

The Galileo affair: history or heroic hagiography?

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From *Creation Ex Nihilo Technical Journal* 14.1(2000) 91-100

The 17th-century controversy between Galileo and the Vatican is examined. Fifteen theses are advanced, with supporting evidence, to show that the Galileo affair cannot serve as an argument for any position on the relation of religion and science. Contrary to legend, both Galileo and the Copernican system were well regarded by Church officials. Galileo was the victim of his own arrogance, the envy of his colleagues, and the politics of Pope Urban VIII. He was not accused of criticising the Bible, but disobeying a papal decree.

Introduction

The process against Galileo Galilei (1564-1642) in the 17th century is frequently used as an argument against creationist scientists and theologians, who make their belief in the trustworthiness of the Bible the starting point of their scientific research. Absolute faith in the Bible, critics say, blinds creationists to scientific progress and hinders science. Thus, Hatisjorg and Wolfgang Hemminger wrote in their book against creationism:

*“Today's Creationism ... turns against the great Christian naturalists of the 15th and 16th century, against Copernicus, Galileo, Kepler and Newton. It repeats the proceeding against Galileo and argues in principle with the Inquisitors, for the issue at the trial was, among other things, whether the natural scientist had the freedom to set experimentation and observation above Scripture Today's Creationists in principle have the same standpoint as the Inquisitors because they follow their empirical- biblicistic method.”*¹

This, of course, is nonsense. Galileo was a scientist who believed in the trustworthiness of the Bible and sought to show that the Copernican (heliocentric) system was compatible with it. He was fighting against the contemporary principles of Bible interpretation which, blinded by Aristotelian philosophy, did not do justice to the biblical text. Galileo was not blamed for criticising the Bible but for disobeying papal orders. Today, most creation scientists read the Bible differently from the contemporary school of biblical interpretation, i.e. higher criticism, and therefore are criticised by the liberal theological establishment and by natural scientists.

The picture of the Vatican process against Galileo Galilei, used by the Hemmingers and others, is not drawn from historical research but from heroic hagiography. The picture of a life-and-death battle between a completely narrow-minded Christian

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Church and an ingenious and always objective natural science in the Galileo affair depends on too many legends.

Examples of hagiographies on Galileo that are full of legends are the biographies of the anthroposophical author, Johannes Hemleben,² the official Galileo biography of the former German Democratic Republic (East Germany) by Ernst Schmutzer and Wilhelm Schultz,³ and the chapter on Galileo in Fischer-Fabian's book *The Power of Conscience*.⁴

There are many examples of a virtually religious, 'adoration' of Galileo⁵ in juvenile⁶ as well as in academic literature.⁷

I know of only one printed exhaustive answer by a creationist (in the broad sense) to the misuse of Galileo's trial by evolutionists. This appears in *The Doorway Papers* by the gap theorist Arthur C. Custance.⁸ An even more extended comment by creationists on the Galileo affair is necessary. This article will give a first evaluation and list important literature, but can only help to start discussion. Koestler is right when he states, "*Few episodes in history have given rise to a literature as voluminous as the trial of Galileo.*"⁹

In view of more than 8,000 titles on the Galileo affair and the 20 volumes of the complete works of Galileo himself, one article cannot discuss all aspects of the whole issue.

The following 15 theses will show why the Galileo affair cannot serve as an argument for any position on the relation of religion and science. I will mainly follow Galileo's own writings,¹⁰ the biography by K. Fischer,¹¹ A. Koestler's research on the original documents of the Galileo process,¹² the essay by A. C. Custance⁸ and the scientific research of the Czech author Zdenko Solle.¹³

The intent of the theses can be summarised with Koestler's judgment, "*I believe the idea that Galileo's trial was a kind of Greek tragedy, a showdown between "blind faith" and "enlightened reason", to be naively erroneous.*"¹⁴

It goes without saying that these theses do not intend to defend the Inquisition or aim at denying any of the scientific value of Galileo's thinking or research. But Solle is correct, when he writes, "*The picture full of contrast, showing a heroic scientist in front of the dark background of Inquisition will develop many different nuances.*"¹⁵

Thesis 1. The Copernican system was well regarded by Church officials

An open defence of the Copernican system was, in principle, without danger. The Ptolemaic system had been denied by many high officials and Jesuit astronomers even before Galileo was born. As the example of the Imperial Court astronomer, Johannes Kepler (1571-1630),¹⁶ proves, many of them followed the Copernican system. "*The Jesuits themselves were more Copernican than Galileo was; it is now well recognized that the reason why Chinese astronomy advanced more rapidly than European astronomy was simply because Jesuit missionaries communicated to them their Copernican Views.*"¹⁷

*“While Martin Luther called the author of *De revolutionibus orbium coelestium* [i.e. Nicolaus Copernicus (1473-1543)] a ‘fool’, which will turn ‘the whole art of Astronomiae upside down’, the book had not been fought by the Vatican. It was seen as a ‘mathematical hypothesis’, but had already been used as an aid in astronomical calculations for a long time. Only some time after leading Jesuit scientists like Pater Clavius had agreed to the trustworthiness of Galileo’s observations, did Copernicus and his followers become ‘suspicious’.”¹⁸*

The book by Copernicus was not placed on the Vatican Index¹⁹ until 1616 to 1620 and was readmitted to the public after some minor changes.²⁰ Only Galileo’s *Dialogo* remained on the Index from 1633 till 1837.²¹

Thesis 2. Galileo was well regarded by the Church

Until the trial against him, Galileo stood in high esteem among the Holy See, the Jesuits and especially the popes of his lifetime. His teachings were celebrated. Galileo’s visit to Rome in 1611, after he had published his *Messenger from the Stars*, “was a triumph”.²² “Pope Paul V welcomed him in friendly audience, and the Jesuit Roman College honoured him with various ceremonies which lasted a whole day.”²³ Jean Pierre Maury writes about this visit:

“Now Galileo’s discoveries have been acknowledged by the greatest astronomical and religious authorities of his time. Pope Paul V received him in private audience and showed him so much reverence, that he did not allow him to kneel down in front of him, as was usual. Some weeks later the whole Collegio Romano gathered in the presence of Galileo officially to celebrate his discoveries. At the same time, Galileo met all the Roman intellectuals, and one of the most famous among them, Prince Federico des Cesi, asked him to become the sixth member of the Accademia dei Lincei (Academy of the Lynxes), which he had founded.”²⁴

Galileo’s first written statement in favour of the Copernican system, his *Letters on Sunspots*, was met with much approval and no critical voice was heard. Among the cardinals who congratulated Galileo was Cardinal Barberini, who later became Pope Urban VIII and would sentence him in 1633.²⁵ In 1615, an accusation against Galileo was filed but denied by the Court of Inquisition. From 1615 till 1632, Galileo enjoyed the friendship of many cardinals and the different popes.²⁶

Thesis 3. Envy, not religion, was the trigger

The battle against Galileo was not started by Catholic officials, but by Galileo’s colleagues and scientists, who were afraid of losing their position and influence. The representatives of the Church were much more open to the Copernican system than were the scientists and Galileo’s colleagues. Galileo avoided and delayed an open confession in favour of the Copernican system in fear of his immediate and other colleagues, not in fear of any part of the Church.²⁷

This was already true of Copernicus himself. Gerhard Prause summarises the situation:

“Not in fear of those above him in the Church - as is often wrongly stated - but because he was afraid to be ‘laughed at and to be hissed off the stage’ - as he formulated it himself - by the university professor, did he refuse to publish his work

“De revolutionibus orbium coelestium” for more than 38 years. Only after several Church officials, especially Pope Clemens VII had requested it, did Copernicus finally decide to publish his work.”²⁸

Only a few scientists living in Galileo's time confessed publicly that they followed Copernicus. Some did so secretly, but most denied the Copernican system.²⁹

“Thus, while the poets were celebrating Galileo's discoveries which had become the talk of the world, the scholars in his own country were, with a few exceptions, hostile or sceptical. The first, and for some time the only, scholarly voice raised in public in defence of Galileo, was Johannes Kepler's.”³⁰

Beside this, the Church represented not only the interests of theologians but also the interests of those scientists who were part of the orders of the Church. The Order of the Jesuits, who were behind the trial against Galileo, included the leading scientists of that day.

Galileo's case confronts us with the heaviness and clumsiness of scientific changes due to the social habits of the scientific community, which Thomas Kuhn has described in his famous book, *The Structure of Scientific Revolutions*. More than once, it was not the Church hindering scientific progress but the scientific community!

Thesis 4. Genius + arrogance – humility = deadly enemies

Galileo was a very obstinate, overly-sensitive, and aggressive scientist, who created many deadly enemies by his harsh polemics even among those who no longer followed the Ptolemaic worldview. Galileo had already earned the nickname 'the wrangler' during his student days ³¹ Koestler shows repeatedly that this personal aspect of many of Galileo's battles made it impossible for other scientists to work with him.³²

“Galileo had a rare gift of provoking enmity; not the affection alternating with rage which Tycho aroused, but the cold, unrelenting hostility which genius plus arrogance minus humility creates among mediocrities. Without the personal background, the controversy which followed the publication of the Sidereus Nuncius³³ would remain incomprehensible.”³⁴

Koestler adds more generally:

“His method was to make a laughing stock of his opponent - in which he invariably succeeded, whether he happened to be in the right or in the wrong. ... It was an excellent method to score a moment's triumph, and make a life long enemy.”³⁵

Solle states it similarly, *“Galileo was not afraid of personal attacks and mockery against others, but this was the easiest way to create enemies.”³⁶*

Koestler comments on an immoderate answer by Galileo against an anti-Ptolemaic writing of the leading Jesuit astronomer Horatio Grassi:

“When Galileo read the treatise, he had an outburst of fury. He covered its margins with exclamations like "piece of asininity", "elephantine", "buffoon", "evil poltroon", and "ungrateful villain ". The ingratitude consisted in the fact that the treatise did not mention Galileo's name - whose only contribution to the theory of comets has been a casual endorsement of Tycho's views in the Letters on Sunspots.”³⁷

Fischer comments on the same event:

*“It is hard to decide what the most remarkable side of this debate is: the open proceeding of the Jesuits against the Aristotelian physics of the heavens, the almost devout bowing of Horatio Grassi before Galileo's authority, Galileo's measureless aggressiveness, which destroyed everything that Grassi had said, or Galileo's ingenious rhetoric, which he used with a great skill against Grassi and Brahe, so that especially Grassi seemed to be a pitiable figure, who did not know what he was talking about...”*³⁸

Koestler writes on a vile and vulgar writing by Galileo against B. Capra:

*“In his later polemical writings, Galileo's style progressed from coarse invective to satire, which was sometimes cheap, often subtle, always effective. He changed from the cudgel to the rapier, and achieved a rare mastery at it....”*³⁹

As an example of Galileo's oversensibility, Custance mentions his reaction against the rumour that a seventy year old Dominican had cast doubts on his thesis in a private conversation. Galileo wrote a harsh letter and called him to account. The Dominican answered that he was too old and would not have enough knowledge to judge Galileo's thesis, and that he had only made some private remarks in a conversation in order not to be called ignorant. Galileo still felt that he had been 'attacked'.⁴⁰

Thesis 5. Galileo refused to share discoveries

Galileo ignored all other researchers, did not inform them about his discoveries, and believed that he alone made scientifically relevant discoveries. As a result of this attitude, some of Galileo's condemned teachings were already out of date, especially because of the progress made by Kepler.

*“Judging by Galileo's correspondence and other records of his opinion of himself he was fantastically selfish intellectually and almost unbelievably conceited. As an illustration of the former there is the now well-known fact that he refused to share with his colleagues or with acquaintances [such] as Kepler any of his own findings or insights; he actually claimed to be the only one who ever would make any new discovery! In writing to an acquaintance he expressed himself as follows: “You cannot help it, Mr. Sarsi, that it was granted to me alone to discover all the new phenomena in the sky and nothing to anybody else. This is the truth which neither malice nor envy can suppress.”*⁴¹

Galileo's relationship to Johannes Kepler is a good example of this and the arguments contained in Thesis 4. Galileo had shared his belief in the Copernican system with Kepler at an early stage of their acquaintance and Kepler had blindly, without proofs, accepted Galileo's book *Messenger from the Stars*.⁴² But Galileo refused to give Kepler one of his telescopes, although he gave them to many political heads of the world.⁴³ It was not until the Duke of Bavaria lent him one that Kepler could use a Galilean telescope.⁴⁴ Galileo wrote his discoveries to Kepler only in anagrams, so that Kepler could not understand them, but Galileo later could prove that these were his discoveries.⁴⁵ After this, Galileo broke off all further contact with Kepler. He totally ignored Kepler's famous book *Astronomia Nova* with the vital proposal of elliptical orbits, even though it was only a further development of Copernicus and of Galileo's discoveries⁴⁶ (cf. Thesis 10).

“For it must be remembered that the system which Galileo advocated was the orthodox Copernican system, designed by the Canon himself, nearly a century before

*Kepler threw out the epicycles and transformed the abstruse paper construction into a workable mechanical model. Incapable of acknowledging that any of his contemporaries had a share in the progress of astronomy, Galileo blindly and indeed suicidally ignored Kepler's work to the end, persisting in the futile attempt to bludgeon the world into accepting a Ferris wheel with forty-eight epicycles as "rigorously demonstrated" physical reality."*⁴⁷

Thesis 6. Galileo was a bad witness In his own defence

Galileo contradicted himself not only during the trial. In oral discussion he denied the Copernican system, which he had defended in earlier writings. Koestler writes about Galileo's defence during the trial:

*"To pretend, in the teeth of the evidence of the printed pages of his books, that it said the opposite of what it did, was suicidal folly. Yet Galileo had had several month's respite in which to prepare his defence. The explanation can only be sought in the quasi-pathological contempt Galileo felt for his contemporaries. The pretence that the Dialogo was written in refutation of Copernicus was so patently dishonest that his case would have been lost in any court."*⁴⁸

*"If it had been the Inquisition's intention to break Galileo, this obviously was the moment to confront him with the copious extracts from his books - which were in the files in front of the judge - to quote to him what he had said about the sub-human morons and pygmies who were opposing Copernicus, and to convict him of perjury. Instead, immediately following Galileo's last answer, the minutes of the trial say: "And as nothing further could be done in execution of the decree, his signature was obtained to his deposition and he was sent back." Both the judges and the defendant knew that he was lying, both the judge and he knew that the threat of torture (territio verbalis) was merely a ritual formula, which could not be carried out..."*⁴⁹

But these discrepancies and even hypocrisy can be found during the whole of Galileo's life. In the beginning, about 1604/1605, when a highly visible supernova soon became weaker, and it was not possible to demonstrate parallax any longer, Galileo sometimes even doubted the Copernican system himself.⁵⁰ In 1613, in his 50th year, Galileo for the first time stated in print his conviction that it was true. But in 1597 he had stated the same in a private letter to Kepler. For 16 years *"in his lectures he not only taught the old astronomy of Ptolemy, but denied Copernicus explicitly"*⁵¹ This was the case even though there would have been no danger at all in presenting the Copernican system.⁵²

He confessed his belief in Copernicus in private discussions and letters only. Several authors have correctly explained this by his fear of mockery from other scientists. Only after Galileo had become famous through his discoveries in the area of mechanics, dynamics and optics, did he admit his Copernican position in print.

Fischer indicates that Galileo could occasionally write things contrary to his own opinion,⁵³ namely in order to harm other people.

Thesis 7. Experimentation not necessary

Galileo was not a strictly experimental scientist. Fischer writes on Galileo's book *De Motu* ('On motion'):

*“One can doubt whether Galileo had made many experiments to prove his theories. If that had been the case, it is hard to understand why he never changed his position that light objects are accelerated faster in the beginning of their natural motion than heavier ones. According to Galileo's own understanding, such tests were neither necessary to prove his theory nor enough to disprove it. His proceeding was axiomatically orientated.”*⁵⁴

Koestler refers to Professor Burtt, who assumes that it was mainly those who stressed empirical research who did not follow the new teaching because of its lack of proof (cf. Thesis 8).

*“Contemporary empiricists, had they lived in the sixteenth century, would have been the first to scoff out of court the new philosophy of the universe.”*⁵⁵

Thesis 8. No need for proof

Galileo always acted as if he had all the proofs, but did not, and could not, present them, as he said, because no one else was intelligent enough to understand them.

Koestler writes, *“He employs his usual tactics of refuting his opponent's thesis without proving his own.”*⁵⁶

As Galileo did not work empirically (cf. Thesis 7), but regarded the Copernican system as an axiom, he did not feel the need for proofs. Not until he was put under pressure because he presented the Copernican system as proven, did he get into difficulties.

When Cardinal Bellarmine, who was responsible for the Court of Inquisition, asked Galileo in a friendly way for his proofs, so that he could accept his theory as proven theory, and asked him otherwise to present his Copernican theory as hypothesis only, Galileo answered in a harsh letter, that he was not willing to present his evidences, because no one could really understand them. Koestler comments on this:

*“How can he refuse to produce proof and at the same time demand that the matter should be treated as if proven? The solution of the dilemma was to pretend that he had the proof, but to refuse to produce it, on the grounds that his opponents were too stupid, anyway, to understand.”*⁵⁷

Galileo reacted in a similar way after the pope himself asked for proofs.⁵⁸ Koestler writes about an earlier letter from 1613, *“But Galileo did not want to bear the burden of proof; for the crux of the matter is, as will be seen, that he had no proof.”*⁵⁹

Virtually all researchers agree that Galileo had no physical proof for his theory.⁶⁰ Some parts of Galileo's theory could even not be proven at all because they were wrong and already outdated by Kepler's research (cf. Theses 10 and 5).

Fischer summarizes, *“He did not have really convincing proofs such as the parallax shift or Foucault's pendulum.”*⁶¹

One must not forget that the Copernican hypothesis itself was never denied by the Inquisition, but only that it was not allowed to be presented as a scientifically proven theory or as a truth. *“In fact, however, there never had been any question of*

condemning the Copernican system as a working hypothesis."⁶² The Copernican system was just "*an officially tolerated working hypothesis, awaiting proof.*"⁶³

As Galileo came more and more under pressure, he finally invented a "secret weapon,"⁶⁴ the totally erroneous theory that the tides were caused by the turning of the earth *per se*. This easily disprovable theory was said to be the absolute secure proof of the Copernican system!⁶⁵

*"The whole idea was in such glaring contradiction to fact, and so absurd as a mechanical theory – the field of Galileo's own immortal achievements – that its conception can only be explained in psychological terms."*⁶⁶

William A. Wallace used recently discovered manuscripts to show⁶⁷ that Galileo knew exactly that the final proof for the Copernican system was lacking and that he was covering this under his rhetoric. Jean Dietz Moss has researched this kind of rhetoric⁶⁸ and clearly identifies how Galileo's own texts show that Galileo knew that he had to fill the missing evidence with rhetoric.

Thesis 9. Ptolemy was no longer an Issue

In Galileo's time, science did not have to decide between Ptolemy and Copernicus. Ptolemy's view that all planets and the sun orbited the earth, was no longer a real option. Rather it is important, "*that the choice now lay between Copernicus and Brahe*,"⁶⁹ because everybody believed that other planets orbited the sun. The question was, whether or not the earth was moving itself or was staying in the centre of the universe. "*Nearly no expert believed in Ptolemaic astronomy any longer. The conflict was between Tycho Brahe and Copernicus.*"⁷⁰

Tycho Brahe, predecessor of Kepler as German Imperial Court astronomer, held to the central position of the earth, while at the same time integrating the observation of the other planets moving around the sun.

*"The arguments and observations which Galileo referred to, were acknowledged, but they denied only the Ptolemaic system, but did not favor in the same way the Copernican system. They were compatible with the Tychonian system, which had the advantage that the central position of the earth was maintained."*⁷¹

Galileo never took a position on this issue nor presented arguments against Tycho Brahe with the exception of his polemical and totally distorted description of Brahe's system in his work against Horatio Grassi.⁷²

Thesis 10. Galileo defended outdated hypotheses

Galileo fought very stubbornly not only for the Copernican system but also for several hypotheses that were out of date and a relapse into the old system. Elaboration of this thesis is already contained in Theses 5, 8 and 9. Galileo defended the 'epicycloids' of Copernicus, even though Kepler already had presented a much better theory.⁷³

His already mentioned erroneous explanation of the tides was used as his major proof for the Copernican system, even though it was untenable and Kepler had discovered the real cause of the tides in the power of attraction of the moon.⁷⁴

In 1618, Galileo explained some visible comets in a fiery work as reflexions of light, so that nobody believed the Jesuit astronomer Grassi, who realised that the comets were flying bodies.⁷⁵

Many further examples have been discussed by Koestler and Fischer.⁷⁶

Thesis 11. Galileo was a victim of personal circumstance

This thesis discusses the personal aspect, the following thesis the political one, although it is not easy to distinguish between them. Under Pope Urban's (VIII) predecessor and his successor no trial against Galileo would have taken place (see Theses 3 and 15). Galileo was the victim of the politics of Pope Urban VIII, who had been very much in favour of him earlier. We should not forget that in 1615, a first trial against Galileo before the Court of Inquisition was decided in favour of Galileo, because of benevolent expert evidence of the leading Jesuit astronomers.⁷⁷

Galileo was prosecuted because of the political situation and his personal attacks on the pope, never for religious reasons. The pope had initiated the proceedings, while the Court of Inquisition calmed the whole matter down instead of stirring up the flames.

Galileo's process took place under a ruthless and cruel pope. A dictionary on the popes says, "*Within the Church the pontificate of Urban was burdened with unlimited nepotism. Urban VIII was a tragic figure on the Papal throne. His reign was full of failures, for which he was himself responsible.*"⁷⁸

Koestler writes at the end of his description of Pope Urban VIII, the former Cardinal Barberini, who for Koestler was "*cynical, vainglorious, and lusting for secular power.*"⁷⁹ He

"was the first Pope to allow a monument to be erected to him in his lifetime. His vanity was indeed monumental, and conspicuous even in an age which had little use for the virtue of modesty. His famous statement that he "knew better than all the Cardinals put together" was only equalled by Galileo's that he alone had discovered everything new in the sky. They both considered themselves supermen and started on a basis of mutual adulation – a type of relationship which, as a rule, comes to a bitter end."⁸⁰

This pope also was a danger to science. "*The Pope paralysed scientific life in Italy. The center of the new research came to the Protestant countries in the North.*"⁸¹

Thus the Galileo affair was mainly an intra-Catholic and intra-Italian problem, and not a gigantic battle between Christianity as such and science as such. The Court of Inquisition did not accuse Galileo of teaching against the Bible, but of disobeying a papal decree.

Urban VIII had favoured Galileo as Cardinal (cf. Thesis 1) and had even written an ode to him. After he had become pope in 1623, his affection for Galileo even increased.⁸²

Only a short time before the trial, Urban's friendship turned into hatred. This was not only due to the political situation (cf. Thesis 12), but to Galileo's personal carelessness, not to say insults. Galileo obtained the right to print his major work *Dialogo* from the pope personally, with approval to make some minor corrections if necessary. Galileo cleverly circumvented papal censorship, and put Urban's main argument for the Copernican system (!) into the mouth of the fool 'Simplicio', who, in the *Dialogo* of three scientists, always asks the silly questions and defends the Ptolemaic view of the world.

*“But it did not require much Jesuit cunning to turn Urban's perilous adulation into the fury of the betrayed lover. Not only had Galileo gone, in letter and spirit, against the agreement to treat Copernicus strictly as a hypothesis, not only had he obtained the imprimatur by methods resembling sharp practice, but Urban's favorite argument was only mentioned briefly at the very end of the book, and put into the mouth of the simpleton who on any other point was invariably proved wrong. Urban even suspected that Simplicius was intended as a caricature of his own person. This, of course, was untrue; but Urban's suspicion persisted long after his fury had abated...”*⁸³

L. Pastor, a defender of papal infallibility, has tried to show that the pope only played a minor role in Galileo's trial and that the (anonymous) Inquisition judged harsher than the pope, as a good friend of Galileo's, would have liked them to do.⁸⁴ Solle has given convincing proof that, in reality, it was just the other way round.⁸⁵ The pope initiated the trial for personal reasons, while the Inquisitors were quite lax. Some of the ten judges seem to have been mainly interested in their own forthcoming, while others applied the brakes. In the end, the final decision lacked three signatures, at least two of them out of protest. The only Cardinal who zealously pushed the trial forward was the pope's brother.

*“That the whole trial was questionable could not be hidden to insiders. There was much resistance by high Church officials and from the Jesuit party.”*⁸⁶

Koestler also comes to the conclusion that the pope initiated the process and *“There is little doubt that the decision to instigate proceedings was Urban VIII's, who felt that Galileo had played a confidence trick on him.”*⁸⁷

Thesis 12. Galileo was a victim of political circumstance

Galileo was the victim of the politics of Pope Urban VIII, whose tactics in the Thirty Years' War were totally confused. He tried to bring the Italian cities under his control and fought against all opposition within the Catholic Church. He failed in all of this in 1644, although he had made some progress in the beginning.

The situation in the Holy See was totally dependent on the political battles of the times. Solle writes:

*“The council of the General-Inquisitors became a reflexion of the battles between the different parties within the Church. Neither under Borgia nor under Urban was the issue astronomy or the faith of the Church, but always politics.”*⁸⁸

*“We have to return to the political situation in Rome, which led to the transformation of an unpolitical astronomer into a criminal.”*⁸⁹

Fischer holds a similar viewpoint:

*“Now the care for the people's souls surely was not the only motive for the Church's actions. The Thirty Years' War had begun in 1618 and finished the time of verbal debate. The Church found itself in the hardest battle over its existence since its earliest history.”*⁹⁰

In the beginning, Pope Urban VIII supported the Catholic German Emperor, but switched over to Catholic France and Protestant Sweden after the two had become allies. He took as an example the ruthless French Cardinal Richelieu and was responsible for the prolongation of the war.

In 1627-1630, Italy underwent the additional Mantuan War of Succession. At the same time the two Catholic powers, Spain and France, which were both allies of the pope, started to fight each other. The head of the Spanish opposition in the Holy See, Cardinal Borgia, came into conflict with the pope over political topics in 1632, because a peace treaty was in view, while the pope wanted the war to go on.⁹¹ A tumult among the Cardinals resulted, after which the pope began a great political purge in the Vatican, which more or less by chance struck all those favourable to Galileo.⁹² The pope initiated many trials by the Inquisition and became an increasingly cruel ruler.

The following connections probably became fateful to Galileo, because they were in opposition to those of the pope:

- The close connection to the family of the Medicis, from which the Tuscan prince came, and which, together with Venice,⁹³ fought against the pope and were only rehabilitated after his death in 1644.⁹⁴
- The connexion with Austria⁹⁵ and Emperor Rudolf II through Kepler, as the pope together with France and Sweden fought against the Catholic German Emperor. The Prince of Tuscany and the German Emperor were close friends.⁹⁶

Solle has shown in detail that it was the beginning of 'modern' nationalism which left Galileo between the fronts of the nationalistic pope, the Italian cities and the parties of the Thirty Years' War.⁹⁷

*“Thus it was not the shadow of a dying and dark night, which put pressure on the scientist [i.e. Galileo] ... but the beginning of modern times.”*⁹⁸

Hemleben, who favours Galileo, has argued that he would not have had to undergo any trial if he had not moved from Padua to Florence, since Padua depended on Venice, but Florence on Rome.⁹⁹ Padua allowed great freedom for scientific research, because Venice was independent of Rome.¹⁰⁰ Even protestants studied there,¹⁰¹ which was impossible in Florence. One of Galileo's best friends, Giovanni Francesco Sagredo (1571-1620), had already warned Galileo in 1611 against moving to Florence, because there he would be dependent on international politics and on the Jesuits.¹⁰² But Galileo ignored this and all later warnings.

Thesis 13. Galileo predeceased Urban VIII

Galileo died in 1642, two years before the death of his great enemy, Pope Urban VIII, in 1644. Following Urban's death the whole situation in Italy changed and the family of the Medicis came back to honour. Galileo would surely have been rehabilitated (cf. Thesis 12).¹⁰³

Thesis 14. Galileo did not reject his faith

Galileo was not a non-Christian scientist of the Enlightenment, but a convinced Catholic.¹⁰⁴ It was indeed his endeavour to show the compatibility of his teachings with the Bible that, among other things, brought him into conflict with the Catholic establishment.

Galileo's thoughts on the relation of faith and science can be seen in the quotations cited by Fischer under Thesis 7. Solle adds:

*“As a deeply believing scientist, Galileo could not live with a discrepancy between science and faith, which seemed to arise when he started to interpret the Bible. As layman, he experienced much resistance by theologians ... His attempts to interpret the Bible were one of the reasons which led to the trial. Another reason was his attempt to popularize the Copernican system.”*¹⁰⁵

Because Galileo interpreted the Bible as a layman and wrote his books in everyday Italian, and thus was a forerunner of Italian nationalism (cf. Thesis 15), he experienced the same resistance Martin Luther had experienced one hundred years earlier when he started to use German in his theological writings.

The preface of his major work *Dialogo* contains clear statements that Galileo did not want to stand in opposition to the Bible¹⁰⁶ or to the Catholic Church. Albrecht Folsing writes:

*“Many of Galileo's admirers in the 19th and 20th century could understand this Preface only as a concession to censorship. Some interpreted it as a roguish by-passing of the Decree, others as unworthy submission, again others as a mockery of the authority of the Church We, on the other hand, want to suggest this text to be an authentic expression of Galileo's intention under the existing conditions. The content is more or less the same as in the introduction to the letter to Ignoli in 1624, which needed no approval from a censor, as it was not written for print, but which was intended to test how much freedom for scientific discussion the Pope and the Roman See would allow. Even if one takes into account those tactical aspects of these texts (the letter of 1624 and the preface to the Dialogo) there is no reason to doubt the honest intentions of the faithful Catholic Galileo.”*¹⁰⁷

As a defender of papal infallibility, L. Pastor has stated that the pope saw a protestant danger in Galileo, but others have doubted this.¹⁰⁸ On the one hand, one of Galileo's first critics was a protestant pastor from Bohemia;¹⁰⁹ on the other hand, Galileo's writings were published and printed in protestant states and thus became known. Besides, Galileo himself was a declared enemy of protestantism.¹¹⁰

Thesis 15. Galileo stood for science and faith

Galileo was not a scientist who denied any metaphysics or favoured the separation of faith and science (cf. Thesis 14). Discussing a quotation in Galileo's *Letters on Sunspots*, Fischer speaks in more general terms:

“In those last sentences, one can hear a somewhat different Galileo from the picture of Galileo which the traditional interpretation paints. The main line of the historiographs of science from Wohlwill to Drake presents Galileo as an

antimetaphysician and anti-philosopher, as the initiator of a physics based on experiment and observation, as the defender of science against the illegitimate demands of religion, as the promoter of a separation of faith and science. And now we hear a confession of love to the great Creator being the final goal of all our work, thus including our scientific work! Science as perception of God's truth! ... The ruling historiographers of science cannot be freed from the reproach that they have read Galileo's writings too selectively."¹¹¹

A little later Fischer writes about the misinterpretation of Galileo's work:
*"This misinterpretation led to the inability to evaluate correctly Galileo's early writings ('Juvenilia'), to ignoring many sections with speculative and metaphysical content scattered all over Galileo's writings, yea, even to a misinterpretation of Galileo's understanding of the relationship between science and faith...."*¹¹²

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2. Hemleben, 1, *Galileo Galilei, mit Selbstzeugnissen und Bilddokumenten dargestellt*, RowoNts Monographien 156, Rowohlt Verlag, Reinbek, Germany, 1969.
3. Schmutzer, E. and Schiltz, W_ *Galileo Galilei, Biographien hervorragender Naturwissenschaftler, Techniker und Mediziner 19*, B. G. Teubner, Verlagsgesellschaft, Leipzig, Germany, 1983.
4. Fischer-Fabian, S., *Die Macht des Gewissens*, Droemer Knauer, Munich, Germany, pp. 149-200 (chapter 4: Galilei oder 'Eppur si muove'), 1987. Fischer-Fabian starts his chapter on Galileo with examples of legends on Galileo which have long been disproved (p. 149). Nevertheless he wants to use them as anecdotes, which are not historical but contain a grain of truth (p. 150). Even though he frequently speaks about Galileo legends (e.g. on p. 193 he shows that Galileo was never tortured), his chapter on Galileo is a pure hagiography, full of heroism.
5. Freiesleben, H.C., *Galilei als Forscher*, Darmstadt, Germany, p. 8, 1968.
6. E.g. the hero-worship with many legends on Galileo in the book for youth by the French professor of physics; Maury, J-P., *Galileo Galilei: Und sic bewegt sich doch~ Abenteuer - Geschichte 8*, Ravensburg, Germany, 1990. (cf. my review in *Querschnitte* Jan/Mar 4, p.23, 1991. Galileo is said to have discovered through his telescope 'irrefutable proofs for the Copernican world-view' (see backcover)!
7. Molir, W, *Naturwissenschaft und Ideologie, Aus Politik und Zeitgeschichte (Beilage zur Wochenzeitung Das Parlament) Nr B 151 92*, pp. 10-18, especially pp. 11-12, April 3, 1992.
8. Custance, A.C., *The medieval synthesis and the modern fragmentation of thought*; in: Custance, A.C., *Science and Faith, The Doorway Papers V111*, Grand Rapids, MI, pp. 99-216, here chapter 3: *History Repeats itself* pp. 152-167, 1978.
9. Koestler, A., *The Sleepwalkers: A History of Man's Changing Vision of the Universe*, Hutchinson, London, p. 425, 1959.

10. Galileo Galilei, *Schriften, Briefe, Dokumente*, 2, Berlin, Munich, 1987, or any English collection of Galileo's writings.
11. Fischer, K., *Galileo Galilei*, Munich, 1983. Fischer discusses very well how far Galileo produced real scientific progress in his times.
12. Koestler, Ref. 9, pp. 352-495; cf. footnote 12yyy.
13. Solle, Z., *Neue Gesichtspunkte zum Galilei-Prozess*, (mit neuen Akten aus böhmischen Archiven), ed. Hamann, G., *Osterreichische Akademie der Wissenschaften, Philosophisch-historische Klasse, Sitzungsberichte* 361, *Veröffentlichungen der Kommission für Geschichte der Mathematik, Naturwissenschaften und Medizin* 24, Vienna, 1980. A very good introduction (without footnotes) into an alternative view of the Galileo affair can be found in the mentioned texts of Gerhard Prause. Catholic historians have produced several refutations and justifications on the Galileo affair, which have not been used in our article, although they argue similarly, see e.g. several articles in: Coyne, G.V., Heller, M. and J. Zycinski, J., *The Galileo affair: a meeting of faith and science*; in: *Proceedings of the Cracow Conference 24 to 27 May 1984*, Vatican City, 1985, and Brandinfiller, W., *Galilei und die Kirche: Ein 'Fall' und seine Losung*, Aachen, Germany, 1994.
14. Koestler, Ref. 9, p. 426.
15. Solle, Ref 13, p. 6.
16. Koestler, Ref 9, pp. 355-358.
17. Custance, Ref. 8, p. 154 with further literature; cf. the addendum in Koestler, Ref. 9, p. 495.
18. Mudry, A., *Atindherung an Galileo Galilei*, editors introduction, in: *Galileo Galilei, Schriften, Briefe, Dokumente*, vol, 2, Berlin and Munich, Germany, p. 29.
19. *Index Liborum Prohibitorum* (Latin: Index of Forbidden Books), list of books once forbidden by Roman Catholic Church authority as dangerous to the faith and morals of Roman Catholics. Publication of the list ceased in 1996, and it was relegated to the status of a historic document. *The New Encyclopaedia Britannica*, 15th Edition, Encyclopaedia Britannica, Inc., Chicago, p. 285, 1992.
20. Koestler, Ref. 9, pp. 457-459; Koestler shows that in Galileo's time, many books were put on the 'Index' without any disadvantages for the authors. He shows that even books from the cardinals and censors judging Galileo were on the Index.
21. Hemleben, Ref 2, p. 167.
22. Koestler, Ref. 9, p. 426.
23. Koestler, Ref 9, p. 426; cf. pp. 426-428; cf. about the visit, Wohlwill, E., *Galilei und sein Kampf für die copernicanische Lehre* Vol. 1, pp. 366-392.
24. Mauty, Ref. 6, p. 96. Totally wrong is the outlook of Frciesleben, Ref. 5, p. 8, who writes, concerning the time after 1610: 'From this time on Galileo tried to get the Copernican system to be acknowledged especially by representatives of the Church. Unfortunately he had the opposite result. '
25. Koestler, Ref. 9, pp. 431, 432.
26. Koestler, Ref. 9, pp. 442-443.
27. So especially Prause, G., *Niemand hat Kolumbus ausgelacht: Mischungen und Legenden der Geschichte richtiggestellt*, Dfisseldorf, Germany, pp. 182-183, n.d.

28. Prause, G., Galileo Galilei war kein Mfirtyrer, *Die Zeit*, p. 78, Nov. 7, 1980.
29. cf. Siemens, D.F., Letter to the editor, *Science* 147:8-9, 1965. His authority is Barber, B., Resistance of scientists to scientific discovery, *Science* 134:596 If., 1961; cf. Custance, Ref. 8, p. 157. The best argument for this thesis can be found in Wohlwill, Ref. 23.
30. Koestler, Ref 9, pp. 369-370.
31. Schmutzer and Schutz, Ref. 3, p. 28.
32. Beside the quotations in the text, further examples of Galileo's fury can be found in Koestler, Ref. 9, pp. 431-432, 433-436, 362-361
33. Galilei, G., *Sidereus Nuncius* (Messenger from the Stars), Venice, 16 10.
34. Koestler, Ref. 9, p. 368.
35. Koestler, Ref. 9, p. 452.
36. Solle, Ref. 13, p. 9.
37. Koestler, Ref 9. p. 467.
38. Fischer, Ref. 11, pp. 128
39. Koestler, Ref. 9, p. 363.
40. Custance, Ref. 8, p. 153.
41. Custance, Ref. 8, p. 153.
42. Koestler, Ref. 9, p. 370.
43. Koestler, Ref. 9, p. 375.
44. Koestler, Ref. 9, p. 378.
45. Koestler, Ref. 9, pp. 376-377.
46. Fischer, Ref. 11, p. 169.
47. Koestler, Ref. 9, p. 438; cf. the next paragraph pp. 438-439.
48. Koestler, Ref 9, p. 485.
49. Koestler, Ref. 9, p. 492.
50. Fischer, Ref. 11, p. 94.
51. Koestler, Ref. 9, pp. 357-358; cf. p. 431.
52. Koestler, Ref. 9, cf Thesis 1.
53. Fischer, Ref 11, p. 138.
54. Fischer, Ref 11, p. 53.
55. Quoted by Koestler, Ref. 9, p. 461.
56. Koestler, Ref. 9, p. 478.
57. Koestler, Ref. 9, p. 449; cf pp. 445-451, especially pp. 449-450 for the whole debate.
58. Fischer, Ref. 11, p. 148.
59. Koestler, Ref 9, p. 436.
60. Fischer, Ref 11, p. 123; cf Custance, Ref. 8, pp. 157, 154-155.
61. Fischer, Ref 11, p. 122.
62. Koestler, Ref. 9, p. 437.
63. Koestler, Ref. 9, p. 437; cf. the whole paragraph.
64. Koestler, Ref 9, p. 464.
65. Koestler, Ref 9, pp. 464-467; cf. Thesis 10 on the tidal theory.
66. Koestler, Ref. 9, p. 454.
67. Wallace, WA, Galileo's concept of science: recent manuscript evidence; in: Coyne et al. (ed.), Ref. 13, pp. 15-40.
68. Moss, J.D., The rhetoric of proof in Galileo's writings on the Copernican System; in: Coyne et al. (ed.), Ref. 13, pp. 41-65.

69. Koestler, Ref 9, p. 427.
70. Fischer, Ref. 11, p. 139; cf. p. 123.
71. Fischer, Ref. 11, p. 12 1.
72. Fischer, Ref 11, pp. 128-129; see the quotation from this section under Thesis 4; cf. Koestler, Ref 9, pp. 467-468.
73. To expand Thesis 5, cf. Koestler, Ref. 9, p. 378 and Custance, Ref. 8, p. 154.
74. Koestler, Ref 9, pp. 464-467, 453-454.
75. Solle, Ref 13, p. 13; cf. Koestler, Ref 9, p. 467.
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81. Solle, Ref. 13, p. 58.
82. Koestler, Ref. 9, p. 472.
83. Koestler, Ref. 9, p. 483.
84. Solle, Ref. 13, pp. 38-39.
85. Solle, Ref. 13, p. 64 and the whole book of Solle; cf. Thesis 6.
86. Fischer, Ref. 11, p. 126 (with additional literature).
87. Koestler, Ref 9, p. 482.
88. Solle, Ref. 13, p. 45.
89. Solle, Ref. 13, p. 22.
90. Fischer, Ref. 11, p. 144.
91. Solle, Ref. 13, p. 25; cf. Fischer, Ref. 11, p. 144.
92. Solle, Ref. 13, pp. 26-27.
93. cf. Fischer, Ref. 11, p. 144.
94. Solle, Ref. 13, p. 54.
95. Solle, Ref. 13, p. 55.
96. Solle, Ref 13, p. 57.
97. Solle, Ref. 13, p. 64-64.
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106. cf. on the positive attitude of Galileo to Scripture, Wohlwill, Ref. 23, pp. 485-524, 542-555, especially p. 543.
107. Folsing, A., *Galileo Galilei, Prozess ohne Ende: Eine Biographie*, Munich, Germany, p. 414; cf. also pp. 414-415, 1983.
108. Following Solle, Ref. 13, p. 38.

109. Solle, Ref. 13, p. 7.
110. Wohlwill, Ref. 23, pp. 552-555; Pedersen, Ref. 104, pp. 92-100.
111. Fischer, Ref. 11, p. 114.
112. Fischer, Ref. 11, p. 115.