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THIRTEEN

THE CHURCH'S MOST RECENT ATTEMPT TO DISPEL THE GALILEO MYTH

George V. Coyne, S.J.

On October 31, 1992, John Paul II, in an address to the Pontifical Academy of Sciences,[1] said that one of the lessons of the Galileo affair is that we now have a more correct understanding of the authority that is proper to the Church and that "[f]rom the Galileo affair one can draw a lesson that remains valid in relation to similar situations that occur today and that may occur in the future."[2] Just 350 years before, Pope Urban VIII had declared that Galileo had made himself guilty of an "opinion very false and very erroneous and which had given scandal to the whole Christian world."[3] The contrast between these two official Church judgments on Galileo separated by a 350-year period is enormous. The question is: What does it bode for the next 350 years? So the import of my paper is not just academic; it attempts to present a judgment on the past and on the present with a view to the future.

In that same speech John Paul II, as he had done on previous occasions, describes the Galileo affair as a "myth":

> From the beginning of the Age of Enlightenment down to our own day, the Galileo case has been a sort of myth, in which the image fabricated out of the events was quite far removed from reality. In this perspective, the Galileo case was the symbol of the Church's supposed rejection of scientific progress, or of

> dogmatic obscurantism opposed to the free search for truth. This myth has played a considerable cultural role. It has helped to anchor a number of scientists of good faith in the idea that there was an incompatibility between the spirit of science and its rules of research on one hand and the Christian faith on the other.[4]

A myth it may be. Or it may be a genuine historical case of a continuing and real contrast between an intrinsic ecclesial structure of authority and the freedom to search for the truth in whatever human endeavor, in this case in the natural sciences.

There is an ample history of the Church's attempts to remedy the Galileo "myth."[5] While making passing reference to these, I will limit myself to addressing directly the most recent and, as best I know, latest attempt. I will seek to evaluate how well it has succeeded and what it bodes for the future. I am referring to the so-called Galileo Commission constituted on behalf of John Paul II by a letter of the cardinal secretary of state of July 3, 1981, to the members of the commission.[6] On October 31, 1992, John Paul II, in a solemn audience before the Pontifical Academy of Sciences, brought to a close the work of the commission. The pope's address was preceded by that of Cardinal Paul Poupard,[7] who had been invited by the cardinal secretary of state by letter of May 4, 1990, to coordinate the final stages of the work of the commission. An analysis of these two addresses reveals some inadequacies. I would first like to discuss those inadequacies and then try to trace their origins in a history of the commission's workings and the circumstances that surrounded them.

In the discourse prepared for the pope, the Galileo affair is described as a "tragic mutual incomprehension,"[8] and the incomprehension is specified by what can be identified as the following four principal conclusions of the two discourses: (1) Galileo did not understand that, at that time, Copernicanism was only "hypothetical" and that he did not have scientific proofs for it—thus he betrayed the very methods of modern science of which he was a founder; (2) "theologians" were not able, at that time, to correctly understand Scripture; (3) Cardinal Robert Bellarmine understood what was "really at stake"; (4) when scientific proofs for Copernicanism became known, the Church hastened to accept Copernicanism and to admit implicitly that it had erred in condemning it. I will discuss each of these four conclusions in turn.

The Methodology of Science and the Meaning of 'Hypothesis'

According to the papal discourse, the "incomprehension" on Galileo's part was that he did not understand the difference between science and philosophy. He would not accept Copernicanism as hypothetical and thus did not understand science, even though he was one of the founders of it. This accusation against Galileo is suspect on

two accounts: (1) a mistaken attribution to Galileo of the failure to distinguish between the notions of science and philosophy—Galileo never denied that there could be considerations beyond scientific ones; (2) the ambiguous notion of "hypothesis." It is wrong, therefore, to imply that Galileo was not faithful to the experimental method of which he was a founder.

In the papal discourse we read: "[L]ike most of his adversaries, Galileo made no distinction between the scientific approach to natural phenomena and a reflection on nature, of the philosophical order, which that approach generally calls for. That is why he rejected the suggestion made to him to present the Copernican system as an hypothesis, inasmuch as it had not been confirmed by irrefutable proof. Such, therefore, was an exigency of the experimental method of which he was the inspired founder."[9] Much could be said about this characterization of the scientific method and Galileo's use of it. I limit myself to discussing the ambiguity involved in the use of the word 'hypothesis.' There are two distinctly different uses of the word in this context: a purely mathematical expedient to predict celestial events or an attempt to understand the true nature of the heavens. This important difference in meaning must be seen against the history of the word's use from antiquity through medieval Christianity to the time of Copernicus through to Galileo. The best historical example of this is, of course, the case of Osiander. In his attempt to save Copernicus, Osiander, unbeknownst to the author and contrary to the latter's intent, wrote his famous preface to advise the reader that the *De revolutionibus* was intended, in the tradition of medieval astronomy, only in the former sense, as a mathematical expedient. There is no doubt that Galileo understood his own investigations to be an attempt to understand the true nature of things. It is well known that he preferred to be known as a philosopher of nature rather than as a mathematician. It can be debated as to whether Galileo himself was ever convinced that he had irrefutable proofs for Copernicanism (involved in that debate would be the very meaning of "proof" for him and for us), but it cannot be denied that he sought evidence to show that Copernicanism was really true and not just a mathematical expedient. Galileo rejected the claim that Copernicanism was a hypothesis in the former sense. He sought to find experimental verification of it in the latter sense. He can certainly not be accused of betraying the very method "of which he was the inspired founder."

The final report given by Cardinal Poupard (hereafter referred to as "the final report") asserts that Galileo did not have proof for the earth's motion, and it cites Galileo's erroneous use of the argument from the tides. However, up until 1616, when the earth's motion was declared by the Congregation of the Index to be "false and altogether contrary to Scripture," Galileo had not yet propagated publicly his argument from the tides. But it did not matter; neither in 1616 nor in 1633 was any science discussed. It was principally for scriptural considerations and also thanks to philosophical convictions that Copernicanism was condemned. Galileo's telescopic

observations of the phases of Venus, of the satellites of Jupiter, of the sequential motions of spots on the sun, and so on were completely ignored. Although not proofs, they were certainly persuasive indications of Copernicanism, and they clearly challenged Aristotelian natural philosophy. Scholars debate as to what degree of likelihood Galileo's arguments for Copernicanism up until 1616 conferred on his final arguments in the *Dialogue.* But there is no doubt that the arguments available from his telescopic observations merited a hearing. But in 1616 the Congregation of the Index did not listen to scientific arguments.

The Church's Incomprehension

As to the Church's "incomprehension," the papal address exclusively faults theologians: "The problem posed by theologians of that age was, therefore, that of the compatibility between heliocentrism and Scripture. Thus, the new science, with its methods and the freedom of research which they implied, obliged theologians to examine their own criteria of Scriptural interpretation. Most of them did not know how to do so."[10] These words echo those of the final report: "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."[11] And:

> It is in that historical and cultural framework, far removed from our own times, that Galileo's judges, incapable of dissociating faith from an age-old cosmology, believed, quite wrongly, that the adoption of the Copernican revolution, in fact not yet definitively proven, was such as to undermine Catholic tradition, and that it was their duty to forbid its being taught. This subjective error of judgment, so clear to us today, led them to a disciplinary measure from which Galileo "had much to suffer."[12]

The 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.

The point, however, is that the majority of theologians of that epoch did not even know of the existence of a new science, did not know its methods, and did not feel obliged to respect the freedom of scientific research. Galileo and others of his time (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 Christina.*) 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, during either the events of 1616 or those of 1632–33.

The papal address also claims that the error of the theologians was due to their failure to "recognize the distinction between Sacred Scripture and its interpretation."[13] 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 used 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.

The "theologians" in both discourses are unidentified and unidentifiable. There is no mention of the Congregation of the Holy Office (the Roman Inquisition), or of the Congregation of the Index, nor of an admonition given to Galileo by Cardinal Bellarmine in 1616, acting on orders from the Pope, nor of the abjuration required of him in 1633 by official organs of the Church. Nor is mention made of Paul V or Urban VIII, the ones ultimately responsible for the activities of those official institutions.

Bellarmine Saw What Was at Stake

When the papal discourse refers to "most" theologians, the implication is that a minority knew how to interpret Scripture, among whom, of course, was Cardinal Bellarmine. The discourse proceeds to accept the erroneous interpretation of Bellarmine's role that was proposed in the final report.

The papal discourse, echoing the final report, describes Bellarmine, in contrast to "most" theologians, as the one "who had seen what was truly at stake in the debate [since he] personally felt that, in the face of possible scientific proofs that the earth orbited around the sun, one should 'interpret with great circumspection' every biblical passage which seems to affirm that the earth is immobile and 'say that we do not understand rather than affirm that what has been demonstrated is false.'"[14] Following the final report, the papal discourse then offers an interpretation of Bellarmine's *Letter to Foscarini* in which two conclusions are derived that appear to make Bellarmine both the most open-minded of theologians and a scholar respectful of science. One must, according to this interpretation of Bellarmine, be circumspect in interpreting scriptural statements about natural phenomena in the face of possible scientific proofs contrary to the interpretation. If such proofs are forthcoming, one must reinterpret Scripture. Note that the epistemic priority is given here to Scrip-

ture. Since Galileo had no irrefutable proofs of Copernicanism, the current interpretation of Scripture by theologians, including Bellarmine, should remain but always be subject to reinterpretation. Is this a correct presentation of Bellarmine's position?

The final report interprets Bellarmine as saying, "As long as there are no proofs for the movement of the Earth about the Sun, it is necessary to be cautious in interpreting Scripture."[15] What Bellarmine actually says is, "Should proofs be had, then we must go back and reinterpret Scripture." The difference is: Bellarmine did not say, "Theologians should be cautious *now* in interpreting Scripture in expectation that proofs for Copernicanism might appear" but rather "If a proof *were* to appear, then *on that day in the future* theologians would have to be cautious in interpreting Scripture."

This interpretation of Bellarmine's position, in both the final report and the papal address, is based on a partial and selective reading of the *Letter to Foscarini.* In the passage immediately preceding the one just cited, Bellarmine had taken a very restrictive position by stating: "Nor can one answer that this [geocentrism] is not a matter of faith, since if it is not a matter of faith 'as regards the topic,' it is a matter of faith 'as regards the speaker'; and so it would be heretical to say that Abraham did not have two children and Jacob twelve, as well as to say that Christ was not born of a virgin, because both are said by the Holy Spirit through the mouth of the prophets and the apostles."[16] Clearly if geocentrism is a matter of faith "as regards the speaker," then openness to scientific results and circumspection in interpreting Scripture are simply ploys. They lead nowhere. Furthermore, Bellarmine cites Scripture itself in the person of Solomon to show that proofs for Copernicanism are very unlikely. And still more, at the end of the *Letter to Foscarini* Bellarmine appears to exclude any possibility of a proof by stating that our senses clearly show us that the sun moves and that the earth stands still, just as someone on a ship "sees clearly" that it is the ship that is moving and not the shoreline. Both discourses cite Bellarmine's statement: "I say that if there were a true demonstration [of Copernicanism] 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, rather than that what is demonstrated is false."[17] What they do not cite is the next sentence of Bellarmine: "But I will not believe that there is such a demonstration until it is shown me." From the concluding sentences of the letter it is clear that Bellarmine was convinced that there could be no such demonstration. A further indication of this conviction on Bellarmine's part is that he supported the decree of the Congregation of the Index aimed at excluding any reconciliation of Copernicanism with Scripture. If he truly believed that there might be a demonstration of Copernicanism, would he not have recommended waiting and not taking a stand, a position embraced at that time, it appears, by Cardinals Barberini and Caetani?[18] And why did he agree to deliver the admonition to Galileo in 1616? This admonition prohibited Galileo from pursuing his research with regard to Copernicanism. Galileo was forbidden

to seek precisely those scientific demonstrations that, according to Bellarmine, would have driven theologians back to reinterpret Scripture.

The Church Corrected Its Error

The judgment rendered in the final report that "the sentence of 1633 was not irreformable"[19] is accepted in the papal address. In both discourses there is an attempt to establish that a reformation actually started as soon as the scientific evidence for Copernicanism began to appear. It is claimed that the reform was completed with the imprimatur granted under Pope Pius VII to the book of Canon Settele entitled *Elements of Optics and Astronomy* (1822), in which Copernicanism was presented as a thesis and no longer as a mere hypothesis.[20] There are a number of inaccuracies of historical fact and interpretation in these judgments.

The imprimatur of 1822 did not refer to Galileo or to the sentence of 1633. It referred to the teaching of Copernicanism. And if it is claimed that the imprimatur implicitly reformed the sentence of 1633, why was that not made explicit? As a matter of fact, the works of Copernicus and Galileo remained on the *Index* until 1835, more than a decade after the Settele affair. And since the sentence of 1633 refers explicitly to Galileo's failure to observe the decree of 1616, why was that decree not also reformed? Of course, if the tactical maneuver of the commissary of the Holy Office, Olivieri, for granting the imprimatur to Settele's book were to be accepted, then the decree of 1616 and the sentence of 1633 would have been fully justified.[21] At the recommendation of the cardinals of the Holy Office, in order to resolve the issue and to "safeguard the good name of the Holy See," Olivieri devised the following formula. Copernicus was not correct, since he employed circular orbits and epicycles. The Church was, therefore, justified on scientific grounds to condemn Copernicanism in 1616 and 1633. Obviously, there was no need to revoke a decree that rejected what was incorrect at the time of the decree! It appears, from the diaries of Settele, that Olivieri himself had some doubts about his argumentation. Considering all of these circumstances, the resolution of the Settele affair can hardly be considered a definitive reform of the sentence of 1633.

But antecedent to this purported definitive reform are several intermediate reform movements that the final report addresses. Referring to the discoveries of aberration and parallax, it states that "[t]he facts were unavoidably clear, and they soon showed the relative character of the sentence passed in 1633. This sentence was not irreformable. In 1741 . . . Benedict XIV had the Holy Office grant an *imprimatur* to the first edition of the complete works of Galileo,"[22] and "This implicit reform of the 1633 sentence became explicit in the decree of the Sacred Congregation of the Index which removed from the 1757 edition of the *Catalogue of Forbidden Books* works favoring the

heliocentric theory."[23] To what extent were the activities of 1741 and 1757 reform decisions? The imprimatur of Benedict XIV was granted under the condition that the stipulations of the Padua inquisitor, who had requested the imprimatur, be observed. The result was that the publication in 1744 of the "complete works" had to exclude the *Letter to Christina* and the *Letter to Castelli.* Furthermore, the *Dialogue* had to be printed in volume 4, accompanied by the 1633 sentence and the text of Galileo's abjuration, and it had to contain a preface emphasizing its "hypothetical" character.

In 1757 after the cardinal prefect of the Congregation of the Index had spoken about the matter with Pope Benedict XIV, a decision was taken at a meeting of the consultors (not the cardinal members) to omit the general prohibition of Copernican books in the new *Index of Forbidden Books,* to be published in 1758. What was to be admitted and prohibited? In the 1619 edition of the *Index of Forbidden Books,* the first after the 1616 decree, and in subsequent editions there were two categories of prohibitions of Copernican works: *nominatim* (specific works) and general. The edition of 1758 excluded *only* the general. Included still were Copernicus's *De revolutionibus,* Galileo's *Dialogue,* and Kepler's *Epitome.*

The Roots of the Inadequacies

The inadequacies discussed above in the discourses that closed the workings of the Galileo Commission would, almost unanimously, be regarded as such by the community of historians and philosophers of science. In fact, I am indebted to that community, to which I cannot claim to belong, for all that I have discussed thus far.[24] As a first attempt at tracing the origins of those inadequacies, it is obvious that one must examine the workings of the commission itself. I shall now do that by discussing the constitution of the commission, the membership, the chronology of the activities, including the meetings, and the official publications and by evaluating the overall activities of the commission.

A critical problem with doing all of this is that, to my knowledge, there is no centralized commission archive. Minutes of each of the commission meetings are available, but much, probably critical, correspondence among the commission members and between the commission and the Vatican Secretariat of State is scattered among the Pontifical Academy of Sciences (Father di Rovasenda was chancellor of the academy at that time and secretary of the commission), the Pontifical Council of Culture and its predecessor councils[25] (Cardinal Poupard was head of the commission's section on culture and was appointed to close the commission's work), and various section heads. Thus far, I have been able to consult only some parts of the archives. Those researches and my personal participation as a member of the commission are the sources for the following.

Constitution of the Commission

On November 10, 1979, John Paul II, near the end of the first year of his pontificate, gave an address to the Pontifical Academy of Sciences on the occasion of the commemoration of the birth of Albert Einstein.[26] In section 6 the pope expressed the "hope that theologians, scholars and historians . . . might examine more deeply the Galileo case." That wish became reality when, on July 3, 1981, a letter of Cardinal Agostino Casaroli, secretary of state, constituted the "Galileo Commission" in the name of the pope, announcing Cardinal Gabriel-Marie Garrone as president with Father Enrico di Rovasenda as his assistant and inviting six persons to accept positions on the commission: Archbishop Carlo Maria Martini for the exegetical section; Archbishop Paul Poupard for the section on culture; Prof. Carlos Chagas and Father George Coyne for the section on scientific and epistemological questions; Monsignor Michele Maccarrone and Father Edmond Lamalle for historical and juridical questions. (Names and titles of persons and the titles of the sections are as given in the letter of Cardinal Casaroli.) The letter requested that "the work be carried out without delays and that it lead to concrete results." There was no public announcement of the constitution of the commission. The existence of the commission only became known when its first publications appeared.[27]

The first meeting of the commission was held at the Pontifical Academy of Sciences on October 9, 1981. Seven meetings of the commission were held, the last on November 22, 1983. On May 4, 1990, a letter of Cardinal Casaroli, then secretary of state, to Cardinal Poupard, then president of the Executive Council of the Pontifical Commission for Culture, invited Poupard to coordinate the final stages of the commission's work. On October 31, 1992, at the biennial meeting of the Pontifical Academy of Sciences, Cardinal Poupard presented in the final report what were described as "the results of the interdisciplinary inquiry" with which the commission had been entrusted, and the pope gave the closing address, the two discourses already discussed above.

Members of the Commission

As best I can judge from the archival material available to me, only those named in the letter of Cardinal Casaroli that founded the commission were official members. In addition, each section had collaborators whose identity can be obtained from the list of publications, from the list of those named as collaborators of the sections on culture and on exegesis, and from the editorial board of Studi Galileiani, a series published by the Vatican Observatory.[28] It is of some interest to consider each official commission member in turn.

Cardinal Gabriel-Marie Garrone, president of the commission, was made a cardinal in 1967. He had been archbishop of Toulouse, France, and he was very much involved at the Second Vatican Council in the formulation of the document *Gaudium et spes,* which treated of the Church in the modern world.[29] He served as prefect of the Congregation for Catholic Education. He suffered ill health from the mid-1980s and died on January 15, 1994. It can be surmised that the long interval between the last meeting of the commission, November 22, 1983, and the conclusion of the work of the commission on July 13, 1990, as announced by a letter of Cardinal Poupard to the commission members in which he states that "various reasons" had contributed to the commission's inactivity, was due in no small part to the personal circumstances of Cardinal Garrone's health.

Cardinal Carlo Maria Martini was named archbishop of Milan on December 29, 1979, the month after John Paul II's Einstein address in which the pope called for a reconsideration of the Galileo affair. He was made cardinal on February 2, 1983. Because of his pastoral responsibilities, he participated only in the first meeting of the commission. He was an eminent biblical scholar and had been rector of the Pontifical Biblical Institute and then the Pontifical Gregorian University.

Cardinal Paul Poupard was named pro-president of the Secretariat for Non-Believers in 1980 (in 1988 this became the Pontifical Council for Dialogue with Non-Believers). In 1982 the Pontifical Council for Culture was established and Poupard was named president of its Executive Council. In 1993 the two councils were united into one, the Pontifical Council of Culture, and Poupard became pro-president. He was made cardinal on May 25, 1985. In addition to chairing the commission's section on culture, he was called upon, as described in the previous section, to coordinate the conclusion of the commission's work.

Father Enrico di Rovasenda, O.P., was chancellor of the Pontifical Academy of Sciences from 1974 to 1986 and was appointed as assistant to the commission's president. He served as secretary of the commission and recorded the minutes of the meetings up until the last one in 1983.

Professor Carlos Chagas, a biophysicist, was president of the Pontifical Academy of Sciences from 1972 to 1988. He died on February 16, 2000.

Father George Coyne, an astrophysicist, has been director of the Vatican Observatory since 1978.

Monsignor Michele Maccarrone, a Church historian, was president of the Pontifical Committee for Research in History (Pontificio Comitato di Scienze Storiche).[30] He was a disciple of Monsignor Pio Paschini and promoted the publication of Paschini's much-contested book *Vita e Opere di Galileo Galilei* (The life and works of Galileo Galilei).[31] He died on May 4, 1993.

Father Edmond Lamalle, S.J., a historian, was archivist for the Curia of the Society of Jesus in Rome. At the request of the president of the Pontifical Academy of

Sciences, Georges Lemaître, he prepared Paschini's book for publication, introducing numerous revisions on his own account, thus adding new complications to the controversy.[32] He participated in no public commission activities, and it appears that he was replaced by Professor Mario d'Addio, but I know of no documentation to support that conclusion. Lamalle died on December 8, 1989.

Professor Mario d'Addio, philosopher and professor at the University of Rome "La Sapienza," participated in the second meeting of the commission on December 11, 1981. He was not named as a member of the commission but may have been a substitute for Father Lamalle, as I have just mentioned.

What conclusions might be drawn from these brief sketches of the commission members? It appears that most members were selected by reason of their office: prefect of the Congregation for Catholic Education, pro-president of the Pontifical Council of Culture, president of the Pontifical Academy of Sciences, chancellor of the same academy, director of the Vatican Observatory, president of the Pontifical Committee for Research in History. There was no philosopher of science or historian of science among the members, nor was there a section dedicated to those disciplines. (Some of the collaborators in the publications of the commission were historians and/or philosophers of science.)[33] Furthermore, several key members for reasons of health or other pressing responsibilities were not able to take an active role in the commission's work. Had Cardinal Martini, for instance, been able to take a more active role in the commission's work, the inadequacies in the interpretation of the role that scriptural exegesis played in the Galileo affair and especially the role of Robert Bellarmine could have been avoided.

Chronology of the Activities of the Commission

On October 9, 1981, the first meeting of the commission was held at the Pontifical Academy of Sciences. At that meeting Father di Rovasenda informed those present that in February 1981 the Holy Father had requested from him a proposal as to the Galileo affair and that on March 11, 1981, he had replied with the suggestion of a commission, with Cardinal Garrone as president and with four sections. At the subsequent meeting on December 11, 1981, Cardinal Garrone was absent due to hospitalization. Archbishop (at that time) Poupard presided. Professor Mario d'Addio participated and presented a note concerning the lack of unanimity in the sentence condemning Galileo. The commission invited Cardinal Garrone as president to request of the Holy Father that he open the archives of the one-time Congregations of the Holy Office and of the Index. At the meeting of June 17, 1982, Cardinal Garrone reported that by letter of January 9, 1982, he had requested of the Holy Father that those archives be opened. At the meeting of October 8, 1982, it was suggested that

an audience be requested with the Holy Father to report on what had been done and to ask for further directives. To my knowledge no such audience occurred. At the meeting of May 9, 1983, Cardinal Garrone referred to a discourse of the pope of that same day[34] in which His Holiness recognized the work of the commission. Cardinal Garrone suggested that all of the works of the commission be published together in a volume(s) with a preface by him and introductions by the various section presidents. To my knowledge, this publication never appeared. At the meeting of November 22, 1983, there was further discussion of the request to open the archives of the one-time Congregations of the Holy Office and of the Index.

On May 4, 1990, Cardinal Casaroli, as already noted, wrote to Cardinal Poupard inviting him, as a result of a previous discussion of Cardinal Poupard with the substitute of the secretary of state of which the Holy Father had been informed, to coordinate the final stages of the commission's work. On May 22, 1990, Cardinal Poupard wrote to the members of the commission recalling that the commission had met seven times and stating that seven years had gone by during which for "various reasons" communications between the members of the commission had discontinued. He referred to the letter of May 4, 1990, sent to him by Cardinal Casaroli, and, in order to proceed to conclude the commission's work, he asked for reports of the various sections. On July 13, 1990, Cardinal Poupard sent a letter to the members of the commission thanking them for their responses and declaring concluded the work of the commission.[35] To the same effect a letter of the same date was sent to the cardinal secretary of state.[36]

What conclusions might we draw from this summary chronology of the commission's activities? There are three periods of apparent inactivity that are difficult to understand. About twenty months passed between the call of November 10, 1979, the "first" call, and the constitution of the commission by the letter of Cardinal Casaroli of July 3, 1981, the "second" call. Why this long interval? During this interval journalistic speculations ripened: a "retrial," a "rehabilitation," even a "canonization." Who initiated this "second" call? The letter of Cardinal Casaroli gives only general hints when it says that the pope was responding to "expectations . . . expressed both in studies and in letters sent to the Holy See and to one or other of its qualified offices and in articles published in scientific journals and information releases." To what extent were parties involved in the "first" call also involved in the "second"? It would be interesting to know whether such insistent pressure existed.[37]

The interval between the last meeting of the commission on November 22, 1983, and the closing of the commission's work with the discourses of Cardinal Poupard and of the pope on October 31, 1992, also requires explanation. There was no unified commission activity during that period. In his letter of May 22, 1990, Cardinal Poupard attributes the lull to "various reasons." Other than the health conditions of Cardinal

Garrone, the commission president, mentioned above, no indication is given of what the "various reasons" were. Finally, about twenty-eight months passed between Cardinal Poupard's letter of July 13, 1990, declaring the work of the commission closed and his final report of October 31, 1992, in which he presents, as he says, "the results of the interdisciplinary enquiry which you [the pope] asked the commission to undertake."[38] The last two publications listed in the Appendix occur during this interval, and, as we shall see, they appear to have had a significant role to play in the final report.

The commission requested several times, as already noted, that the archives of the one-time Congregations of the Holy Office and of the Index be opened, but without success at that time. As a result, however, of the insistence of the commission, the Pontifical Academy of Sciences in the immediate postcommission years initiated a project, *The Catholic Church and Science,* to publish all documents concerning the Catholic Church and science contained in the archives of the previous Congregations of the Holy Office and of the Index.[39] I have no further knowledge of the progress of this project.

Except at the seven meetings of the commission over a three-year period, there was little or no exchange between the four sections of the commission. Apparently the only list of the publications officially sponsored by the commission, including those in preparation at the time of the closure of the commission, are those referred to in the final report of October 31, 1992. (See the Appendix for a list of these publications in chronological order.) The commission as a whole never accepted or rejected any of the publications so referred to, and the last two publications in chronological order appeared after the letter of Cardinal Poupard of July 13, 1990, in which he declared the work of the commission to be concluded.

Evaluation of the Activities of the Galileo Commission

What are we to make of the four points on which the final report and the papal discourse following it are subject to criticism? I suggest that two summary statements can be made: (1) there appears to have been a retreat within the Church from the posture taken in 1979 to that which concluded the work of the Galileo Commission in 1992; (2) history continues to show that the differences between authority in the Church and authority in science are persistent.

In his discourse of November 10, 1979, John Paul II said that "Galileo had much to suffer . . . from the men and agencies of the Church."[40] In his discourse and in the final report of October 31, 1992, the whole Galileo affair is summed up as a "tragic mutual incomprehension" from which a "myth" has endured according to which the Galileo controversy has become a symbol of what some think to be an inevitable con-

flict between science and faith. Both Galileo and "some theologians" were uncomprehending: Galileo because he did not respect the very scientific method of which he was one of the principal founders, the need to prove hypotheses by sound scientific evidence; "some theologians" because they did not know how to interpret Scripture. The discourse of 1979 seems to imply that Galileo need not have suffered and that the official Church held some responsibility for his sufferings. In the discourses of 1992 the implication is that Galileo's suffering was inescapable ("tragic" in the sense of the classical Greek tragedies) because of the "mutual incomprehension," inevitable if we consider those times. In the end it appears that no one was responsible for Galileo's sufferings. They had to be; they were "tragic"; they were driven in an inevitable way by the circumstances of that historical period, by an incomprehension of which Galileo himself could be accused.

From what I have presented above, the picture given in the discourses of October 31, 1992, does not stand up to historical scrutiny. What happened between 1979 and 1992? Why was the pope's wish for the work of the commission not fulfilled, namely, the desire that he expressed in his 1979 discourse and that Cardinal Casaroli repeated in his letter constituting the commission, that by "a frank recognition of wrongs from whatever side they come, [it might] dispel the mistrust that still opposes, in many minds, a fruitful concord between science and faith"?

What made the "mutual incomprehension" "tragic" and therefore provided the basis for the "myth" of Galileo? The most reasonable response, it appears, is that the "incomprehension" should be attributed to the official organs of the Church and in the end to Pope Paul V and Pope Urban VIII. This would have been more in keeping with the pope's 1979 statement that Galileo had suffered at the hands of institutions of the Church. And it could have arisen consistently with the pope's pastoral concerns in the Galileo case.[41]

The pope alludes explicitly to these concerns. At that time the geocentric universe seemed to be part of the teaching of Scripture. So pastoral concerns made it difficult to accept Copernicanism. He says: "Let us say, in a general way, that the pastor ought to show a genuine boldness, avoiding the double trap of a hesitant attitude and of hasty judgment, both of which can cause considerable harm." However, he draws no conclusion from this. What conclusions might be drawn? First, the Church's position with respect to Galileo was surely not "hesitant." Was it hasty? The pope makes an ambiguous admission that it was when he says, in comparing the Galileo case to the one that arose later concerning biblical exegesis, that "certain persons" rejected well-founded conclusions from history in their preoccupation to defend the faith.[42] "That," the pope admits, "was a hasty and unhappy decision." But note that the protagonists of this hasty conclusion are "certain persons," not theologians, not institutions of the Church, certainly not popes! In fact, it was the Pontifical Biblical Commission that drew the hasty conclusion in the exegesis

case, and it was the Congregation of the Index, the Congregation of the Holy Office, and Paul V who enacted a hasty decree in 1616 and the Congregation of the Holy Office and Urban VIII who proclaimed a hasty condemnation of Galileo in 1633.

This reluctance to place responsibility where it truly belongs is repeated in the papal discourse of October 31, 1992, with regard to the condemnation of Galileo. The claims made in the final report that the sentence of 1633 was not irreformable and that as the debate evolved it was concluded with the imprimatur granted to the work of Settele are accepted verbatim. The verdict passed on Copernicanism at that time would, of course, today be regarded as erroneous, in that sense showing that it was "reformable." But, so far as we can conclude from the circumstances of the condemnation, Pope Urban VIII and the cardinals of the Holy Office did not themselves think it to be "reformable." Furthermore, if it was reformable, why has the condemnation of 1633 or, for that matter, the decree of the Congregation of the Index in 1616 never been explicitly "reformed"?

Myths are founded in concrete happenings. In the Galileo case the historical facts are that further research into the Copernican system was forbidden by the decree of 1616 and then condemned in 1633 by official organs of the Church with the approbation of the reigning pontiffs. This, and not a "tragic mutual incomprehension," is at the source of the "myth" of Galileo. Galileo was a renowned world scientist. The publication of his *Sidereus Nuncius* (The starry messenger) established his role as a pioneer of modern science. He had tilted the Copernican-Ptolemaic controversy decisively against the long-held Ptolemaic system. Observational evidence was increasingly challenging Aristotelian natural philosophy, which was the foundation of geocentrism. Even if Copernicanism in the end were proven wrong, the scientific evidence had to be pursued. A renowned scientist, such as Galileo, in those circumstances should have been allowed to continue his research. He was forbidden to do so by official declarations of the Church. There lies the tragedy. Until that tragedy is faced with the rigor of historical scholarship, the "myth" is almost certain to remain.

Neither the final report nor the papal discourse appears to reflect the majority of the conclusions enunciated in the official publications of the commission.[43] There are strong indications, from a textual comparison of the two documents of 1992 with the commission's publications, that the views of some collaborators, not commission members, weighed disproportionately in the formulations of these documents. And, judging from an overall view of the commission's publications, their opinions are minority ones on many important issues. At any rate, the conclusions stated in the final report and repeated in the papal discourse were never submitted, as best I know, for comment to the members of the commission. For those two reasons (they appear to reflect a minority opinion and they were not approved), these two documents cannot justifiably be considered to be conclusions of the commission's work.

The Future

Could the Galileo affair, interpreted with historical accuracy, provide an opportunity to understand the relationship of contemporary scientific culture and inherited religious culture? In the Catholic tradition there is what Blackwell calls a "logic of centralized authority" required by the fact that revelation is derived from Scripture and tradition, which are officially interpreted only by the Church.[44] In contrast, authority in science is essentially derived from empirical evidence, which is the ultimate criterion of the veracity of scientific theory. In the trial of 1616 Blackwell sees the defendant to be a scientific idea and the authority that condemned that idea to be 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? But, having already exercised that authority over a scientific idea, the Church then applied that authority in the admonition given by Bellarmine to Galileo in 1616. That admonition would go on later to play a key role in the condemnation of Galileo in 1633 as "vehemently suspect" of heresy.[45]

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. Thus, as Blackwell 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? In the third part of the same discourse whereby he received the final report, John Paul II 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."[46] Would that the Congregation of the Index in 1616 had displayed a similar kind of caution regarding Copernicanism! Would that the wisdom expressed by John Paul II might guide the Church's action in times to come!

Appendix. List of publications of the Galileo Commission in chronological order as derived from the final report by Cardinal Poupard of October 31, 1992:

1982 Brandmüller, Walter. *Galilei und die Kirche oder das Recht auf Irrtum.* Regensburg: Pustet.

1983 Pedersen, Olaf. *Galileo and the Council of Trent.* Studi Galileiani 1:1. Vatican City: Vatican Observatory Publications.

1983 Poupard, Paul, ed. *Galileo Galilei, 350 ans d'histoire, 1633-1983.* Paris: Descleé.

1984 Baldini, Ugo, and George V. Coyne, eds. and trans. *The Louvain Lectures (Lectiones Lovanienses) of Bellarmine and the Autograph Copy of His 1616 Declaration to Galileo.* Studi Galileiani 1:2. Vatican City: Vatican Observatory Publications.

1984 Pagano, Sergio M., and Antonio G. Luciani, eds. *I documenti del processo di Galileo Galilei.* Scripta Varia 53. Vatican City: Pontifical Academy of Sciences.

1985 Coyne, George V., Michael Heller, and Józef Zycinski, eds. *The Galileo Affair: A Meeting of Faith and Science.* Studi Galileiani 1:3. Vatican City: Vatican Observatory Publications.

1985 d'Addio, Mario. *Considerazioni sui processi a Galileo.* Quaderni della Rivista della Chiesa in Italia 8. Rome: Herder.

1986 Fabris, Rinaldo. *Galileo Galilei e gli orientamenti esegetici del suo tempo.* Scripta Varia 62. Vatican City: Pontifical Academy of Sciences.

1987 Brandmüller, Walter. *Galileo y la iglesia.* Madrid: Rialp.

1988 Zycinski, Józef M. *The Idea of Unification in Galileo's Epistemology.* Studi Galileiani 1:4. Vatican City: Vatican Observatory Publications.

1989 Westfall, Richard S. *Essays on the Trial of Galileo.* Studi Galileiani 1:5. Vatican City: Vatican Observatory Publications.

1992 Brandmüller, Walter. *Galileo e la chiesa ossia il diritto ad errare.* Vatican City: Libreria Editrice Vaticana.

1992 Brandmüller, Walter, and Egon J. Greipli, eds. *Copernico, Galileo, e la chiesa: Fine della controversia (1820).* Atti del Sant'Ufficio. Florence: Leo S. Olschki.

Notes

1. John Paul II, "Lessons of the Galileo Case," *Origins* 22 (1992): 370–74, English translation; original in *Discorsi dei Papi alla Pontificia Accademia delle Scienze (1936–1993)* (Vatican City: Pontifical Academy of Sciences, 1994), 271 ff. The occasion of the discourse was the audience usually granted at the conclusion of the biennial plenary session of the Pontifical Academy of Sciences. The topic of the plenary session was the emergence of complexity in mathematics, physics, chemistry, and biology, and the first part of the discourse is dedicated to that theme. The last part speaks to the role of the academy in the development of human culture. The central and most substantial part of the discourse, however, is dedicated exclusively to responding to the final report of the Galileo Commission's work, which had been given by Cardinal Poupard immediately preceding the papal address.

2. John Paul II, "Lessons," sec. 11, para. 1.

3. See Annibale Fantoli, *Galileo: For Copernicanism and for the Church,* 2d ed., ed. and trans. George V. Coyne (Vatican City: Vatican Observatory Publications, 1996), 447.

4. John Paul II, "Lessons," sec. 10, para. 1.

5. See, for example, Fantoli, *Galileo,* 487 ff.

6. (The composition of the Commission will be discussed below.)

7. Paul Poupard, "Galileo: Report on Papal Commission Findings," *Origins* 22 (1992): 374–75, English translation; original in *Après Galilée* (Paris: Desclée de Brouwer, 1994), 96–97.

8. John Paul II, "Lessons," sec. 10, para. 1.

9. Ibid., sec. 5, para. 2.

10. Ibid., sec. 5, paras. 3 and 4.

11. Poupard, "Galileo," sec. 5, para. 1. The use of the word 'profound' here is a bit puzzling. A description of the heavens from the way they appear to human observers is hardly profound.

12. Ibid., sec. 5, para. 2.

13. John Paul II, "Lessons," sec. 9, para. 1.

14. Ibid., sec. 9, para. 2.

15. Poupard, "Galileo," sec. 2, para. 3.

16. Maurice E. Finocchiaro, *The Galileo Affair: A Documentary History* (hereafter *GA*) (Berkeley: University of California Press, 1989), 68.

17. *GA*, 68.

18. See Fantoli, *Galileo*, 262–63 n. 79.

19. Poupard, "Galileo," sec. 3, para. 2.

20. Paolo Maffei, *Giuseppe Settele, il suo diario e la questione galileiana* (Foligno: dell'Arquata, 1987), shows that, although the imprimatur to Settele's book was a de facto recognition of Copernicanism, it did not refer at all to the Galileo affair. He furthermore shows that Settele had hoped that his case would bring the Church to reconsider that affair.

21. This is essentially the thesis of Walter Brandmüller, *Galilei und die Kirche oder das Recht auf Irrtum* (Regensburg: Pustet, 1982), and Walter Brandmüller and Egon J. Greipl, eds., *Copernico, Galileo, e la chiesa: Fine della controversia (1820)*, Atti del Sant'Ufficio (Florence: Leo S. Olschki, 1992). In fact, the latter work is referred to in a footnote in the final report to support this thesis.

22. Poupard, "Galileo," sec. 3, para. 2.

23. Ibid., sec. 4, par. 1.

24. A meeting was held in September 1998 at the Vatican Observatory at Castel Gandolfo (Rome) to discuss the results of the Galileo Commission. The participants were Ugo Baldini, Richard Blackwell, Annibale Fantoli, Paolo Maffei, Ernan McMullin, and Michael Segre. I am indebted to all of them but especially to Annibale Fantoli for much of what I have presented thus far. See especially Annibale Fantoli, *Galileo and the Catholic Church: A Critique of the "Closure" of the Galileo Commission's Work*, Studi Galileiani 4:1 (Vatican City: Vatican Observatory Publications, 2002), translation of "Galileo e la chiesa cattolica: Considerazioni critiche sulla 'chiusura' della questione galileiana," in *Largo campo di filosofare: Eurosymposium Galileo 2001*, ed. José Montesinos and Carlos Solís (La Orotava: Fundacion Canaria Orotava de Historia de la Ciencia, 2001), 733–50.

25. See Melchor Sánchez de Toca Alameda, "Un doble aniversario: XX aniversario de la creación de la Comisión de Estudio del Caso Galileo y X de su clausura," *Ecclesia* 16:2 (2002): 142 n. 4, for a summary of the history leading to the creation of the current Pontifical Council of Culture.

26. John Paul II, "Faith, Science, and the Search for Truth," *Origins* 9 (1979): 384–92, sec. 6, para. 2.

27. At the meeting of the commission on June 17, 1982, it was decided that all publications of the commission would carry the title "Studi Galileiani," and at the meeting of Oct. 8, 1982,

it was further specified that the title would be "Studi Galileiani—Research Promoted by the Study Group Instituted by His Holiness John Paul II."

28. See the Appendix for the list of publications. Sánchez de Toca Alameda, "Un doble aniversario," gives lists of the collaborators for the section on culture (154) and for the section on exegesis (156). The editorial board of Studi Galileiani consisted of Juan Casanovas, S.J. (Vatican Observatory), George Coyne, S.J. (Vatican Observatory), Jerzy Dobrzycki (Polish Academy of Sciences), Michael Hoskin (Cambridge University, U. K.), Francisco Gomes Magalhães (Federal University of Minas Gerais, Brazil), Ernan McMullin (University of Notre Dame), and Olaf Pedersen (University of Aarhus, Denmark).

29. In this regard, see Fantoli, *Galileo,* 503–6, for a history of the role of the Galileo affair in discussions at the Second Vatican Council concerning the relationship of the Church to science.

30. This committee represents the Holy See on the International Committee for Historical Research (Comité international des sciences historiques). It is also a subcommission of the Holy See to the International Commission for Comparative Church History (Commission internationale d'histoire ecclésiastique comparée). It has nothing to do with the history of science as such, despite the temptation to think so from the French and Italian expressions. It is a research institute in Church history, not the history of science.

31. See Fantoli, *Galileo,* 503 ff, for a thorough discussion of the travails of this publication and the contribution it made to nourishing the myth of Galileo.

32. See ibid., 526–28.

33. See note 28.

34. John Paul II, "A Papal Address on the Church and Science: Commemoration of the 350th Anniversary of the Publication of the *Dialogue on the Two Chief World Systems,*" *Origins* 13 (1983): 50–52.

35. Due to the dispersal of the commission files, it is difficult to know in what these reports consisted. For the section on epistemological and scientific questions the publications up to that date sponsored by that section of the commission were submitted with a letter of Coyne to Poupard of June 19, 1990, with the notice that other publications of the section were pending. See the publications in chronological order in the Appendix (those with the attribution "Studi Galileiani" represent the contributions of this section). The pending publications appeared only after Oct. 31, 1992, when the final report was presented. Poupard replied to Coyne in the letter referred to of July 13, 1990, in which he expressed thanks for the "exhaustive response."

36. Sánchez de Toca Alameda, "Un doble aniversario," 158 n. 34.

37. In 1964 at the Second Vatican Council in the course of the commission meetings leading up to the formulation of the document on the Church in the modern world (*Gaudium et spes*), several cultural and scientific associations (Pax Romana, Union des scientifiques français) and many individual scientists urged that there be a "solemn rehabilitation of Galileo." The efforts were in vain. See Fantoli, *Galileo,* 528–31.

38. Poupard, "Galileo," sec. 5, para. 3. It does not appear that the papal audience at which the pope received the report was scheduled specifically for that purpose. See note 1.

39. At the Council Meeting of the Pontifical Academy of Sciences, on Jan. 26, 1998, this report was presented:

About 2500 codices kept in the archives of the current Congregation of the Doctrine of the Faith and derived from the previous Congregation of the Inquisition and Congregation of the Index had been examined and all the documents concerning the Catholic Church and Science had been catalogued. On this subject there are from 4000 to 4500 documents which deserve publication. The length of each document varies from a few lines up to 15 pages. In order to publish all documents four volumes will be necessary. The languages used in the documents are Latin and Italian. Some documents on the Galileo trial were so far unknown. Also some new documents on Giordano Bruno and Tommaso Campanella have been found. After copying and transcribing the text, the four volumes will be published. The first volume will contain the 16th century materials; the 2nd volume the Galileo process; the 3rd volume the 17th century and the 4th volume the 18th century.

40. John Paul II, "Faith, Science," sec. 6, para. 2.

41. John Paul II, "Lessons," sec. 7.

42. Ibid., sec. 8.

43. As I have mentioned above in the section on the chronology of the activities of the commission, the last two publications appeared after the commission's activities had been officially terminated.

44. Richard J. Blackwell, "Could There Be Another Galileo Case?" in *The Cambridge Companion to Galileo,* ed. Peter Machamer (Cambridge: Cambridge University Press, 1998), 348–66.

45. See chap. 5 of this book.

46. John Paul II, "Lessons," sec. 13, para. 2 (emphasis mine).