific knowledge of nature. Galileo made a significant contribution to this development. With his telescopic observations he was, in fact, undermining the prevailing Aristotelian natural philosophy of his day and was defending the birth of modern science against a mistaken view of Scripture. The Church of his time was not prepared to accept his contribution to this theological development. What does this history have to contribute to the challenges we face today in the interactions between science and religious belief?

### The Theological Venture

The theological venture discussed by McMullin is by modern thinking a very limited venture, since it concerns exclusively biblical exegesis. However, when seen in light of the Council of Trent (1545-1563) it assumes a much broader role in theology, especially in the areas of ecclesiology and the development of doctrine. Martin Luther's break with Rome in 1519 set the stage for one of the principal controversies to surface in the conflict of the Church with Galileo, the interpretation of Sacred Scripture. In the 4<sup>th</sup> Session of the Council of Trent (8 April 1546), the Reformation Council, the Catholic Church in opposition to Luther solemnly declared that Scripture could not be interpreted privately but only by the official Church:

. . . in matters of faith and morals pertaining to the edification of Christian doctrine, no one relying on his own judgment and distorting the Sacred Scriptures according to his own conceptions, shall dare to interpret them contrary to that sense which Holy Mother Church, to whom it belongs to judge their true sense and meaning, has held and does hold . . . (Favaro 1968, XIX, 321; translation by Blackwell 1991).

Galileo, in his *Letter to Castelli* (Favaro 1968, V, 282-288; translation in Finocchiaro 1989) and his *Letter to the Grand Duchess* (Favaro 1968, V, 309-348; translation by Drake 1957), as McMullin demonstrates with great care, had privately (“according to his own conceptions”) interpreted Scripture as to the sayings therein about the motion of the Sun. In so doing he contradicted the judgment of the consultors of the Holy Office who on 24 February 1616 decreed:

. . . this proposition [“The Sun is the center of the world and hence immovable of local motion”] . . . is formally heretical since it explicitly contradicts in many places the sense of Holy Scripture according to the literal meaning of the words . . . (Favaro 1968, XIX, 321; translation by Finocchiaro 1989).

Was Galileo, in the mind of the Church, at fault? There are two essential theological issues here. First, the Council of Trent limits its decree on the interpretation of sacred Scripture to “matters of faith and morals.” Secondly, the decree of the consultors of the Holy Office speaks of the “sense of Holy Scripture according to the literal meaning of the words.” Now Galileo contends in his *Letter to Castelli* and in his *Letter to the Grand Duchess* that the nature of the motions in the planetary system is not a matter of faith and morals. Furthermore, he discusses in detail what “literal meaning of the words” might signify in terms of the many ways of interpreting Sacred Scripture. The crux of the theological problem which will eventually lead to the Church’s condemnation of Galileo is right here. The great merit of McMullin’s essay is his thorough and precise analysis of Galileo’s theology on Scriptural exegesis in the two letters and in his examination of the evidence to show that Galileo took a firm position, although at times ambiguous, as to the fact that Scripture does not teach what is the proper field of the natural sciences.

## Tradition

Tradition plays a key role in the theology of the nature of the Church and in the development of doctrine. In this regard McMullin very wisely discusses

Augustine's (354-430 CE) theology of Scriptural exegesis especially in his *De Genesi ad litteram* (translation in Taylor 1982) as a preparation for discussing Galileo's views on exegesis. A key issue that occurs throughout the history of Scriptural exegesis and one that continues into our own day, as I shall discuss shortly is, the question as to whether Scripture directly teaches anything about natural events. Briefly and in modern terms, does Scripture teach science. As McMullin shows, Augustine displayed impatience with those who sought knowledge of nature in Scripture. He admonishes his listeners that the issue of salvation far outweighs the mere desire for natural knowledge. He says, for instance:

There is a great deal of subtle and learned inquiry into these questions [nature] . . . but I have no further time to go into these questions and discuss them, nor should they have time whom I wish to see instructed for their salvation. (Taylor 1982, 2.10.23).

At other times, however, he appeals to Scripture to support a claim about the natural world. In the end for Augustine the Scriptures have some relevance for knowledge of the natural world. Subsequent traditions in the Church will remain unclear as to the relevance of Scripture for natural knowledge. With Galileo there is a considerable development in this matter. Before I pursue this, however, we should consider that, in light of our discussion of Church tradition, there is another issue in addition to Scripture which concerned the Church in the controversy with Galileo, namely, the Aristotelian philosophy of nature.

In fact, in the decree of the consultors of the Holy Office mentioned above we read:

. . . this proposition ["The Sun is the center of the world and hence immovable of local motion"] is foolish and absurd in philosophy . . . (Favaro XIX, 321; translation by Finocchiaro 1989).

The philosophy referred to is clearly that of Aristotle which, according to a long tradition, was at the foundation of the theological considerations on which the Church's doctrinal statements were formulated. If Aristotle's philosophy of nature was at risk – which it was in the Copernican controversy – then the whole fabric of Aristotelian philosophy, and together with it much of the Church's theology, could be at risk.

The natural philosophy of Aristotle (384 -321 BC) was an attempt to understand the true nature of the world and it was not just a mathematical expedient, as it had been for the Pythagoreans. For Aristotle all sub-lunar bodies were made of a combination of four elements: earth, water, fire and air. Since earth was the heaviest and water the next heaviest element, the planet Earth which consisted principally of these two elements had to be at the center as its natural place. Furthermore, there was a distinction between earthly elements and heavenly elements. Heavenly bodies by their nature were perfect in shape and in appearance: spheres, therefore, and smooth. They had to move in perfect geometrical trajectories, i.e., circles. There were at increasing distances from the Earth a series of real transparent rotating spheres on which were fixed all of the then known celestial objects. This natural philosophy, based on pure theoretical considerations, dominated the view of the universe for about 2,000 years. It presented a natural philosophy, a depiction of the universe as it was truly thought to be. It would eventually collapse under the weight of observations, especially those of Galileo reported in his *Sidereus Nuncius* (Favaro 1968, III, 53-96; translation in Drake 1957). To explain these observations a new physics would be necessary. The Aristotelian view of the universe was crumbling. The long-standing tradition of the Church in embracing Aristotelian philosophy as the foundation of its theology was being menaced.

We now return to a discussion of the development with Galileo of the Church's tradition in the interpretation of Sacred Scripture as to matters concerning our scientific knowledge of nature. As we have seen, Galileo interpreted Sacred Scripture privately which contributed to his condemnation. However, based on the following discussion of McMullin's paper, there is little doubt that Galileo essentially anticipated by some 300 years the official teachings of the Church on the interpretation of Scripture and thus made an important contribution to the development of Church tradition in this matter. In fact, on 18 November 1893 Pope Leo XIII issued his encyclical *Providentissimus Deus* which called for the study of the languages, literary forms, historical settings, etc. of Scripture so that a fundamentalist approach to Scripture could be avoided. Furthermore, on 7 May 1909 Pope Pius X founded the Pontifical Biblical Institute which is dedicated to such studies.

The Scriptural Controversy

As McMullin has shown, one of the first indications that Scripture was to play an important role in the Galileo affair occurred over lunch in 1613 at the palace of the Grand Duke of Tuscany when the Duke's mother, Christina, became alarmed by the possibility that the Scriptures might be contradicted by observations such as those of Galileo which might support a sun-centered universe. Since Galileo was supported by the Grand Duke and Duchess and in general by the Medici family, this episode was of acute interest to him. Although he was not present, it was reported to him by his friend, Benedetto Castelli. Galileo hastened to write the long letter to Castelli in which he treats of the relationship between science and the Bible (Favaro 1968, V, 282-288; translation in Finocchiaro 1989). In it Galileo stated what has become a cornerstone of the Church's teaching:

I would believe that the authority of Holy Writ had only the aim of persuading men of those articles and propositions which, being necessary for our salvation and overriding all human reason, could not be made credible by any other science, or by other means than the mouth of the Holy Ghost itself. But I do not think it necessary that the same God who has given us our senses, reason, and intelligence wished us to abandon their use, giving us by some other means the information that we could gain through them - and especially in matters of which only a minimal part, and in partial conclusions, is to be read in Scripture.

Galileo was encouraged and supported in his thinking about Scripture by the publication of a letter by the Carmelite theologian, Antonio Foscarini, which favored Copernicanism and introduced detailed principles of the interpretation of Scripture which removed any possible conflict (Favaro 1968, V, 282-288; translation in Blackwell 1991). The renowned Jesuit Cardinal, Robert Bellarmine, who will play an important role in the Galileo affair, responded to arguments of Foscarini by stating that:

. . . I say that if there were a true demonstration that the sun is at the center of the world and the earth in the third heaven, and that the sun does not circle the earth but the earth circles the sun, then one would have to proceed with great care in explaining the Scriptures that appear contrary; and say rather that we do not understand them than that what is demonstrated is false. But I will not believe that there is such a demonstration, until it is shown me (Favaro 1968, XII, 171-172; translation in Finocchiaro 1989).

However, in the end Bellarmine was convinced that there would never be a demonstration of Copernicanism and that the Scriptures taught an earth-centered universe.

Finally in June 1615 Galileo completed his masterful *Letter to the Grand Duchess* (Favaro 1968, V, 309-348; translation by Drake 1957) in which he essentially proposes what the Catholic Church will begin to teach only about three centuries later, i.e., that the Books of Scripture must be interpreted by scholars according to the literary form, language and culture of each book and author. His treatment can be summed up by his statement that:

. . . I heard from an ecclesiastical person in a very eminent position [Cardinal Baronio], namely that the intention of the Holy Spirit is to teach us how one goes to heaven and not how heaven goes (Favaro 1968, V, 319; translation by Drake 1957).

In the end, as McMullin discusses in great detail, there is no clear indication in Galileo's writings as to whether he was convinced that there was simply no teaching on scientific matters in Scripture. But he certainly leaned toward that conclusion and decisively so as to Copernicanism.

#### The Modern Church on Scripture and the Galileo Affair

The most recent view of the Church with respect to the 1633 condemnation of Galileo for his venture into theology is found in the report of the Galileo Commission (Coyne 2005). In that report we read:

Certain theologians, Galileo's contemporaries, being heirs of a unitarian concept of the world universally accepted until the dawn of the 17th century, failed to grasp the profound, non-literal meaning of the Scriptures when they describe the physical structure of the created universe. This led them unduly to transpose a question of factual observation into the realm of faith (Poupard 1992).

This incomprehension of theologians, it is said, was due to the fact that, "although the new science and the freedom of research that the methods of the new science supposed should have obliged theologians to reexamine their criteria for interpreting Scripture, most of them did not know how to do

this.” However, the majority of theologians of that epoch did not even know of the existence of a new science, did not know its methods, nor did they feel obliged to respect the freedom of scientific research. Galileo and others of that epoch (Kepler, Castelli, Campanella, etc.) were ahead of their time in proposing freedom of research. (Galileo wrote of it in the *Letter to Castelli* and in the *Letter to the Grand Duchess*). It took a long time, with the development of modern science, before this became an accepted principle. It would have carried no weight, therefore, with the theologians of Galileo’s day, neither during the events of 1616 nor during those of 1632-1633.

It is, furthermore, claimed that the error of the theologians was due to their failure to recognize the formal distinction between Sacred Scripture and its interpretation.” This cannot be correct. Since the time of Augustine, this distinction was well-established and it was taught in all the schools of exegesis at the time of Galileo. In fact, in 1616 the qualifiers/consultors of the Holy Office knew this distinction and made use of it in formulating their philosophical-theological opinion on Copernicanism. Their opinion did not ignore the distinction but their exegetical principle was flawed in that they required a demonstration of Copernicanism before one could abandon the literal interpretation of the Scriptural text. Despite the inadequacies of the report of the Galileo Commission as regards the part that Scriptural exegesis played in the Galileo Affair, the Commission did, at least in the popular mind, effect a reconciliation of the Church with Galileo.

## The Future

In modern times the interpretation of Scripture still plays a key role in the public acceptance of scientific results. This is obvious in such areas as scientific evolution and cosmology. The current situation in the evolution debate is better understood if we review a few significant episodes in the history of the debate. In 1669 Niels Stensen, a Danish scientist and Catholic priest, discovered in the mountains of Tuscany, Italy the fossil of a shark’s tooth almost identical to that of a shark caught off of the coast of Leghorn, Italy. He intuited that Tuscany must have been inundated in geological times by an ocean. He published a fundamental work on such themes and is credited thereby for having founded three branches of geological sciences: paleontology, crystallography and historical geology. The geological findings of Stensen and subsequent evolutionary biology required times much longer than those deduced from the Bible, billions of years instead of

thousands of years. For the first time also the Biblical flood was considered as the source of the inundations. From then on the mistaken attempt to employ the Bible as a source of scientific knowledge will unduly complicate the debate over evolution.

Despite what is commonly thought, it was not Charles Darwin who first caused problems for the theologians with the implications that might be drawn from the theory of evolution. About one hundred years before Darwin the *College de Sorbonne* in Paris (a kind of French Holy Office or Inquisition) condemned the great French naturalist, Georges Buffon, for having proposed, from both the cooling rate and the sequence of geological strata, that it took billion of years to form the crust of the earth. Darwin's great contribution to the growing scientific evidence for evolution was not so much evolution as such but rather the adaptation of living organisms to the environment, only one of the two great pillars of evolutionary theory: internal mutations in an organism and natural selection. Controversy from religious believers immediately showed its foreboding head. The mistaken thinking was essentially that if we human beings are descended from the apes, then we are only apes. On the contrary, Genesis says that "God created the plants and animals according to their species," i.e. he created each individual species. Furthermore, religious thinkers, not Darwin himself, thought mistakenly that evolution was dominated by chance and, therefore, not under God's dominion. We now know that it is not dominated by chance.

The great British intellectual and Roman Catholic Cardinal, John Henry Newman, stated in 1868: "The theory of Darwin, true or not, is not necessarily atheistic; on the contrary, it may simply be suggesting a larger idea of Divine Providence and Skill (Newman 1980)." What a marvelous intuition and one which fits very well the implications to be drawn from our scientific knowledge of an evolutionary universe.

This brief survey of some historical incidents shows the ups and downs of the view of the Church with respect to Darwinian evolution. However, one half century after Darwin research on evolution by Catholic scholars was a veritable mine field. Many saw on the horizon another "Galileo Affair." Nonetheless, in 1996 in a message to the Pontifical Academy of Sciences Pope John Paul II declared that: "New scientific knowledge has led us to the conclusion that the theory of evolution



is no longer a mere hypothesis (John Paul II 1996).”

One of the principal issues in the debate about scientific evolution – and, indeed, about Big Bang cosmologies – is the interpretation of the two creation accounts in Genesis. And so we return to McMullin’s detailed discussion of Augustine’s formulation of the exegetical principles for the interpretation of Genesis, to what Galileo began with his theological venture, and to the beginning of the official approach of the Church with Leo XIII’s encyclical *Providentissimus Deus* and Pius X’s founding of the Pontifical Biblical Institute. A more recent and thorough theological analysis of creation in the Hebrew Bible is given by Clifford (1988). But there still persists a widespread fundamentalist interpretation of the creation accounts in Genesis which conflicts with our scientific knowledge of evolution and cosmology (see, for instance, Schroeder 1990). This makes for one of the thorniest issues in the maturing dialogue between science and religious belief. From McMullin’s discussion of Galileo’s theological venture it becomes clear that a modern Galileo would have seized upon the opportunity to show that a correct view of Scripture would advance the dialogue. Others have done so (see, for instance, Haught 2010).

Apart from the specific issue of Biblical exegesis which McMullin addresses, there exists a more general problem with respect to ecclesiology. Could the Galileo affair, interpreted with historical accuracy, provide an opportunity to come to understand the relationship of contemporary scientific culture and inherited religious culture? For the Church revelation is derived from Scripture and tradition which are officially interpreted only by the Church (see, for instance Blackwell 1998). In contrast, authority in science is essentially derived from empirical evidence, which is the ultimate criterion of the veracity of scientific theory. In the case of Galileo the defendant was a scientific idea supported by limited but persuasive scientific observations. The authority which condemned that idea derived from the decree of the Council of Trent on the interpretation of Scripture. What would have been the consequences if, instead of exercising its authority in this case, the Church had suspended judgment? There is a clear distinction here between authority exercised over the intellectual content of a scientific idea and that exercised over a person in the enforcement of the former. This results in the fact that, as Blackwell (1998) so clearly puts it, the abjuration forced on Galileo in 1633 “was intended to bend—or break— his will rather than his reason.” Could

this contrast between the two authorities result in other conflicts? It is of some interest to note that in the third part of the same discourse whereby he received the final report of the Galileo Commission John Paul II (1992) says:

And the purpose of your Academy [the Pontifical Academy of Sciences] is precisely to discern and to make known, in the present state of science and within its proper limits, what can be regarded as an acquired truth or at least as enjoying such a *degree of probability that it would be imprudent and unreasonable to reject it*. In this way unnecessary conflicts can be avoided (italics by me).

Would that the consultors of the Holy Office in 1616 had displayed such wisdom regarding the degree of probability for Copernicanism and thus, even if unwittingly, allowed Galileo's theological adventure to mature, as it eventually did.

## References

- Blackwell, R. 1991, *Galileo, Bellarmine and the Bible* (Notre Dame: University of Notre Dame Press, 1991)
- Blackwell, R. 1998, "Could there be another Galileo case?," in *The Cambridge Companion to Galileo*, ed. P.Machamer. (Cambridge: Cambridge University Press, 1998) 348-66
- Clifford, R.J. 1988, "Creation in the Hebrew Bible," in *Physics, Philosophy and Theology: A Common Quest for Understanding*, eds. R. Russell, W. Stoeger and G. Coyne (Vatican City: Vatican Observatory Foundation 1988; distributed by University of Notre Dame Press, Notre Dame, IN, USA) 151-170
- Coyne, G.V. 2005, "The Church's Most Recent Attempt to Dispel the Galileo Myth," in *The Church and Galileo*, ed. E. McMullin (Notre Dame, IN, USA: The University of Notre Dame Press 2005) 3400-349
- Drake, S. 1957, *Discoveries and Opinions of Galileo* (New York: Doubleday and Co., 1957)
- Favaro, A. 1968, *Edizione Nazionale delle Opere di Galileo Galilei* (Florence: Giunti Barbera, 1968)
- Finocchiaro, M. 1989, *The Galileo Affair* (Berkeley: University of California Press, 1989)
- Haight, J. 2010, *Making Sense of Evolution: Darwin, God, and the Drama of Life* (Louisville: Westminster John Knox Press 2010)
- John Paul II 1992, *Discourse to the Pontifical Academy of Sciences, Origins* 22, 370-75 (12 November, 1992)

John Paul II 1996, The original message in French was published in *L'Osservatore Romano* for 23 October 1996 and an English translation in the Weekly English Edition of *L'Osservatore Romano* for 30 October 1996

Newman, J. H. 1980, *The Letters and Diaries of John Henry Newman* (Oxford: Oxford University Press, 1980) 77

Poupard. P. 1992, "Galileo: Report on Papal Commission Findings," *Origins* 22, 374-375

Schroeder, G. 1990, *Genesis and the Big Bang: The Discovery of Harmony between Modern Science and the Bible* (New York: Bantam Books 1990)

Taylor, J.H. 1982, *Augustine's "On the Literal Sense of Genesis"* (New York: Newman Press, 1982)

George V. Coyne, S.J. is Director Emeritus of the Vatican Observatory and currently holds the McDevitt Chair in Religious Philosophy at Le Moyne College, Syracuse, New York, USA. [coynegv@lemoyne.edu](mailto:coynegv@lemoyne.edu)