What about Galileo?

An enormous number of books have been written in the last 150 years claiming that the Catholic Church is not competent to speak of science. Invariably at some point "the Galileo Case" is trotted out as "proof." This can be intimidating, especially to the young. This writer's goal is to provide the reader with so much detail that he will never have to blink when an antagonist asks "But what about Galileo?" The intimidators are aided from within the Church by scientific method scholars as explained in chapters 13 and 14.

Perhaps the best modern popular narrative regarding the "Galileo case" was in the *New York Times* of October 31, 1992, "After 350 Years, Vatican Says Galileo Was Right: It Moves." The whole article must be included so that it can be analyzed because from beginning to end it has falsehoods and significant omissions. To paraphrase it would destroy its context.

> **ROME, Oct. 30—** More than 350 years after the Roman Catholic Church condemned Galileo, Pope John Paul II is poised to rectify one of the Church's most infamous wrongs – the persecution of the Italian astronomer and physicist for proving the Earth moves around the Sun.
>
> With a formal statement at the Pontifical Academy of Sciences on Saturday, Vatican officials said the Pope will formally close a 13-year investigation into the Church's condemnation of Galileo in 1633. The condemnation, which forced the astronomer and physicist to recant his discoveries, led to Galileo's house arrest for eight years before his death in 1642 at the age of 77.
>
> The dispute between the Church and Galileo has long stood as one of history's great emblems of conflict between reason and dogma, science and faith. The Vatican's formal acknowledgement of an error, moreover, is a rarity in an institution built over centuries on the belief that the Church is the final arbiter in matters of faith.
>
> At the time of his condemnation, Galileo had won fame and the patronage of leading Italian powers like the Medicis and Barberinis for discoveries he had made with the astronomical telescope he had built. But when his observations led him to proof of the Copernican theory of the solar system, in which the sun and not the earth is the center, and which the Church regarded as heresy, Galileo was summoned to Rome by the Inquisition.
>
> By the end of his trial, Galileo was forced to recant his own scientific findings as "abjured, cursed and detested," a renunciation that caused him great personal anguish but which saved him from being burned at the stake.
>
> Since then, the Church has taken various steps to reverse its opposition to Galileo's conclusions. In 1757, Galileo's "Dialogue Concerning the Two Chief World Systems" was

removed from the Index, a former list of publications banned by the Church. When the latest investigation, conducted by a panel of scientists, theologians and historians, made a preliminary report in 1984, it said that Galileo had been wrongfully condemned. More recently, Pope John Paul II himself has said that the scientist was "imprudently opposed."

"We today know that Galileo was right in adopting the Copernican astronomical theory," Paul Cardinal Poupard, the head of the current investigation, said in an interview published this week.
This theory had been presented in a book published in 1543 by the Polish scientist Nicolaus Copernicus in opposition to the prevailing theory, advanced by the second-century astronomer Ptolemy, that the Sun and the rest of the cosmos orbited the Earth. But the contest between the two models was purely on theoretic and theological grounds until Galileo made the first observations of the four largest moons of Jupiter, exploding the Ptolemaic notion that all heavenly bodies must orbit the Earth.

In 1616, the Copernican view was declared heretical because it refuted a strict biblical interpretation of the Creation that "God fixed the Earth upon its foundation, not to be moved forever." But Galileo obtained the permission of Pope Urban VIII, a Barberini and a friend, to continue research into both the Ptolemaic and the Copernican views of the world, provided that his findings drew no definitive conclusions and acknowledged divine omnipotence.

But when, in 1632, Galileo published his findings in "Dialogue Concerning the Two Chief World Systems," the work was a compelling endorsement of the Copernican system.

Summoned to Rome for trial by the Inquisition one year later, Galileo defended himself by saying that scientific research and the Christian faith were not mutually exclusive and that study of the natural world would promote understanding and interpretation of the scriptures. But his views were judged "false and erroneous." Aging, ailing and threatened with torture by the Inquisition, Galileo recanted on April 30, 1633.

Because of his advanced years, he was permitted house arrest in Siena. Legend has it that as Galileo rose from kneeling before his inquisitors, he murmured, "e pur, si muove" -- "even so, it does move."

From its first sentence to its last sentence the *NY Times* article is plagued with factual errors and important omissions but one can't deny it is an excellent example of the popular narrative of the case that is ingrained in American secular culture and the Catholic scholars who also promote it. The summary of the Galileo affair below owes much to *The Case of Galileo* by Rev. C. C.

O'Connor, published in Dublin, Ireland, in 1924. When Fr. O'Connor cites sources, this writer will include them.

Analysis

In the first sentence, the *Times* said that Galileo was condemned for proving that the earth moves around the sun. The *NY Times* writer noted that Galileo had two trials, one in 1616 and his second was in 1633. In neither trial was he tried for proving that the earth moves around the sun. In fact, Galileo had nothing to do with proving the earth moves around the sun and he was not condemned as the reader will see.

That the earth moves around the sun is known as the heliocentric theory. It was first proposed in 270 B.C, by the Greek astronomer Aristarchus. In 130 B.C., his theory was rejected by Hipparchus, who held that the sun goes around the earth. That is the geocentric theory. Hipparchus's ideas were adopted by another Greek astronomer, Ptolemy, who lived in the 2nd century A.D. His system, the Ptolemaic, held that the whole universe revolved around the earth. Ptolemy's great work, *Almagest*, was a summary of practically everything that was known about astronomy up to his time and was the authoritative work on astronomy for centuries. Ptolemy's theory was the scientific consensus in 1616 and 1633 when Galileo was tried.

Heliocentric Theory Revived

The heliocentric theory, though out of fashion, had never died, and it was known in the scientific literature of the 16th Century. Nicolaus Copernicus, who had studied at three universities in Italy, read about it. After his own observations convinced him, he revived it by publishing *De revolutionibus orbium coelestium* (*On the Revolutions of the Celestial Spheres)* in 1543, 21 years before Galileo was born. His theory, which is heliocentric, became known in history as the Copernican Model. A Danish astronomer of scientific renown, Tycho Brahe, published in the late 1570s a geo-heliocentric model in which the sun and moon orbit the earth while the other planets orbit the sun. The first published defense of the Copernican Model was Johannes Kepler's 1595 work, *Mysterium Cosmographicum* **(***The Cosmographic Mystery).*

Although the Copernican Model continued to gain favor, it did not replace the Ptolemaic Model as the scientific consensus. Copernican theory met with opposition from astronomers who doubted heliocentrism due to the absence of an observed stellar parallax which is the apparent shift of position of any nearby star (or other object) against the background of distant objects. If the Earth was moving around the sun, that shift should be observed. Stellar parallax is so difficult to detect that its existence was the subject of much debate in astronomy for thousands of years. It was only first proven in 1838 when Friedrich Bessel made the first successful stellar parallax measurement ever, for the star 61 Cygni. The extremely small observed shifts are observed, for example, at time intervals of six months when Earth arrives at exactly opposite sides of the Sun in its orbit.

Even though there was no observed stellar parallax the scientific consensus swung toward the heliocentric theory when Isaac Newton, calculating from Kepler's Three Laws (discovered in 1609 and 1619), made the argument that the earth and the planets really went around the sun and were kept in their paths by the attraction of gravitation. Newton's work, *Philosophiae Naturalis Principia Mathematica* (Mathematical Principles of Natural Philosophy) was published in 1687.

In itself, the Copernican Model prior to Newton's work did not explain things any better than the Ptolemaic Model, except that it was simpler and more likely to be correct. On the other hand, Ptolemy's system had appearances on its side. NASA could land a rover on a planet using either model because in space all positions are relative. Of course, the equations would change. On scientific grounds, it is easy to understand why the scientific consensus of Galileo's day did not accept the Copernican theory. Up until 1687, it was a very controversial hypothesis. Galileo died in 1642, the year in which Newton was born.

Products of Catholic Culture

From Chapter 3, readers of this book may understand that the current scientific cosmology, that branch of philosophy dealing with the origin and general structure of the universe, is dominated by Humanists of agnostic and atheist persuasion. The reader may also understand that much of their work is theoretical, hypothetical and constantly revised. Therefore, it is worth noting that Galileo, Copernicus, Kepler, and Newton were not products of the Humanists' so-called Enlightenment. They were inheritors of the scientific and university tradition of Christendom, including the common language that permitted European scientists to exchange ideas. Their works were in Latin. In those days, one's religion was expected to be the same as one's sovereign. Copernicus was a Polish Catholic who studied at three universities in Italy. He had a canon law degree and made his living working for the Church, thanks to his uncle, who was a bishop. Kepler was a Protestant but, as he indicated in the title, Kepler thought he had revealed God's geometrical plan for the universe. According to a biography, much of Kepler's enthusiasm for the Copernican system stemmed from his theological convictions about the connection between the physical and the spiritual; the universe itself was an image of God, with different parts of it representing the Three Persons of the Trinity. His first manuscript of *Mysterium* contained an extensive chapter reconciling heliocentrism with biblical passages that seemed to support geocentrism. Newton, in his 1687 work, *Philosophiae Naturalis Principia Mathematica,* that caused the Copernican theory's acceptance by the scientific consensus, wrote:

> This most beautiful system of the sun, planets, and comets could only proceed from the counsel and dominion of an intelligent and powerful Being. This Being governs all things, not as the soul of the world, but as Lord over all, and on account of His dominion He is wont to be called Lord God, Universal Ruler.

What Galileo Didn't Do

To summarize the above paragraphs: Galileo did not prove that the earth revolves around the sun. He had nothing to do with originating that theory or with it becoming the scientific consensus decades after he was dead. The credit for the heliocentric theory becoming the scientific consensus belongs to Copernicus, Kepler and Newton. The *NY Times* was so wrong. But there is so much more about which that newspaper story that was wrong.

So why, 359 years after his second trial, was Galileo headline news in America's "newspaper of record?" Just as evolution has more to do with philosophy than science, so also does the misrepresentation of Galileo's case have more to do with anti-Catholicism than science. It is part of the ongoing propaganda of Humanists aimed at intimidating Catholics, who might otherwise contest their bogus theories that are masquerading as science and polluting our culture, by asking us "What about Galileo?"

Background Leading to Galileo's Trials

The Protestant Revolt began in 1517, but primarily affected northern Europe when Galileo became an adult. The Council of Trent, begun in 1545 launched the Catholic Counter-Reformation. In southern Europe, the sovereigns, be they mighty kings like Phillip II of Spain or paltry princes and nobles of what later became Italy, were loyal to the Holy See and acknowledged it as the judge of faith and morals. It had been that way for centuries in united Christendom and that is why Galileo submitted to trial by a Congregation under the Pope.

Galileo Galilei was born and died in Florence, Italy. He attended the University of Pisa and in 1589 was appointed a lecturer there in mathematics which in those days included astronomy or celestial mechanics. He made enduring enemies at that time because of his style, which included ridicule of his scientific colleagues. They adhered to the teaching of the celebrated Greek philosopher Aristotle, who was then, and had been for centuries, an unquestioned authority. Through experiments he conducted, Galileo proved that in some things, at any rate, Aristotle was wrong. If Aristotle was wrong, it followed that Galileo's colleagues were wrong and they were unwilling to admit it. So the young professor thought he could bring them around more easily through ridicule than reason. He proceeded to make them a laughing stock to the students and people of Pisa. Because of Galileo's style, instead of welcoming Galileo's discoveries, his colleagues became exasperated with his arrogance and made things so hot that Galileo resigned his position in 1591 and went home to Florence.

In 1592, he succeeded to the Chair of Mathematics at the University of Padua where his predecessor had taught the Ptolemaic system and Galileo continued to teach it. The program of his

lectures from 1592 to 1604 is still preserved and those who have read them find interesting the arguments he proposed in favor of Ptolemy's system and against that of Copernicus. While that was his public position, he seemed to privately lean toward Copernicus' theory. In a 1597 letter to Kepler (the German mathematician whose Laws of Motion aided Newton), Galileo confessed that he taught the Ptolemaic system because he was afraid of being ridiculed. The scientific consensus was strongly in favor of the Ptolemaic system. No doubt there are many scientists today who teach and write in line with the evolutionary consensus because they want to be published and employed. Galileo wasn't afraid of being hampered by the Church—it was the scientists, not the theologians, he dreaded.

What Galileo Discovered

In 1609, Galileo heard from Kepler that, in the previous year, a Dutch spectacles maker had crafted the first telescope. Then Galileo made one and improved it to 32x magnification with which he made discoveries that made him famous in scientific circles. In 1610, he discovered Jupiter's satellites which he interpreted as proof of the superiority of the Copernican system. He reasoned that if big Jupiter had smaller satellites revolving around it, the Earth would logically revolve around the enormous sun rather than the other way around. Galileo made many other celestial discoveries that year and became the most ardent apostle of the Copernican system. Unfortunately, his ardor turned to aggressiveness. The boldness—some say recklessness--with which he insisted on converting his scientific colleagues served but to alienate them. It was the same style that marked his short-lived tenure at Pisa.

In 1611, Galileo went to Rome and was received in triumph. He set up his telescope in the gardens of the Pope's residence and showed the wonders of the heavens to leading churchmen and laymen. He had a long audience with the Pope and he was elected to the Accademia dei Lincei, the highest honor that could be paid to a scientist. He left Rome with pleasant anticipation of what lay ahead for him.

Galileo's triumphs only served to increase the bitterness and perhaps the envy of the scientific opponents he had made at Pisa and Padua by the sarcasm he had inflicted upon them. But at that point in time, all they could do was to lick their wounds. It is impossible to blame the Pisa and Padua scientists, or most other scientists of Galileo's day, for not accepting the Copernican theory. It had been around since 21 years before Galileo was born and until 1687, 45 years after Galileo died, it was an unconvincing hypothesis. In the course of this controversy, an appeal was made by Galileo's scientific opponents to the Bible in order to discredit his teaching and in that way the matter was shifted to the theological domain.

How the Controversy Began

It is a pity that Galileo did not stay clear of that field, but he "took the bait" and pursued his opponents into a quagmire. Here is how it happened. In 1611, a book was published, *Against the Movement of the Earth,* which endeavored to refute Copernicus with texts from the Bible. That book annoyed Galileo, who regarded its author as an ignorant busybody who wrote about things of which he knew nothing. In retrospect, the book had little scientific merit but for the first time it gave a theological aspect to the question. Convinced that the arguments in the book were doomed to fail, Galileo did not pay much attention to them until they came to the attention of his patron, the Grand Duke of Tuscany, in 1613. The Grand Duke had appointed Galileo as his Court Mathematician and Philosopher and the money that came with that job meant a lot to Galileo. The Grand Duke's mother and a priest, a former pupil of Galileo's who was a mathematics professor at the University of Pisa, had a discussion about Copernican theory. The priest upheld Galileo's teaching while the Duke's mother, quoting the Bible, upheld Ptolemy. The priest reported the conversation to Galileo. Galileo wrote a short letter to the priest, Fr. Castelli. Galileo wrote a longer letter to the mother and tried to explain that the Bible, if properly understood, was in no way opposed to the teaching of Copernicus or himself.

In the process of doing so Galileo walked right into a controversy that continues today and which is described in detail in chapter 10 of this book. Briefly that controversy goes as follows. The Church teaches that the Bible is inerrant. Some maintain that what the Church actually teaches, or should teach, is that it is only inerrant regarding matters in it that are there for our salvation. Those holding that view maintain that they can decide what is in the Bible for our salvation and what is not for our salvation. Whatever is not in the Bible for our salvation, they say, could be erroneous. If this doesn't seem like a problem to the reader, he is advised to flip back to chapter 10. Galileo asked the Grand Duke's mother, rhetorically, 'how can an opinion that has nothing to do with salvation be heretical?" That was a tactical error that played into the hands of his opponents, who answered that Galileo was a layman and asked who gave him the authority to interpret the Bible. The seriousness of that charge against him must be viewed in the context of the times. As the result of the raging Protestant Reformation that featured freelance biblical interpretation, the Council of Trent in 1546 promulgated a decree that forbade anyone to interpret the Bible in a sense contrary to that held by the Church. Galileo's opponents made sure Rome knew of Galileo's attempt at biblical interpretation and, whether it was right or wrong, it had to be looked at. Instead of silencing his opponents by his interpretation of the Bible, he only made them more determined to have his interpretation submitted for judgment.

Science Was Not on Trial

In 1615, the letter that Galileo wrote to Fr. Castelli was sent by a Dominican priest of Florence to what today is known as the Congregation for the Doctrine of the Faith. In previous times, it was called Congregation of the Index, and at other times, it was called the Holy Office of the Roman

Inquisition. After an inquiry, it was declared that the letter, though containing some phrases that were open to objection, was not contrary to Catholic doctrine. But Galileo got the hint to leave the Bible alone. He was told to "write freely but keep out of the sacristy." The same Dominican then denounced Galileo's *Letters on the Solar Spots* that had been published in 1613. At the same time, Galileo was accused of relations with a notorious anti-papal colleague that caused grave doubt as to the genuineness of his faith. This began what is known as the Process of 1616.

Whatever began the controversy, it certainly wasn't a purely scientific question that dragged the Congregation into it. The Bible had been brought into the affair, quite wrongly perhaps, by Galileo's scientific opponents, his supporters, and himself. Consequently, it had ceased to be a purely scientific question. In view of the fairly recent declaration from the Council of Trent prohibiting private interpretation of the Bible the Congregation could not ignore it. Galileo was too much of a celebrity in Rome.

The Process of 1616

At that time, the Congregation had attached to it a special body of theologians called "Qualifiers." Their task was to "qualify" propositions brought to the Congregation by stating what level of censure, if any, they merited. For example a proposition could be deemed "heretical," "erroneous," or whatever else it might be. The standard for "heretical" was that it directly and immediately opposed a revealed and defined truth of faith. It was "erroneous" if it was opposed to teaching which, though not defined, is commonly regarded as certain.

When the works of Copernicus and the support of them by Galileo were summed up for submission to the Qualifiers they were:

1. The sun is the center of the world, and consequently, it does not move through space;
2. The earth is not the center of the world, and it is not immovable, but does move through space, and it also turns on its axis.

Before reading the opinion of the Qualifiers, two facts need to be mentioned. The first has been mentioned before, namely, that those two propositions were contrary to the scientific consensus of 1616. They had supporters to be sure, but until Newton's *Philosophiae Naturalis Principia Mathematica* was published 71 years later, the burden of proof was Galileo's responsibility. The theologians were not in a position to, nor was it their job to, debate the scientific case.

Secondly, Doctor of the Church St. Augustine (d. 430 AD) established as the principle for biblical interpretation what the Church's standard became. It was the standard in 1616 and it is the standard today. Leo XIII, in his 1893 encyclical devoted to interpretation of Holy Scripture, *Providentissimus Deus*, quoted Augustine within his own binding teaching:

> There can never, indeed, be any real discrepancy between the theologian and the physicist, as long as each confines himself within his own lines, and both are careful, as St. Augustine warns us, "not to make rash assertions, or to assert what is not known as known." If discussion should arise between them, here is the rule, also laid down by St. Augustine, for the theologian:
>
> "Whatever they can really demonstrate to be true of physical nature, we must show to be capable of reconciliation with our Scriptures; and whatever they assert in their treatises which is contrary to these scriptures of ours, that is to Catholic faith, we must either prove it as well as we can to be entirely false, or at all events we must, without the smallest hesitation believe it to be so."

In other words, the standard procedure was to go with the ordinary meaning of the words of Scripture unless there is a need to reconcile the words of Scripture with something of a physical nature that has been demonstrated to be true.

The Logical Outcome

Those two facts determined the outcome of Galileo's hearing. The first proposition, they said, considered from the view of philosophy, was absurd and false. The reader is reminded that in that era, science was called natural philosophy. Recall that the translation of the Latin title of Newton's 1687 scientific opus is *Mathematical Principles of Natural Philosophy*. In the 21st Century, readers and *NY Times* pundits would not agree the 1st proposition was false, but in 1616, most scientists would have. Remember that Galileo taught Ptolemy's System at the University of Padua until 1604 even though in a 1597 letter to Kepler Galileo confessed that he taught the Ptolemaic system because he was afraid of being ridiculed. Our era may judge those theologians wrong, but they can't be judged as unreasonable. Unqualified themselves to judge the science of the matter, they perhaps wrongly but reasonably went with the plain meaning of the words of Scripture because, according to the scientific consensus, there was nothing of a physical nature that had been demonstrated to be true that required Scripture to be reconciled with it.

In qualifying the second proposition, they said from the theological point of view that it is formally heretical, inasmuch as it expressly contradicts several passages of Holy Scripture, according to the natural meaning of these passages and the common interpretation of the Fathers and theologians. They added that the second proposition looked at from the view of philosophy (science), was the same as the first, namely, absurd and false. From the theological standpoint, the censure attached to it was "at least erroneous in faith." Based on the two facts that guided their reasoning, it is hard to imagine how the Qualifiers could have reasonably reached any other conclusions.

Not Condemned

The Congregation accepted the Qualifiers' recommendation, and the formal decision required Galileo to "abandon altogether the opinion that the sun is the center of the world and immovable, and that the earth is in motion; to abstain for the future from defending or teaching it in any manner, either by speech or writing, under penalty of proceedings being taken against him in the Holy Office." When he was formally censured the word "heretic" was not used, it has been suggested, because the Congregation did not want to give Galileo's opponents that name to use against him. In 1616, after the trial, when rumor had it that he had been condemned as a heretic, Galileo obtained a certificate signed by Cardinal (now St.) Robert Ballarmine testifying that he had not been asked to abjure any of his opinions or doctrines, nor had any penance been imposed upon him. He explained that he had only been informed of the declaration of the Sacred Congregation that the Copernican doctrine is contrary to the Holy Scriptures, and consequently cannot be defended or held. Cardinal Ballarmine was present when Galileo received verbally the Congregation's decision and is known for his efforts to have the decrees of the Council of Trent implemented. His testimony on the certificate he signed at Galileo's request carried enormous weight.

It Wasn't the Congregation's Initiative

One can see that in the Process of 1616, the Congregation had to referee a fight it didn't start. It judged reasonably, based on the facts then existent, and censured softly. Galileo had his "day in court" and was treated fairly and kindly. When one considers that perhaps Galileo's ungracious style in dealing with those who disagreed with him seemed to lie at the base of his troubles, it could be said that he got better than he deserved.

None of this episode indicates that "the Church," meaning the Magisterium and the Pope's infallibility, was proved wrong. Neither was involved. It was a hearing by a Congregation. Pope Paul V approved it, but if he wanted to raise it to the level of an *ex cathedra* decree, he could have by making it specifically his own and declaring that he meant to settle the Copernican question definitely and irrevocably forever. He didn't. He merely approved it as these types of decisions usually are, *in forma communi* (in the ordinary way). It is a decree of a Congregation, no more, no less. The Pope could have made it his own by approving *in forma specifica* and then it would have become a Papal Decree. He didn't. Though they have great weight, Papal Decrees would not be a binding exercise of the Ordinary Magisterium. The Church never promulgated for the binding of the faithful that the Copernican theory was contrary to faith or morals. The Congregation simply did not accept an unproved hypothesis as the basis for interpreting Scripture.

As a follow-up to the Galileo trial, in March of the same year, Copernicus' book was banned "until it shall have been corrected." Banned altogether was a book by a priest which attempted to show that Copernicus' book was not opposed to the Bible.

Galileo after the Process of 1616

He acquiesced in the order that was given him and promised to observe it. If Galileo was being sincere in the letter he had written to a Bishop almost a year to the day before his 1616 trial, one can see why he promptly submitted. In February of 1615, he declared he would do anything rather than cause scandal by refusing to submit to a decision by the ecclesiastical authorities. As already shown above, the Ptolemaic system was the scientific consensus of the era, so, apart from any question of the scandal which might be caused, his bowing to the decision of the Congregation was in reality nothing more than falling in with the views of the great majority of the scientists of his day.

When Galileo returned to Florence, he was under a cloud, but had no reason to be downcast. He was personally convinced of the truth and ultimate triumph of his opinions. He knew that the Congregation's decision, which only applied to him, was not going to be the last word on the subject. He had lots of well-placed friends in Rome and by his prompt submission he earned favor with Pope Paul V, who received him and assured him of his protection. When the Congregation banned other books related to the trial, as stated above, none of Galileo's works were mentioned, perhaps because of his prompt submission. Galileo realized that for the time being, at least, it would be best to keep his promise. In Florence, he went on with his studies and kept out of print.

Time proved him right. In 1620, the changes in Copernicus' book had been made and, commentators believe, they were of little consequence. The net result was that the Copernican theory could be held as a hypothesis, but not a fact. By 1623, Galileo was "straining at the bit." He devised a way to stay within the letter of the promise he made. He prepared a book that included more observations of the heavens and concluded that, since the Copernican model was condemned by the Congregation and the Ptolemaic model was condemned by the telescope, there must be some other explanation for the astronomical things that were being observed. That was camouflage, but he sought and got from the Roman authorities an Imprimatur, an official permission to print the book. At nearly the same time, his greatest friend among the cardinals, Cardinal Barberini, became Pope Urban VIII. Galileo asked his friend for permission to dedicate the book to him. When it was published with the proud words, "Dedicated by permission to His Holiness Pope Urban VIII," his social and scientific enemies must have cringed and ground their teeth. The book was an immediate success, and Galileo's glory days were back. In 1624, he had six private audiences with his friend and tried to get him to quash the decree of 1616, but to no avail. Thinking that he would bring the Pope around, and perhaps getting a little cocky, Galileo,

in 1624, clearly broke his promise by writing a letter to a bishop in defense of the Copernican system.

The *Dialogue* Deception and Betrayal of Friendship

For the next six years Galileo worked on a book he thought would finish the Ptolemaic system for good, *Dialogue on the Two Principal Systems of the World*. When he went to Rome to seek an Imprimatur, it was recognized that Galileo had entirely ignored the prohibition of 1616 and broken his promise. He was told of certain changes that needed to be made and without them no Imprimatur would be given. Galileo reluctantly agreed to make them and returned to Florence. But then he tried to get around that promise, too. He had enormous support behind him from the heir of the Grand Duke of Tuscany, who had appointed him Court Mathematician and Philosopher. So, he applied to have the book published in Florence, but the Roman authority, Msgr. Riccardi, with whom he negotiated, refused and reminded him of his promise to make the agreed corrections. Political pressure from the Grand Duke was applied on Msgr. Riccardi who agreed to transfer the matter to the Inquisitor of Florence. He, being there under the nose of the Grand Duke, was more pliable. Galileo got the Imprimatur of the Inquisitor of Florence. Then Galileo committed a very rash and contemptible act that was reflective of his life-long style. He reverted to the haughty professor of his days at Pisa and Padua when ridicule of those who disagreed with him was his stock in trade.

The book was published with practically none of the changes that Rome had insisted upon. Worse yet, it proclaimed to have the Imprimatur of the Inquisitor of Florence and the Imprimatur of Rome (which had not been given). Galileo had to know full well that the conditions laid down by Msgr. Riccardi had not been fulfilled. But even that wasn't the worst. The book was written in the form of a dialogue between three speakers named Segredo, Salviati and Simplicio. Though the names were fictitious, everyone knew that they represented certain individuals. Segredo was a well-known Venetian and Salviati represented a well-known Florentine. Both were friends of Galileo, and both were dead. They were advocates of the Copernican system. Simplicio, the name obviously chosen for he was the simpleton of the group, advocated the Ptolemaic system. His ridiculous arguments were received with roars of laughter by his clever companions.

Who was that fool Simplicio? It could have been any of the Roman authorities or rival scientists but, rightly or wrongly, many people identified him with the reigning Pope. It appeared certain that a number of Simplicio's arguments were the very ones Urban VIII had used during the audiences wherein Galileo tried to get him to rescind the finding of 1616. The book created a painful sensation in that it showcased Galileo's duplicity, his contempt for the decree of 1616, his ingratitude to Urban who had befriended him when he needed friends, the unworthy methods to which he had stooped to have the book published, his lie about having received the Imprimatur of Msgr. Riccardi, and his unfairness to his opponents in putting their case in the mouth of a fool.

This shocked the public, at least that part of it that followed these matters. It showed a far different Galileo from the public *persona* he had cultivated since 1616. It could not be ignored. Thus began the process of 1633.

The Process of 1633

In September of 1632, Galileo received an order to come to the Holy Office a.k.a the Roman Inquisition. Think of this as a modern day subpoena from a court. Galileo said he couldn't come because of illness, so he was granted a postponement. The months rolled by and medical certificates kept arriving in Rome, testifying that he was too weak to travel. Finally, Rome informed the local Inquisitor, the one who had been bent into giving an Imprimatur on the *Dialogues*, that a representative of the Holy Office and a doctor would be sent to Florence to examine Galileo. It was said that if the state of his health really required it, he would be granted a further postponement. But, if he was found to be malingering, he would be arrested. Galileo's health improved and he arrived in Rome in a litter supplied by the Grand Duke on February 13, 1633. One might speculate that his health improved naturally or the threat of a doctor's visit and his arrest ended his malingering, but it matters little to the case. When he arrived in Rome he stayed at the home of a friend, the Grand Duke of Tuscany's ambassador to the Holy See, while waiting for the trial. The trial began April 12, 1633. Fr. O'Connor cites the 11th edition of the *Encyclopedia Britannica* for the information that says that instead of being put into one of the cells, as was customary, he stayed at the residence of the Procurator "where he occupied the best apartments and was treated with unexampled indulgence."

The Three Charges to Which Galileo Pleaded "Not Guilty"

1. Violating an order of the Holy Office dated February 25, 1616, forbidding him to defend or teach, in any way whatsoever, false doctrine, namely, the Copernican Model, which order he had promised at the time to faithfully obey. (In modern times this might be called "contempt of court.")
2. Writing a book entitled *Dialogue of the Two Principal Systems of the World*, in which that doctrine is stated to be true though it had been qualified by theologians of the Holy Office, and condemned as altogether contrary to the Holy Scriptures. (This was a charge that Galileo taught heresy.)
3. Believing in his heart that such doctrine was true, though it had been condemned as false and contrary to the Holy Scriptures by the Holy Office. (This was a charge that he was a heretic.)

With respect to these charges, keep in mind that the scientific consensus was about the same in 1633 as it had been in 1616 so there was no need to revisit the scientific issue. Newton wasn't even born. When the trial opened Galileo was confronted with the decree of 1616 he promised to

honor. His reply was that what had been read out to him in 1616 was not the official decree but a summary of it that was made by Cardinal Bellarmine. He said that what was read to him included "forbidden to teach or defend the Copernican doctrine," but it had not included the phrase "in any way whatsoever." He maintained that, since those words were omitted, he was within his rights to teach and defend the Copernican doctrines as a hypothesis, and that is all he had done or intended to do. The point was nothing more than a quibble. Galileo and everyone else knew it. But, in order to give the accused the benefit of the least doubt, the trial was adjourned for more than two weeks. The adjournment was to give both sides time to re-read *Dialogues*, and see whether Galileo had taught the Copernican doctrine as a fact or a hypothesis.

Galileo's Lame Defense

When the trial resumed, Galileo gave an eloquent speech he had crafted to explain how the book he intended to refute Copernican theory ended up defending Copernican theory. He admitted that, having read the book over again

> [I]n order to note whether, contrary to my most sincere intention, there had by any inadvertence fallen from my pen anything from which a reader or the authorities might infer some taint of disobedience on my part…I freely confess that in several places it seemed to me set forth in such a form that a reader ignorant of my real purpose might have had reason to suppose that the arguments adduced on the false side, and which it was my intention to refute, were so expressed as to be calculated rather to compel conviction by their cogency than to be easy of refutation…I now see I was misled by that natural complacency which every man feels with regard to his own subtleties, and in showing himself more skillful than the generality of men in devising, even in favor of false propositions, ingenious and plausible arguments….My error, then, has been—and I confess it—one of vain-glorious ambition and of pure ignorance and advertence…And in confirmation of my assertion that I have not held, and do not hold, as true the opinion which has been condemned, I promise to take up the arguments already adduced in favor of the said opinion, which is false and has been condemned, and to confute them in such most effectual manner as by the blessing of God will be possible to me. I pray, therefore, this Sacred Tribunal to aid me in this good resolution, and to enable me to put it into effect. (Hull, S.J.: *Galileo and his Condemnation*, p. 55-58.)

That admission naturally entailed admission of the first charge; consequently he pleaded guilty to both. Contrary to the *New York Times*, no threat of torture was involved in the only two charges of which he was convicted. He was not convicted of the third charge that he was a heretic. With respect to the two charges to which he pleaded guilty, he appealed to his judges to consider his age, 69, and his impaired state of health, when they passed sentence.

Acquitted on Charge of Heresy

The reason he was acquitted on the third charge, in spite of all he had written in favor of Copernican's theory, certainly reflects on the utter fairness of the trial. Why he was acquitted must be told. When it came to the third charge, "believing in his heart that such doctrine was true, though it had been condemned as false and contrary to the Holy Scriptures by the Holy Office," Galileo maintained his innocence. "Before the decision of the Congregation of the Index," [in 1616] replied Galileo, "I had an open mind on the question, regarding both views as tenable. But after that decision all doubt vanished from my mind, and I held, and still hold, that the opinion of Ptolemy is true and certain." Reading that today, it certainly looks like Galileo was lying and that's how it looked in 1633. It was pointed out to him that his writings didn't seem to suggest that he thought Ptolemy was right and Copernicus wrong. "I repeat again," Galileo replied, "that since the decision of my superiors I never believed in my heart that the Copernican doctrine was true." Of course they did not accept his denial. Torture was a recognized form of judicial examination in that era and he was threatened, but the threat failed to elicit a different answer. "I tell you plainly," he repeated, "that ever since I was informed of the decision by the Index I never believed in the Copernican opinion." Since there was no proof that in his heart he really believed in the Copernican opinion (Galileo alone could prove that and he had denied it) he was allowed to stand down.

His Sentence

On June 22, 1633, sentence was passed on Galileo. The sentence itself was preceded by a recap of the history of what led up to the trial and the judgment. Although he was acquitted of the third charge, that he was a heretic, he was declared to be "vehemently suspected" of heresy, that is, suspected of having held the Copernican doctrine that he had denied holding. Consequently, for that reason, and the two to which he had pleaded guilty, he was told he had incurred the censures and penalties prescribed in the canons and other constitutions for delinquents of that description. He was told it would be the Holy Office's pleasure that he be absolved, provided that with a sincere heart and unfeigned faith, in its presence he abjured his said errors and heresies. The text of the abjuration was given to Galileo. In addition, he was told that "in order that your grievous and pernicious error and transgression may not go unpunished and that you may be made more cautious in the future, and may be a warning to others to abstain from delinquencies of this sort" he received the following punishment:

1. *Dialogues* was banned.
2. Galileo was to be detained in the Holy Office prison "for a period determinable at our pleasure."
3. As a penance, once a week for the next three years he was to recite the seven penitential psalms.

"We reserve for ourselves the power of moderating, commuting or taking off the whole or part of said punishment or penance." As was the custom, Galileo knelt, was placed under oath and recited the abjuration prepared for him. In a magnificent example of kindness in return for insult, Pope Urban VIII immediately cancelled the part about the Holy Office prison and designated the palatial Villa Medici that belonged to the Grand Duke of Tuscany as Galileo's abode. Within a month, Galileo was permitted to accept the invitation of the Archbishop of Sienna who entertained him with princely hospitality. However, Galileo longed for Florence, so the Pope allowed him to return to his villa outside the city. At first he was not permitted to go into Florence but Urban removed that restriction later on.

Galileo returned to his research and studies and in 1638 published a work on mechanics, *Dialogues on the New Science*, considered to be the most valuable of his books. Four years later, he died at the age of 78, a ripe old age especially for the 17th Century. As many older people do even today, Galileo suffered a number of bodily infirmities including blindness. He also had long-running domestic issues, especially with his daughter, which was unrelated to his academic pursuits. Upon his death bed, he received the special blessing of Pope Urban VIII. He is buried in the basilica of Santa Croce in Florence where Florence's greats are buried. That is an honor similar to the way England has buried distinguished persons, including Darwin who lies a few feet from Newton, in Westminster Abbey. In 1734 a monument to Galileo was erected in Florence with the inscription "without equal in his age."

The Final NY Times Falsehood

After being treated to that *NYT* writer's version of the abuse Galileo received at the hands of the "Inquisition," (now there is a loaded word) it made a good dramatic ending in which *NYT* readers could picture sick, old Galileo rising from his knees after swearing an oath that he didn't believe the earth moved and see his lips moving as he whispered to himself, "e pur, si muove" –"even so, it does move." In Fr. O'Connor's 1924 book he cited the *Encyclopedia Britannica's* article on Galileo regarding the origin of the legend.

> The legend, according to which Galileo, rising from his knees after repeating the formula of abjuration, stamped on the ground and exclaimed E pur si muove! is, as may readily be supposed, entirely apocryphal. Its earliest ascertained appearance is in the Abbe Irailh's *Qierelles Littereraires* (Vol. III, p.49) 1761.

That would be 128 years after it was supposed to have happened.

The Church and the Galileo Case

In summary, the charge that the Galileo Case is evidence of the Church's opposition to science or that the Church suppressed the Copernican theory for doctrinal reasons has no truth to it. The Church never taught the geocentric system as a matter for belief. The Vatican's Congregation was dragged into the case by Galileo's scientific colleagues who opposed him and the basis of the charge against him was private interpretation of Scripture. One can see how wise the proscription against private interpretation by the Council of Trent was. Today there are perhaps thousands of Protestant and Evangelical sects each interpreting the Bible as they see fit (and quite a number of nominally Catholic scholars doing the same.) The Congregation's decision was not an authoritative teaching proposed for the belief of the universal Church, i.e., it was not an exercise of either the Ordinary or Extraordinary Magisterium. It was simply a judicial act of a Congregation. Based on the facts at hand, the theologians made the correct decision. Try to write a scenario in which the theologians of the Congregation could have decided otherwise. On what basis could they have made a judicial finding such as the following?

"It is clear that Galileo has engaged in private interpretation of Scripture in disobedience to the Council of Trent. It is clear that Galileo's interpretation is contrary to the plain meaning of the words of Scripture. It is clear that we are obliged to follow the plain meaning of the words of Scripture unless there is a reason to interpret them because of an apparent contradiction with a known fact. Galileo's opinion is not based on a known fact; it is just a hypothesis that doesn't enjoy more than a minority of support in the scientific community. However, although we are without scientific expertise ourselves, we have decided that Galileo's opinion, as contrary as his hypothesis is to the plain meaning of the words of Scripture and contrary to the best advice we can get from the scientific community, is so credible to us that this Congregation endorses it and will immediately set about introducing a new interpretation of Scripture in harmony with it."

That would be absurd.

The Copernican view continued to gain ground without any attempt to hide it by the Church as some have claimed. Yet, it was not until 1687 that Newton's work turned Copernican Theory into the new scientific consensus even though astronomers still looked for evidence from stellar parallax and that was not demonstrated until 1838.

Stand Tall

No Catholic has any reason to be intimidated by any reference to Galileo. Pay no attention to those scientific method scholars and evolutionary cosmologists within the Church spinning false versions of it to sell their books and DVDs. Understand that Popes have speech writers for talks to groups that do not involve their Ordinary Magisterium and the speech writers are products of their education, such as it is. Pay no attention to Catholic baiters in the media. You now know more

about the facts of the case than anyone with whom you are likely to have a face-to-face discussion. Defend your Church with confidence!

Post Script

Pope St. John Paul II's October 31, 1992 address to the Pontifical Academy of Science that was the subject of that *New York Times* article was during the Plenary Session when invitees were discussing The Emergence of Complexity in Mathematics, Physics, Chemistry and Biology. That address is online at www.casinapioiv.va/content/dam/accademia/pdf/sv100.pdf. It is not exactly the *mea culpa* that the secular media reported. In fact it was a warning to scientists. For example JP II said:

> In his effort to establish a rigorous description and formalization of the data or experience, the scientist is led to have recourse to metascientific concepts, the use of which is, as it were, demanded by the logic of his procedure. It is useful to state exactly the nature of these concepts in order to avoid proceeding to undue extrapolations which link strictly scientific discoveries to a vision of the world, or to ideological or philosophical affirmations, which are in no way corollaries of it. Here one sees the importance of philosophy which considers phenomena just as much as their interpretation.

That is the same point that Pope Pius XII made most vehemently in *Humani Generis*, namely, the tendency of many to engage in undue extrapolations from science into metaphysics, that branch of philosophy that deals with the first principles of things, including abstract concepts such as being, knowing, substance, cause, identity, time, and space.