

Thomas Schirrmacher

“But it Does Move!”, and Other Legends About Galileo Galilei

*28 Theses regarding the trial of Galileo Galilei
(Updated and enlarged version 2012)*



Theological Accents

Theologische Akzente

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Since I wrote a short essay under the same title in 1990 – which has been repeatedly reprinted¹ and hotly debated on the internet for a great number of years, I have decided to rework and expand the article on the basis of literature which has appeared over the last twenty years. By using the form of a number of theses, I have done this reworking and expansion without making basic changes to the work’s character as a brief introduction.

Foreword

The 17th century trial of Galileo Galilei endures as a repeatedly held out argument against scientists who find themselves able to reconcile their belief in a creator and their scientific research. Faith supposedly makes a person blind to scientific progress and hinders science. This is either a spoken or unspoken opinion associated with the issue.

The image of the trial against Galileo Galilei, which silently stands in the background, does not stand up to historical research. Too many legends are required to support the picture of a battle between the so very narrow

Christian church and the so very brilliant and rational scientists. Galileo was himself a deeply religious man, while his keenest opponents were university scholars and not scholars within the church. Furthermore, no one placed the Bible over scientific evidence, since neither Galileo nor a contemporary was able to bring forth evidence for the Copernican worldview (these were not found until later). And the Bible was also not the point of reference. Rather, it was the authority of the Greek philosopher Aristotle.

“There is hardly a scientist who continues to be as controversially discussed as Galileo Galilei ... why is there not even any recognizable indication of a consensus ...?”² Olaf Pedersen expressed his opinion in 1991 that after 350 years of research and discussion a convergent research opinion on Galileo seems to be as far from being reached as it ever was:

“The story of Galileo Galilei (1564–1642), his scientific efforts, and his struggle for recognition have long since exceeded the limits of historical research and have become one of the defining myths of modern science. This idea of a

*conflict between light and darkness and between reason and irrationality is at the bottom of this myth.*²³

The intention of the following theses is well summarized in the words of Arthur Koestler:

*“In other words, 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.”*²⁴

In the following there are several reasons, presented in thesis form, which have been pieced together and do not allow Galileo’s trial to be cited as an argument for any position on the relationship between religion and science.

It is probably superfluous to point out that the theses neither justify the methods or the existence of the inquisition in any way nor place Galileo actual scientific significance and genius in question (whereby Galileo’s actual discoveries were never the subject of the inquisition trial that was conducted). However:

*“The contrast-rich picture of a scientist with the courage of a hero standing before the dark background of the Inquisition thereby receives numerous colorful nuances.”*²⁵

I will essentially proceed on the bases of a selection of new German texts by and about Galilei⁶, Klaus Fischer’s scientific biography⁷, Arthur Koestler’s investigation of the records of the case⁸, Arthur C. Custance’s⁹ response, and the scholarly exposition entitled “New Points of View on the Trial of Galilei” by the Czech Zdenko Solles.¹⁰ In addi-

tion to that, there are other important publications.^{11, 12} On the whole, however, I believe I have had the opportunity to look through every important work produced in European languages accessible to me.¹³

*“Few episodes in history have given rise to a literature as voluminous as the trial of Galileo.”*²⁴

In view of the 5.912 titles listed as literature on Galileo up to 1964, to which another 1,500 were added over the subsequent 20 years¹⁵ (to my knowledge, a count over the last 25 years or so does not exist), and the twenty volume edition of his works¹⁶, it appears foolhardy to expect to make a presentation of Galileo in article form which does justice to all the aspects involved.

I The ‘encyclopedia’ rediscovered the story of Galileo in the 18th century

1. Thesis: Since the Enlightenment, the presentation of Galileo’s life has become overgrown with legends, myths, and prejudice.

“The most popular Galileo legend, which puts the defiant expression ‘but it does move’ into the mouth of the Florentine scholar after renouncing the teaching on the movement of the earth in 1633, comes from the time of the Enlightenment. In addition to this glorifying picture, prevailing trends created the Galileo they found to be necessary: the pioneer of truth and the renegade, the martyr of science and the

*cunning and tactical zealot – in short, the positive, the negative, the torn hero.*¹⁷

Above all it was volume four of the famous Enlightenment ‘L’Encyclopédie,’ with its article entitled “Copernicus,” that discovered and popularized the modern Galileo legend.¹⁸

Among the inventions of the ‘L’Encyclopédie’ which have been parroted up to the present day is the claim that the trial of Galileo crippled scientific progress in Italy for centuries. This claim was propagated anew by Bertrand Russell.¹⁹

Although it has long been documented that scientific progress within and outside of the church moved ahead as quickly as in the rest of Europe,²⁰ Hans Mohr still maintains the following: “The judgment was unable to prevent the rise of the sciences and the demise of the old order.”²¹

2 Myths of martyrdom and hagiography

2. Thesis: The adulation of Galileo sometimes carries the traits of religious myths of martyrdom or medieval hagiography.

Ernan McMullin is correct when he writes: “No other person in the history of science captures the fantasy as much as Galileo Galilei.”²² “Viewed in this way, Galileo advanced to becoming a martyr for science. This opinion is incorrect ...”²³

David Whitehouse for instance wrote the following gushing flattery and falsification of history in 2009, which have very little to do with historical truth:

*“Courage had left him, not, however, his trust in science. Whatever the church ordered, he knew that science had now been freed and could no longer be treated like a child. To place his body and mind under house arrest was only a temporary victory. Science experienced a tremendous upswing in the person of Galileo Galilei, and yet it lasted over 350 years until the church began to think about what they had done to this man.”*²⁴

It sounds like the biography of a saint. However, it can neither be historically documented nor is it psychologically coherent. That Galileo’s “courage” released a “tremendous upswing” in science is nonsense. In the first place, Galileo’s condemnation was hardly noted outside of Italy. Science had long since found itself in an upswing, and this was also the case in non-Catholic areas where the Pope had no influence and in non-Catholic areas in which there was no Inquisition at all.

As examples of Galileo Galilei biographies which make Galileo into a hero is a monograph published under the rororo label (a label used by the Rowohlt Publishing house, or rororo for short) by the adherent of anthroposophy, Joachim Hemleben,²⁵ the ‘GDR biography’ (GDR refers to the prior German Democratic Republic, or East Germany) by Ernst Schmutzer and Wilhelm Schütz,²⁶ and the chapter

on Galileo in Siegfried Fischer-Fabian's book entitled *The Power of Conscience* (German title: *Die Macht des Gewissens*).²⁷

There are many prime examples for what appears to be a virtual modern religious veneration of Galileo, in literature for young people²⁸ as well as in the 'adulation'²⁹ found in scientific works.³⁰

3 Legends: The leaning tower of Pisa and "but it does move"

3. Thesis: In addition to the never expressed phrase "but it does move,"³¹ the best example of a Galileo legend is the experiment at the leaning tower of Pisa.

Hence Alexander Koyré nevertheless states the following in "The Experiment at Pisa: Case Study of a Legend,"³² a work in which Koyré shows that Galileo never conducted the experiment and indeed could not have conducted it: "For today's average well-read individual, Galileo's name is firmly connected with the picture of the leaning tower."³³ "The story of the 'experiment' at Pisa has in the meantime fallen into the category of common intellectual property; one finds it in handbooks and travel guides,³⁴ indeed even scientific literature does not constitute an exception.³⁵ This is the case even though as early as 1909 the fact of the legendary character of the experiments had been documented.³⁶

In the course of all of this, the point of dispute is a text by the Galileo biographer Vincenzo Viviani,³⁷ which emerged sixty years after Galileo's death.

"Neither Galileo's friends nor his opponents ever speak about it. Nothing is more improbable than something associated with such silence. We would indeed have to assume that Galileo did not allow himself to describe experiments as actually performed which he only conceived of and thereby purposely concealed a dazzling experiment he actually performed."³⁸

Koyré has documented that Galileo could not have even envisioned the experiment, since he held to a completely different conception of physics than what allegedly was to be demonstrated.³⁹

Arthur Koestler begins his section about Galileo in his famous, if disputed, history of astronomy entitled *The Sleepwalker: A History of Man's Changing Vision of the Universe*⁴⁰ in a similar way:

"The personality of Galileo, as it emerges from works of popular science, has even less relation to historical fact than Canon Koppernigk's. In his particular case, however, this is not caused by a benevolent indifference towards the individual as distinct from his achievement, but my more partisan motives. In works with a theological basis, he appears as the nigger in the woodpile; in rationalist mythology, as the Maid of Orleans of Science, the

*Saint George who slew the dragon of the inquisition. It is, therefore, hardly surprising that the fame of this outstanding genius rests mostly on discoveries he never made, and on feats he never performed. Contrary to statements in even recent outlines of science, Galileo did not invent the telescope; nor the microscope; nor the thermometer; nor the pendulum clock. He did not discover the law of inertia; nor the parallelogram of forces or motions; nor the sun spots. He made no contribution to theoretical astronomy; he did not throw down weights from the leaning tower of Pisa, and did not prove the truth of the Copernican system. He was not tortured by the Inquisition, did not languish in its dungeons, did not say ‘eppur si muove’; and was not a martyr of science. What he did was to found the modern science of dynamics, which makes him rank among the men who shaped human destiny.*²¹

Additionally there is Gerhard Prause. He has most notably rendered outstanding service in the battle against legends in the presentation of history,⁴² and he writes as follows with respect to the viewpoint that the trial of Galileo is the greatest scandal within Christianity and a proof of the backwardness of the church:

“The truth is, however, that this is a primitive cliché, an adulterated story-book tale, a legend which appears to be immortal, although it has long since been corrected by professional historians and such corrections have been pro-

*pagated by best-selling authors – most impressively by Arthur Koestler.*²³

4 The Copernican system had long since established itself in the church at the time of Galileo

4. Thesis: The Ptolemaic system had already been rejected by high Catholic officials and Jesuit astronomers prior to the time of Galileo. Many followed Copernicus’ system. Copernican teaching had long since established itself in the church at the time of Galileo. It was only the demonstrative evidence which was missing.

Public espousal of the Copernican system was not dangerous in principle, as one can see in the example of the imperial astronomer Johannes Kepler.⁴⁴

*“The Jesuits themselves were more Copernican than Galileo. It is in the meantime generally acknowledged that the reason Chinese astronomy developed faster than European astronomy is simply found in the fact that Jesuit missionaries conveyed the Copernican world view to them.”*²⁵

“While Martin Luther dismissed the author⁴⁶ of ‘De revolutionibus orbium coelestium’, as a ‘fool,’ who ‘would reverse the entire art of astronomy,’ the Vatican left the work alone. It was only viewed as a ‘mathematical hypothesis’ and had already long been used as an aid for astronomical calculations. After significant Jesuit scholars such as Peter

*Clavius also confirmed the correctness of Galileo's astronomical observations, Copernicus and his adherents became 'suspicious.'*⁴⁷

(In contrast to Luther, John Calvin was of the opinion that neither Ptolemy's viewpoint nor that of Copernicus could be substantiated with the Bible, since the Bible is written in a language for everyone and not in a special language geared towards science.⁴⁸)

Copernicus' decisive book was, by the way, only on the index of forbidden books from 1616 to 1620 and was again admitted after slight modifications.⁴⁹ It was only Galileo's Dialogue that remained on this list from 1633 to 1837.⁵⁰

*"Whoever parades the church's judicial murder of the 'Copernican' Giordano Bruno, or the case of Galileo, in order to insinuate that at the time of Copernicus there was open enmity on the part of the Catholic Church toward heliocentric teaching, will be shown otherwise by the simple fact of the dedicatory foreword. It was not until Bruno's radicalization of Copernican consequences with its unmistakable anti-Christian impact that Copernicanism was discredited in the eyes of ecclesiastical rulers."*⁵¹

5 Galileo was held in high esteem by the church and the popes

5. Thesis: Up until shortly before his trial, Galileo was held in high esteem by the Roman Curia, the Jesuits, and

in particular by the popes. His teachings were in fact celebrated.

His visit to Rome in 1611 after the publication of his Star Messenger "was a triumph"⁵² and an academic ceremony.⁵³ "Pope Paul V received him, amicably gave him audience, and the Jesuit council honored him with various ceremonies ..."⁵⁴ Jean-Pierre Maury writes the following regarding this visit:

*"Galileo's discoveries are now recognized by the greatest astronomical and religious authority of the time. Pope Paul V gives him private audience and bestows so much honor upon him that he prevents him from kneeling, which is actually the reigning convention. Several weeks later the entire Collegio Romano gathers in Galileo's presence in order to officially celebrate his discoveries. At the same time, Galileo meets all the Roman intellectuals and one of the most famous, Prince Federico Cesi, asks him to become the sixth member of the Accademia dei Lincei, of which Prince Federico Cesi was the founder."*⁵⁵

Pope Paul V received Galileo in 1616 one week after the writings of Copernicus were placed under review and assured him, according to Galileo's own report, of his greatest esteem and support.⁵⁶

Galileo's first printed statement in favor of the Copernican system, 'Letters on Sunspots' received much acclaim in Rome, and there were no critical voices heard. Among the cardinals who congratulated Galileo were Cardinal Barberini, the later Pope Urban VIII who let him be denounced in 1633.⁵⁷ In 1615

charges against Galileo were rejected by the court of Inquisition. From 1615 until 1632 Galileo enjoyed the friendship of many cardinals and the popes.⁵⁸

And regarding the pope himself, under whom Galileo was denounced, the following is to be said:

*“Soon after he was enthroned, Urban VIII received Galileo in the Vatican in 1624 and gave him six private audiences. This expression of honor was not unusual insofar as Urban VIII was an admirer of Galileo. Shortly before the audiences were given, Galileo had published *The Assayer* and had dedicated it to Urban VIII.”⁵⁹*

6 The battle against Galileo emanated primarily from scientists and colleagues

6. Thesis: The battle against Galileo did not just emanate from Catholic dignitaries but rather especially from Galileo’s scientific colleagues who feared for their positions.

Representatives of the church were significantly more open to Copernican teachings than scientists and Galileo’s colleagues. Galileo did not delay public affirmation of the Copernican world view out of fear of the church but rather out of fear of his scientific colleagues.⁶⁰ This applies similarly to Copernicus himself. Gerhard Prause aptly summarizes the situation with respect to Copernicus as follows:

*“Not out of fear of his ecclesiastical superiors – as is repeatedly and incorrectly maintained – but rather because he feared – and so he said – being ‘laughed at by university professors and hissed off the stage,’ he allowed his work *De Revolutionibus Orbium Coelestium* (On the Revolutions of the Celestial Orbs) to lie unpublished for 38 years. It was not until the requests of his ecclesiastical superiors, in particular Pope Clement VII, that Copernicus decided to publish his work.”⁶¹*

Only few scientists at the time of Galileo openly backed the Copernican system, while many secretly held it to be correct. The masses openly rejected it.⁶²

“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 few exceptions, hostile or skeptical. The first, and for some time the only voice raised in public in defense of Galileo, was Johannes Kepler’s.”⁶³

Next to that, the Church simultaneously represented the interests of scientists bound to the Church, since after all the Jesuits in Rome pressed for the trial and were among the leading scientists of their time.

Especially in the case of Galileo, one confronts the sluggishness of the scientific community demonstrated in Thomas Kuhn’s *The Structure of Scientific Revolutions* that makes scientific revolutions move ahead so tediously. *Often enough throughout history it was not the church but rather the scientific*

community which held up scientific progress! There is no group and no movement in history which can maintain that it has never held up the progress of science. Christian churches have also done it, just as they have often by the same token promoted science. I cannot recognize that they have stood in the way of a scientific revolution more frequently than others.

7 Aristotle was seen as infallible, less so the Bible

7. Thesis: It was above all Aristotle's sacrosanct position that made it difficult to accept Galileo's hypotheses, not the position held by the Bible.

Walter Brandmüller writes:

"It was not the theology of that time which disapproved of Copernicus' teaching. Rather, it was the philosophers (even if these individuals were closely tied to theology)."⁶⁴ It was the claim to totality on the part of the philosophers – in this case the Aristotelians – and much less persecution by theologians, against which Galileo struggled."⁶⁵

Even one of the sharpest critics of the church in the case of Galileo writes as follows:

"The truth is that science started on its modern path by taking over ideas derived from parts of the system starting with Aristotles. In some respects it was a happy choice. It enabled seventeenth century science to formulate physics and chemistry with a completeness such that

its postulations have remained valuable up to the present time. However, the progress of biology and physics has probably been impeded by the uncritical adoption of half-truths."⁶⁶

However, it is also important that Matthias Dorn for instance has demonstrated that Galileo remained in Aristotle's grip, although he originally was a Platonist.⁶⁷

In this connection Lydia La Dous points out that it is wrong to think that as a result of the earth no longer being in the center of things, mankind had been dethroned through Copernicus. In fact, the status of the earth and of humanity had been heightened compared with Aristotle's view.⁶⁸

8 Galileo was stubborn ad polemical

8. Thesis: Galileo was an above-average stubborn, petulant, and aggressive scientist and even produced deadly enemies due to his constant harsh polemic at those points where the Ptomelaic world view had long since been renounced.

The Tuscan envoy, under whose charge Galileo stood, characterized Galileo in a letter to the Tuscan prince as follows:

"...He is passionately involved in this quarrel, as if it were his own business, and he does not see and sense what it would comfort; so that he will be snared in it, and will get himself into danger ... For he is vehement and is all fixed and impassioned in this affair, so that it is impossible, if you have him around, to

escape from his hands. And this business which is not a joke but may become of great consequence, and this man is here under protection and responsibility ...”⁶⁹

Anna Mudry begins her new German selection of Galileo’s works and letters⁷⁰ with the words:

“The biography of the co-founder of modern science actually demonstrates many contradictions, inconsistencies, and retractions which Galileo’s contemporaries sense as such. Indeed they praised him as the ‘Columbus of the new heaven.’ However, they also responded with pricked ears to his inner turmoil. ‘This is due to the fact that as a clever man he wanted and sensed what the holy church wanted and sensed. However, he caught fire for his own opinions, had fierce passions within himself, and little power and caution to conquer them ...’ This is what the envoy of the Tuscan grand duke, Piero Guicciardini, reported on March 4, 1616 back to Florence. And Guicciardini was not someone exactly sympathetic towards Galileo, although he had an intelligent feel for Galileo’s conflict.”⁷¹

Koestler repeatedly points to this personal side of numerous disputes which made it impossible to cooperate with Galileo in a scientific sense.⁷² As early as during his studies he received the nickname the “wrangler.”⁷³ Koestler writes the following on Galileo’s responses to the critics of his Message from the Stars:

“In contrast, Galilei possessed the seldom talent of arousing enmity; not the indignation alternating with fond-

ness which Tycho evoked. Rather, it was a cold, merciless enmity which genius plus arrogance minus humility produced in circles of the mediocre. Without this personal conflict, the conflict which the publication of the *Sidereus Nuncius* triggered would remain incomprehensible.”⁷⁴

Arthur Koestler writes:

“His method was to make the opponent ludicrous – and he was always successful at this, regardless of whether rightfully so or not ... The method demonstrated itself to be exquisite for celebrating triumphs in the moment and to produce enemies for life.”⁷⁵

Zdenko Solle formulates it similarly:

“Galilei did not shirk back from personal attacks and ridicule, and yet this was also the best way to produce enemies.”⁷⁶

Koestler writes the following about Galileo’s excessive response to an anti-Ptolemaic writing by the leading Jesuit astronomer Horatio Grassi:

“When Galilei read the treatise, he had an outburst of fury. He covered its margins with exclamations like ‘piece of asininity,’ ‘elephantine,’ ‘bufoon,’ ‘evil poltroon, and ‘ungrateful villain’. The ingratitude consisted in the fact that the treatise did not mention Galileo’s name – whose contribution to the theory of comets had been a casual endorsement of Tycho’s views in *Letters on Sunspots*.”⁷⁷

Klaus Fischer comments on the same squabble:

*“It is difficult to decide what the most notable thing about this dispute is: the open course of action of the Jesuits against Aristotelian celestial physics, Horatio Grassi’s almost submissive behavior vis-à-vis Galileo’s authority, the immoderate aggression with which Galileo demolished everything that Grassi uttered, or Galilei’s ingenious rhetoric, which he skillfully played off against Grassi and Brahe, the former appearing to be the most pitiable of figures who does not know what he is talking about ...”*⁷⁸

Koestler writes as follows on a maligning and scurrilously written communication against Baldassare Capra⁷⁹:

*“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 of it ...”*⁸⁰

He also produced enemies in the process – also among those who had been favorably disposed to him.

A. C. Custance mentions as an example of Galileo’s oversensitivity to criticism his reaction to rumors that a seventy year old Dominican had expressed doubt about his theses in a private conversation. Galileo wrote a strong letter and demanded an account. The Dominican responded that he was too old and too little schooled to judge Galileo’s theses at all. He had only made a few private comments in order to not appear uninformed. Galileo continued to feel “attacked.”⁸¹

Decisive for the trial against Galileo was the fact that words of the pope fond of Galileo were put in the mouth of the character ‘Simplicio’ in Galileo’s *Dialogue* in a way that expressed much foolishness (see in this connection Thesis 20).

9 Galileo ignored other scientific researchers

9. Thesis: Galileo ignored all other researchers, did not communicate his research results to them, and believed that he alone made scientific discoveries. As a consequence, Galileo’s teachings which were condemned had already become obsolete, especially by developments reached 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 a letter 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.’”*⁸²

At the same time, an example to mention relating to the preceding Thesis 8

is Galileo’s relationship to Johannes Kepler. Galileo had indeed written to Kepler but had never read or understood him. Rather, he had ignored Kepler.⁸³ Galileo used weak arguments and ignored Kepler’s significant stronger ones.⁸⁴

Although Galileo had informed Kepler very early on that he was a Copernican and Kepler ‘blindly,’ i.e., without his own evidence, aligned himself with Galileo’s Message from the Stars,⁸⁵ Galileo refused to give him one of his telescopes which he at the same time had given to political leaders throughout the world.⁸⁶ Kepler was first able to reproduce Galileo’s results through a Galilean telescope which the Duke of Bavaria lent him.⁸⁷ Galileo thereafter informed Kepler of his research results in the form of anagrams so that Kepler could not know what the results were and Galileo would be able to later demonstrate his rightful position as discoverer.⁸⁸ Afterwards, Galileo forever broke off all contact to Kepler. He completely ignored Kepler’s famous work *Astronomia Nova*, although it represented a further development of Copernicus’ efforts going also beyond Galileo’s teachings.⁸⁹

“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 acknowl-

ding 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.”⁹⁰

In short:

“Galileo was perhaps no devout Catholic in the traditional sense. Yet he was deeply convinced that God had chosen him to not only make some discoveries in the starry heavens but rather to make to make all such new discoveries. He viewed the contributions of other astronomers as inferior in comparison to his own. This was regrettable.”⁹¹

10 Galileo was sometimes contradictory

10. Thesis: Galileo was not first contradictory in the trial, where he advocated Copernican teachings in his writings and yet decisively denied the same verbally.

Arthur Koestler writes the following on the trial and Galileo’s defense:

“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 months’ respite to prepare his defense. The explanation can only be sought in the quasi-pathological contempt which Galileo felt for his contemporaries. The pretence that the Dialogue was writ-

*ten in refutation Copernicus was so patently dishonest that his case would have been lost in any court.*⁹²

*“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 ... 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 ...”*⁹³

And yet this dichotomy, indeed even hypocrisy, pervades Galileo’s entire life. At first Galileo himself doubted the Copernican world view, for instance in 1604/1605 when a clearly visible supernova rapidly became weaker and no parallaxes were able to be detected.⁹⁴ He defended the Copernican world view for the first time in a publication in 1613 in the fiftieth year of his life. However, in 1597 he had already confessed his belief in Copernicus’ system in a private letter to Johannes Kepler. For 16 years “he not only taught ... the old astronomy according to Ptolemy but expressly repudiated Copernicus.”⁹⁵ Furthermore, he did this although a confession of adherence to Copernicus’ teachings would have been completely harmless at that time.⁹⁶ Yet he only confessed to this stance in private conversa-

tions and letters. Various authors suppose that behind his behavior was more than anything a fear of derision from other scientists. It was not until Galileo became famous for his discoveries in the areas of mechanics, dynamics, and optics that he also voiced himself on Copernican astronomy in publications.

Klaus Fischer occasionally points out that Galileo was able to write things that were contrary to his own opinion,⁹⁷ and that he mostly did this in order to injure others.

II Galileo was not a strictly experimental scientist

11. Thesis: Galileo was not a strictly experimental scientist, in any event not in the area of astronomy.

Klaus Fischer penned the following about Galileo’s writing *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.”*⁹⁸

Koestler refers to Professor Burt, who assumes that it was mainly those who stressed empirical research who did not

follow the new teaching, because of its lack of proof (comp. the following theses 12 and 13).

“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.”⁹⁹

William R. Shea comments as follows in order to provide better understanding of the situation:

“So that we do not misunderstand the historical situation, we have to think about the fact that Galileo, whom we celebrate as the father of the scientific revolution, was not the man known by his scientific contemporaries. He had not yet written the works on mechanics for which he later became famous, and he was already close to fifty years of age without having written on the world systems, something that he had already announced in 1610. His reputation rested upon his discoveries with the telescope, which were indeed ingenious but to a large degree attributable to the fact that in the Republic of Venice there were good lenses available.”¹⁰⁰

There are two scientific revolutions associated with Galileo:

“On the one hand there is the Copernican, that is to say the one on which Galileo took sides and which he vehemently contended for. And then there is a second one, namely the introduction of the mathematically described experiment as a source of knowledge, which he initiated and which became a great success. Galileo’s renown is more to be substantiated and justified through the

second, since his contribution to the first revolution is to at least be designated as problematic, whereas the second became a success without restriction and is traceable back to him.”¹⁰¹

12 Galileo had no evidence

12. Thesis: Galileo was never able to present evidence for his theory. The first pieces of evidence – depending on their interpretation – became available 50 or 100 years after his death.

Since Galileo did not work empirically in astronomy (see Thesis 11) but rather regarded the Copernican system as an axiom, he did not initially feel the necessity for proofs. It was not until he was placed under pressure, since he simply put forth the Copernican system as proven, that he got into difficulties for lack of evidence.

Virtually all researchers agree that Galileo was unable to introduce any physical proof.¹⁰² Since it had already been superseded by Kepler’s work, there was much regarding the theory defended by Galileo that also could not be demonstrated. Fischer summarizes as follows:

“He did not have really convincing proofs such as the parallax shift or Foucault’s pendulum.”¹⁰³

“What Galileo had introduced as proof for the heliocentric system by 1633 was not less, but also not more, than he already had in 1616.”¹⁰⁴

With this said, however, we have arrived at the core of the problem.

There is no doubt: Neither Copernicus nor Galileo had put forth more than a hypothesis. Nothing could be said about there being compelling demonstrability. It was not until Newton had formulated the gravitational laws that the way for proof of the movement of the earth was opened up. Additionally: that the sun was the center of the universe is something which astronomy has repeatedly moved farther and farther away from with each of its spectacular discoveries.¹⁰⁵

“However, building upon the research Galileo conducted in mechanics in the last years of his life, Newton only discovered the gravitational laws in 1684. With this aid, Newton was able to demonstrate the actual existence of the heliocentric system. A further century had to go by before Guglielmini was in a position to provide the first experimental proof for the movement of the earth. Only the combination of geometric and physical methods would have been capable of putting forth that evidence, which Galileo at his time was not yet able to do at all.”¹⁰⁶

In 1728 the Englishman James Bradley found the first true proof for the movement of the earth around the sun, and in 1734 this knowledge made its way to Italy.¹⁰⁷

In summary the following can be said:

“These demonstrations lead to the awareness that that which Galileo maintained was not able to be established ..., a finding of central importance.

This destroys the wrong picture of Galileo as someone arguing for the truth and falling prey to the ignorance of the Catholic Church. One cannot speak of ignorance. On the contrary: There, where Galileo was truly correct, he was followed. And where he was wrong or his arguments overrated, one did not let himself be deceived. With this in mind, it is difficult to understand why Galileo did not use what actually at the time was the sole telling argument: Kepler’s laws.”¹⁰⁸

13 The Church only wanted proofs

13. Thesis: The pope and the Inquisition demanded nothing other from Galileo than proofs and/or the acknowledgement of the hypothetical character of the Copernican world view.

When for instance Hans Mohr writes: “With all the means of a repressive power, the church of the time declared to the natural scientist using the experimental method that a critical world view examination had to be disallowed,”¹⁰⁹

it is unfortunately nonsense. This has never been the topic. Indeed the pope explicitly declared that he wanted to review the reigning world view if Galileo would provide pieces of evidence. However, neither Galileo nor any of Galileo’s contemporaries had any experimental proofs for Galileo’s viewpoint. To be sure, Galileo made experimental demonstration the center of

research. However, in the process it was not the Copernican world view which was at issue, and the results achieved by it were never doubted by the Church. Walter Brandmüller writes:

“It is for this reason actually astounding that in a letter dated April 12, 1615 from Cardinal Bellarmine to the Carmelite Provinzial Foscari, who likewise occupied himself with the question of the day, wrote: “Third. I say that if there were a true demonstration ... then it would be necessary to proceed with great caution in explaining the passages of Scripture which seemed contrary, and we would rather have to say that we did not understand them than to say that something was false which has been demonstrated. But I do not believe that there is any such demonstration; none has been shown to me. It is not the same thing to show that the appearances are saved by assuming that the sun really is in the center and the earth in the heavens. I believe that the first demonstration might exist, but I have grave doubts about the second, and in a case of doubt, one may not depart from the Scriptures as explained by the holy Fathers ...”¹¹⁰

“As early as the first discussion regarding Copernicus in 1615, Cardinal Bellarmine, arguably the most important theologian of his time, defended this position: Certainly one could say that that problem in question, ‘Ptolemy or Copernicus,’ was not a question of faith. With respect to the (scientific) object, this indeed was the case – argu-

ably, however, it was a question of the contents of the Holy Scriptures. If a true proof for the heliocentric system was present, one would have to be very cautious in interpreting the Scriptures and rather say that we have possibly not understood its manner of expression.”¹¹¹

Galileo wrote in a letter to Dini in May 1615 that the simplest way to harmonize science and the Bible would be to bring forth many pieces of evidence for Copernicus’ point of view. Due to the fact, however, that his opponents were not in a position to follow the simplest and most obvious arguments, it would have been a waste of time to compile these proofs.¹¹²

Let us return to the claim made by Hans Mohr that Galileo is supposed to have introduced experimentation as planned and controlled observation in the natural sciences.¹¹³ The Church at that time is supposed to have suppressed this experimental research with “all the means of repressive power”¹¹⁴ and to have forbidden a review of the Ptolemaic world view. Mohr shows that this is not the result of historical research. Rahter, he projects back onto the issue his aversion to the Catholic Church. This is due to the fact that the Church has indeed up to the present day “always ... been stiffly entrenched in doctrinaire attitudes”¹¹⁵, as has recently been the case with biomedicine.

“Galileo fell into conflict with the ruling church of the time on account of his new way of thinking ...,”¹¹⁶ according to Mohr. Not a word is said of the fact that it only was a question

of whether Galileo's theory was verified or only probabilistic – the pieces of evidence were truly found much later. There is not a word of the fact that Galileo's view of astronomy had already been superseded by Kepler and others. There is not a word of the fact that that for which Galileo truly became famous and which was his 'new way of seeing things' was never doubted by the Church. Nothing is allowed to becloud the black and white picture.

14 Galileo withheld the evidence

14. Thesis: Galileo always pretended to have evidence, but he apparently did not introduce it because no one would have understood it anyway

When Cardinal Bellarmine, who was responsible for the trial of inquisition, kindly asked for proof from Galileo, this was done in order to accommodate Galileo's wish to have the Copernican system considered as verified. Failing this, Galileo was asked to defend the Copernican system as a hypothesis. Galileo answered in a letter that was written in a sharp tone that he was not ready to present evidence since no one would understand it anyway. Arthur Koestler comments as follows:

"How could he refuse to produce evidence and at the same time demand that the matter should be treated as if proven? The solution to the dilemma was found in maintaining that he had the proof but was refusing to present it with the justification that his oppo-

nents were too dumb to understand it anyway."¹¹⁷

Galileo reacted similarly when the pope himself demanded evidence from him.¹¹⁸ To an earlier polemical letter dating from 1613, Koestler writes:

*"Galileo did not want to bear the burden of proof; for the crux of the matter is ... that he had no proof."*¹¹⁹

It should not be forgotten that Copernicus' hypothesis was never generally denied by the Inquisition. Rather, it was only not to be advocated as a proven theory or truth. "In fact, however, there had never been any question of condemning the Copernican system as a working hypothesis."¹²⁰ The Copernican world view was simply "an officially tolerated working hypothesis awaiting proof."¹²¹

Just so that no one understands me incorrectly: The church had and in my opinion never has the right to threaten any scientist with punishment. That was naturally only possible given the dual role of the pope as a political ruler and a religious leader in the Baroque age. For that reason I agree with Matthias Dorn when he writes:

*"For that reason Feyerabend (1986?) is also not to be agreed with when he maintains in his fourteenth chapter that the church rightly condemned Galileo on the basis of reason. Such an evaluation could arise only if one reduces the 'case of Galileo' to the 'scientific aspect' and thus takes Galileo's deficit with respect to proof as the sole decision criterion."*¹²²

Alfred North Whitehead pointed out something else in 1949:

“I will give you two illustrations, both from science: Galileo said that the earth moves and that the sun is fixed; the Inquisition said that the earth is fixed and the sun moves-, and Newtonian astronomers, adopting an absolute theory of space, said that both the sun and the earth move. But now we say that any one of these three statements is equally true, provided that you have fixed your sense of ‘rest’ and ‘motion’ in the way required by the statement adopted. At the date of Galileo’s controversy with the Inquisition, Galileo’s way of stating the facts was, beyond question, the fruitful procedure for the sake of scientific research. But in itself it was not more true than the formulation of the Inquisition. But at that time the concepts of relative motion were in nobody’s mind-, so that the statements were made in ignorance of the qualifications required for their more perfect truth. Yet this question of the motions of the earth and the sun expresses a real fact in the universe; and all sides had got hold of important truths concerning it. But with the knowledge of those times, the truths appeared to be inconsistent.”¹²³

15 Invented proofs

15. Thesis: The ‘proofs’ which Galileo finally produced were all erroneous and were not accepted by anyone. It is not the case that only the Church did not accept them.

When Galileo was increasingly pushed into a corner, he finally invented a “secret weapon,”¹²⁴ namely the completely erroneous theory that the seasons were directly caused by the rotation of the earth. This easy to refute theory was supposed to constitute the absolutely certain proof for the Copernican world view.¹²⁵

“The whole idea was in such glaring contradiction to the facts, and so absurd as a mechanical theory – the field of Galileo’s own immortal achievements – that it can only be explained in psychological terms.”¹²⁶

Matthias Dorn writes:

“Galileo erred in the meaning of the seasons, to which he attributed the major emphasis in the Dialogue. All rhetorical efforts at that time could not even cover up the defective nature of his thinking.”¹²⁷

“Which pieces of evidence was Galileo able to present for the Copernican system of the world? In the Dialogue and in other writings the following are named and discussed in extenso:

- *The mountains and seas of the moon,*
- *the moons of Jupiter,*
- *the phases of Venus,*
- *the changes in the brightness of the planets,*
- *the sunspots,*
- *the trade winds (not discussed here),*
- *the seasons.”¹²⁸*

William A. Wallace has shown on the basis of heretofore unknown manu-

scripts¹²⁹ that Galileo very well knew that he was missing the decisive piece of evidence for the Copernican view of the world, and that he glossed over it with rhetoric. Jean Dietz Moss has gone into the matter and shown how it emerges from Galileo's texts themselves that he was aware of the fact that actual proof was due and that he whitewashed this with eloquently expressed words.¹³⁰

16 Galileo refuted Ptolemy, but he did not prove Copernicus

16. Thesis: Whatever Galileo introduced as proofs for his theory might demonstrate the untenability of Ptolemy, but it did not demonstrate an alternative model such as that of Copernicus.¹³¹

Arthur Koestler writes the following in this connection: "He employs his usual tactics of refuting his opponent's thesis without proving his own."¹³² And Matthias Dorn aptly comments:

*"That Galileo, perhaps with the intuition of an experienced scientist, favored the correct system of the world, indeed speaks for him. Yet it cannot eliminate the argumentative weaknesses."*¹³³

17 Galileo provided no response to Tycho Brahe

17. Thesis: At the time of Galileo, science was not posed before a choice of Ptolemy or Copernicus. Rather, it was a "choice between Copernicus

and Brahe,"¹³⁴ since the Ptolemaic world view was counted as obsolete and in any case one proceeded on the assumption that the earth moved around the sun.

*Additionally, in a scientifically unacceptable manner, Galileo had abstained from grappling with Tycho Brahe's system at all, not to even mention the demonstration of its untenability."*¹³⁵

However, it seems that would have been his proper task:

*"There was hardly a leading expert who still believed Ptolemaic astronomy. The conflict was thus between Tycho Brahe and Copernicus."*¹³⁶

Tycho Brahe, who was Kepler's predecessor as the emperor's court astronomer, maintained the central position of the earth in his system, even though it orbited around the sun.

*"The arguments and observations which Galileo referred to were indeed acknowledged, but they only denied the Ptolemaic system and did not in like fashion speak for the Copernican system. They were compatible with the Tychonian system, which had the advantage of maintaining the central position of the earth."*¹³⁷

Galileo had never rightly taken on this debate, if one disregards his polemic against and distortion of Brahe's system in his writings against Horatio Grassi.¹³⁸

"It is indeed completely clear to us today that neither Copernicus nor Galileo provided any real proof that

*corresponded to the actual relationship of the cosmos to the heliocentric system. Without a doubt, and indeed above all through observations made with his telescope, Galileo provided several weighty, if not sweeping, reasons for the fact that the geocentric system could not be true. However, Tycho de Brahe, with whom Galileo had not grappled, had already known that. Hence nothing had yet been demonstrated for Copernicus' benefit. Thus our question has to be whether this was also understandable by Galileo's contemporaries. And in fact it was.*¹³⁹

18 Galileo also defended what had long since been superseded

18. Thesis: Galileo fought likewise for the Copernican system as obstinately as for theories which looked to other scientists to be more of a relapse into the old conception of the world.

This thesis actually emerges from Theses 9, 15, and 17. Galileo held firmly to Copernicus' epicycles, although Kepler had already gotten beyond this.¹⁴⁰

His erroneous explanation of the tides had to serve as the primary piece of evidence for the Copernican system, although it was also already untenable at that time and Kepler had found the correct cause in the gravitational pull of the moon.¹⁴¹

In 1618 Galileo interpreted visible comets in a passionate piece of writing as a light reflex, in order that one did not believe the astronomer and Jesuit Grassi that they were flying bodies.¹⁴²

19 The later popes would not have allowed Galileo to be condemned, and earlier ones did not pursue his condemnation

19. Thesis: Among Urban VIII's predecessors, no trial against Galileo was pursued, and among his successors there would not have been a trial.

Stated otherwise: the prior popes were for Galileo, and the popes afterwards would not have allowed Galileo to be condemned.

Evidence is found in Theses 5, 6, and 21. After all, in 1615 an initial trial before the court of the Inquisition was decided in Galileo's favor on the basis of a favorable opinion provided by the leading Jesuit astronomer.¹⁴³

20 Galileo was a victim of Urban VIII

20. Thesis: Galileo became the victim of the politics of Pope Urban VIII, who had earlier been very partial to Galileo. The blame for this rests on political circumstances and the personal attacks made by Galileo against the Pope. These were not, however, religious reasons. The trial proceeded from the Pope, while the Inquisition weakened the trial more than it intensified it.

Theses 20 and 21 go into the personal aspect of the matter, while Thesis 22 goes into the political aspect. And yet they are not easily separated from each other.

Galileo's trial took place under a ruthless and cruel pope. In a Catholic encyclopedia on the popes, one reads the following:

*“Within the Church, Urban’s pontificate was burdened by unlimited nepotism. Urban VIII is a tragic figure on the papal throne: his reign was filled with failures for which he himself, however, was responsible.”*¹⁴⁴

At the end of what was not exactly a flattering description of Urban VIII, formerly Cardinal Barberini, who was “cynical, vainglorious, and lusting for secular power,”¹⁴⁵ Koestler writes that 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.”*¹⁴⁶

The Pope's conduct also affected science:

*“The Pope paralyzed scientific life in Italy. The center of new research moved to the Protestant countries in the north.”*¹⁴⁷

With that said, the Galileo affair was actually only an intra-Catholic and intra-Italian problem with a very short

duration. It was not, however, quite simply a gigantic battle between Christianity and science as such.

21 The Pope: From friend to foe

21. Thesis: It was not until shortly prior to the trial that the friendship with Urban turned to enmity, and this was due to Galileo's making fun of the Pope in his major work entitled the *Dialogue*.

As a cardinal, Urban VIII had been very partial to Galileo (see Thesis 5) and had even composed an ode to him.¹⁴⁸ After he became Pope Urban VIII in 1623, his fondness for Galileo increased even more.¹⁴⁹

It was just prior to the trial that Urban's friendship turned to enmity. In addition to political reasons (Thesis 22), the cause was also due to personal imprudence – if not insults – on the part of Galileo. Galileo obtained permission from the Pope to print his major work, *Dialogue*, provided that certain corrections were made. Galileo shrewdly circumvented the censorship by placing Urban's favorite argument in the mouth of the shallow-brained Simplicio. Simplicio is one of three scientists in the dialogue and always asks the 'silly' questions and defends the old world view. Urban VIII found out about this and became aware of the contents of the book at some time between the end of June and the middle of July 1632.¹⁵⁰ This was shortly before the disaster ran its course. Without this

he surely would have hardly lent Galileo's enemies his ear.

*“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 trickery, 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 Simplicio 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 ...”*¹⁵¹

Enrico Belloine writes:

*“The book was finally printed February 21, 1632 under the title Dialogue Concerning the Two Chief World Systems: Ptolemaic and Copernican. The hostile reaction was already so strong in the summer that it came to a statement from Pope Urban VIII. The Pope felt that he had been attacked and betrayed because one of his theses had been reproduced in the Dialogue in a form that held him up to ridicule. The thesis which the pope had personally expressed said that God in his unending power could bring about the perceived phenomenon in an unending number of various ways. As a result, mankind was not able to come upon the truth by observing the phenomenon alone.”*¹⁵²

As a defender of papal infallibility, Ludwig von Pastor has attempted to demonstrate in his history of the popes that the Pope was himself only slightly involved in the trial and that the (anonymous) Inquisition conducted the proceedings more aggressively than the Pope, as Galileo's friend, would have liked.¹⁵³ Zdenko Solle, however, has asserted good reasons for seeing the circumstances as being exactly the other way around.¹⁵⁴ The Pope prompted the entire trial for personal reasons, and the Inquisition, in contrast, conducted the trial in a very relaxed manner, whereby some of the ten judges were more concerned with their own advancement. Others, however, placed a brake on the events. The result was that in the end three signatures were missing, at least two of which were arguably missing out of protest! The only cardinal who proceeded with zeal was the brother of the Pope.

*“That the whole trial was questionable could not be hidden from insiders. There was much resistance from high church officials and from the side of the Jesuits.”*¹⁵⁵

Koestler likewise sees the Pope as the actual cause of the trial:

*“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.”*¹⁵⁶

22 Galileo was a victim of Urban VIII's politics

22. Thesis: Galileo also became a victim of the politics of Pope Urban VIII, who in the Thirty Years' War manoeuvred in an incomprehensible manner, tried to bring Italian cities under his control, fought against internal opposition, and after initial success completely failed in 1644.

The condition of the Curia was completely determined by the political disputes of the time. Zdenko Solle writes:

"The Council of General Inquisitors became a picture of the party cadre of the Church at that time. Neither in the case of Borgia nor of Urban was it a question of astronomy or of doctrine. Rather, it was always a question of politics."¹⁵⁷

Additionally:

"Let us return to the political situation in Rome, which caused a state enemy to be made out of our unsuspecting astronomer"¹⁵⁸

Fischer expresses himself similarly:

"The concern for the salvation of one's soul was certainly not the sole motivation behind church-related action. The Thirty Years' War began in 1618, and it ended the time of arguing with words. The Church found itself in its fiercest battle for self-justification since the earliest days of its history."¹⁵⁹

During the Thirty Years' War, Pope Urban VIII initially supported the Catholic emperor. However, after Catholic France and Protestant Sweden became allies, he changed over to their

side and at the same time made a role model out of the ruthless French Cardinal Richelieu. In the process he encouraged the continuation of the war.

Between the years 1627–1630 Italy additionally experienced the War of Mantuan Succession. At the same time, there arose a dispute in the Thirty Years' War between the Catholic powers of France and Spain, with which the Pope had amicable arrangements. The head of the Spanish opposition in the Vatican, Cardinal Borgia, let things develop into a heated political dispute with the Pope, since a peace treaty was in sight while the Pope continued to push for war.¹⁶⁰ A tumult followed among the cardinals. After that, the Pope conducted a large-scale political cleansing within the Vatican, which more or less by chance affected all of Galileo's backers.¹⁶¹ The Pope led numerous trials of inquisition and developed into an abominable ruler.

The following two relationships possibly doomed Galileo, because they were directed against the Pope's alliance policy:

The close relationship to the de Medici, who supplied the Tuscan prince, fought with Venice¹⁶² against the Pope, and they were not vindicated until 1644 after the death of the Pope;¹⁶³

The relationship with Austria¹⁶⁴ and the Emperor Rudolph II through Kepler, since the Pope fought with France and Sweden against the Catholic Emperor. The princes of Tuscany (and Galileo's protectors) and the emperor in Vienna were close friends.¹⁶⁵

Zdenko Solle has thoroughly documented that it was emerging ‘modern’ nationalism which left Galileo between the Pope and the Italian cities and between the parties of the Thirty Years’ War.¹⁶⁶

“Thus it was not the shadow of a dying and dark night but rather the beginnings of the modern era which put pressure on the researcher who had engrossed himself in his scientific work.”¹⁶⁷

Joachim Hemleben, who is otherwise completely partial to Galileo, has shown that Galileo would not have been subject to a trial had he not moved from Padua to Florence. This was due to the fact that Padua was dependent on Venice, while Florence, however, was dependent on Rome.¹⁶⁸ Thanks to Venice’s independence from Rome, there was a great degree of freedom in science which prevailed,¹⁶⁹ such that even Protestants were able to study there.¹⁷⁰ This 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.¹⁷¹ However, Galileo ignored these and all later warnings.

[Michael H. Shank has pointed out that during Galileo’s entire time of activity, Italy and Europe were entangled in wars, above all in the so-called Thirty Years’ War and in defending against the expansion of the Ottoman Empire.¹⁷²]

23 Galileo died two years too early

23. Thesis: Galileo died two years prior to the humiliation of his opponent Pope Urban VIII in 1644. It was in this year that the entire situation changed, and the Medici’s again regained their honor. Galileo would have surely no longer been condemned.¹⁷³

Galileo’s work had already appeared in 1656 with the permission of the Church, but without the Dialogue.¹⁷⁴ However, it contained an admiring letter from Pope Urban VIII to Galileo. In 1710 Dialogue was also published. The censorship of Copernican writings was altogether quickly ended and removed.¹⁷⁵

When Pope John Paul II apologized in 1979 for the trial of Galileo and officially rescinded the court decision,¹⁷⁶ it should not lead to the false conclusion that up until that time it had been abided by.

24 Galileo considered the Bible to be God’s Word

24. Thesis: Galileo was a scientific researcher who believed in the credibility of the Bible and always sought to show that the Copernican world view was by all means compatible with the Bible. He contended against the reigning understanding of the Bible that did not do justice to the Bible, since it was blurred by Aristotelian glasses.

Galileo was not charged with infringing upon the Bible, but rather with going against papal ordinances and against the prohibition of holding that a hypothesis without proof expresses truth. Matthias Dorn writes:

“The discussion about Galileo’s faith receives an important endorsement through all of this: as problematic as his devotion to the church might have been, it was paired with a profound respect for the Holy Scriptures, which was an integral component of his thought.¹⁷⁷ Galileo did not lift science to the position of a corrective to the Holy Scriptures. Rather, in the case of contradictions he only drew exegetical consequences of the type that led to a better understanding of the text but that neither rejected nor denied the text.”¹⁷⁸

“One cannot speak of ‘demythologizing’ the biblical text (Hemleben 1987). Galileo made very concrete efforts at interpretation and never doubted the revelatory character of the Holy Scriptures. Also, Galileo did not advocate the ‘theory of double truth’ (Kuznecov 1970).”¹⁷⁹

A letter to Benedetto Castelli dated December 21, 1613 was dedicated to expressing Galileo’s understanding of the Bible. In this letter one reads the following:

“... that, through the Scripture cannot err, nevertheless some of its interpreters and expositors can sometimes err in various ways ... namely to want to limit oneself always to the literal meaning of the words; for there would thus emerge

not only various contradictions but also serious heresies and blasphemies, and it would be necessary to attribute to God feet, hands and eyes, as well as bodily and human feelings like anger, regret, hate and sometimes even forgetfulness of things past and ignorance of future ones.”¹⁸⁰

“I maintain that the authority of the Holy Scriptures has the sole goal of convicting people of those articles and teachings which are indispensable for their salvation and proceed beyond all human knowledge, and which are able to be made credible through no other science and by no other means than through the mouth of the Holy Spirit itself. However, that the same God who has endowed us with senses, the faculty of judgment, and reason, relegated these and made intermittent use of and wanted to convey knowledge to us in ways other than through them, is something I do not think it is necessary to believe, especially not when it comes to those sciences for which only an exceedingly small portion is contained in the Scriptures, and above that only in scattered sentences; ...”¹⁸¹

Enrico Belloine wrote the following regarding this letter:¹⁸²

“The central topic of the letter was the differentiation de fide problems and de rerum natura problems. The Holy Scripture, according to Galileo, contains the absolute truth, as far as it has to do with questions of faith. However, when it comes to questions of natural philosophy, the Scriptures, even if they

are inspired by God, do not lay claim to scientific truth. Rather, they have to be understood as statements from a point of view which people without education can also grasp. For that reason, it is necessary that when it comes to questions of science that are able to be linked to certain portions of text in the Holy Scriptures, a good Christian should not only take the literal wording into account. A good Christian has to interpret these connections very astutely, the more so as it only has to do with a few Bible passages.”¹⁸³

According to Olaf Pedersen, Galileo primarily quotes St. Augustine, Hieronymus, Thomas of Aquinas, and additional medieval theologians in his theological letters.¹⁸⁴ However, he apparently does not know of the most significant key witnesses which he could have quoted.¹⁸⁵ As a theological amateur, Galileo was actually poorly armed for the discussion.¹⁸⁶

It is not without good reason that his chief witness is St. Augustine,¹⁸⁷ even if his knowledge of the church father was rather superficial. What he took from St. Augustine could be summarized as follows:

“Galileo emphasized that the Bible uses this manner of expression for the sake of simple people, in order that they more easily understand statements regarding salvation. ‘The Holy Scriptures and nature,’ he declares, ‘both trace back to the divine Word: the first as dictation from the Holy Spirit, and the second as a loyal executor of the commands of God.’ No truth which is discovered in

*the Holy Scriptures can contradict the Bible.”*¹⁸⁸

Finally, it has to be added that for his part, Galileo loved to charge others with teaching against the Holy Scriptures.

*“On the other hand, Galileo tended to designate his point of view as ‘inspired by God’ and to stigmatize those of his opponents as ‘contrary to the Scriptures.’ The popular conception of Galileo as a martyr for freedom of thought is a crude oversimplification. The fact that his viewpoints differed from most recognized scholarly instructors did not make him into a freethinker.”*¹⁸⁹

25 Galileo was a convinced Catholic

25. Thesis: Galileo was no secular Enlightenment scientist. Rather, he was a convinced Catholic. Even his efforts to demonstrate the compatibility of his teachings with the Bible led, among others, to conflicts with the Catholic hierarchy.

Olaf Pedersen has most clearly worked out that Galileo was a convinced Catholic and Christian.¹⁹⁰ In his view there is not the slightest indication that Galileo ever doubted the Catholic Church, be it from the direction of Protestantism, of indifference, or of secularism.¹⁹¹

For instance, Galileo made a pilgrimage to Loreto in 1618. He had attempted it earlier and would again later as well, but he did not receive a permit to travel.¹⁹²

Zdenko Solle writes as follows regarding the relationship between faith and science in the case of Galileo:

*“As a deeply religious scientist, Galileo could not live with the appearance of a discrepancy between science and faith, and he started to interpret the Bible. As a layman, he experienced much resistance from 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.”*¹⁹³

The foreword of the Dialogue itself contains clear statements regarding the fact that Galileo did not want to stand in opposition to the Bible¹⁹⁴ and to the Church. Albrecht Fölsing writes regarding this:

“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 Dialogue) there is no reason to doubt the honest intentions of the faithful Catholic Galileo.”*¹⁹⁵

Indeed Ludwig Pastor, as a defender of papal infallibility, maintains that the Pope saw a Protestant danger in Galileo, and yet there are others who doubt this.¹⁹⁶ After all, Galileo’s first critic was a Protestant pastor from Bohemia,¹⁹⁷ even though after the trial his writings were published in Protestant countries and thereby became known. Incidentally, Galileo was a declared anti-Protestant.¹⁹⁸

Galileo was, by the way, legally a clergyman, even if only in order to receive a benefice:

*“Galileo was not expected to wear the clothes of an order or to change his lifestyle: he did, however, have to have his hair cut and received the religious rite of the tonsure from Archbishop Alessandro Strozzi on April 5, 1631. Since that time Galileo was a member of the clergy and was occasionally so identified in legal documents.”*¹⁹⁹

26 Galileo wrote in Italian

26. Thesis: While Galileo interpreted the Bible as a non-theologian and composed his writings in popular Italian, thus becoming a precursor to Italian nationalism, he experienced resistance similar to that Martin Luther received 100 years earlier, from the side of the church as well as from the side of science.²⁰⁰

“Galileo did not compose his most important works in Latin but rather in Italian. The danger thus existed that the dispute about the correct world would no longer be a purely academic affair but rise to the position of being a subject of public discussion.”²⁰¹

27 Galileo did not separate faith and science

27. Thesis: Galileo was not a scientist who rejected all metaphysics or called for a separation of faith and science.

Klaus Fischer makes the following fundamental comment on a quote from Galileo’s ‘Letters on Sunspots’:

“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 historiographers of science from Wohlwill to Drake presents Galileo as an anti-metaphysician 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 for the great Creator being the final goal of all our (and thus including our scientific) work! Science as perception of God’s truth! ... The ruling historiography of science cannot be freed from the reproach that they have read Galileo’s writings too selectively.”²⁰²

Somewhat later he writes the following about the misinterpretation of Galileo’s work:

“This misinterpretation led to the inability to correctly evaluate Galileo’s early writings (‘Juvenilia’), to ignoring many sections with speculative and metaphysical content scattered throughout Galileo’s writings, yea, even to a misinterpretation of how Galileo understood the relationship between science and faith, how he interpreted the relative scientific importance of religious statements, the binding nature of the Inquisition for science and the scientific significance of his own cosmology, cosmogony, and other natural philosophical considerations such as those regarding atomism.”²⁰³

28 Galileo did not advocate the autonomy of science

28. Thesis: Galileo never advocated the autonomy of science and was not – as is often maintained – its father.

This has been most convincingly documented by Matthias Dorn in his investigation *Das Problem der Autonomie der Naturwissenschaften bei Galilei* (English translation of the title: *The Problem of the Autonomy of Science in the Case of Galileo*).²⁰⁴ The Baroque’s holistic view did not allow nature and revelation to simply be separated.²⁰⁵

“This is somewhat understandable when seen against the backdrop of the Baroque. In contrast to our world,

*which is divided into independent and autonomous areas where religion struggles for existence as one area of life among others, the individual of the Baroque era saw the heavens and earth, time and eternity, the divine and the human, the church and the world, science, technology, and faith as a rapturously magnificent display and as a harmonious component of the one immense and all encompassing cosmos of being which proceeds from and strives towards God.*²⁰⁶

Conclusion

A genius, according to the Galileo myth, defends the results of his empirical research against religious obscurantists and in the process becomes a precursor to the liberation of western thought from all forms of authoritarian tradition. Reality is, as usual, more complicated and not so melodramatic.

*“Whoever occupies himself seriously with the life and work of Galileo Galilei quickly determines that the topic is enormously multi-layered and complex ...”*²⁰⁷

Let us summarize the results with the words of Lydia La Dous:

“The ‘case of Galileo’, in the sense that Galileo Galilei had problems with the Catholic Church and finally was condemned because he advocated a new scientific opinion unsuitable for the Church is repeatedly taken today as an alleged demonstration of the fact of hostility on the part of the church

*towards science. This ‘case’ has very little to do with the historical events surrounding Galileo.”*²⁰⁸

From the side of the Pope and from Galileo’s side, there were piles of mistakes and weaknesses, and on both sides this was in part due to philosophical reasons and in part due to egos. To draw any generalizing conclusions regarding all scientists and theologians and churches is a falsification of history and itself unscientific.

Appendix: Brecht’s Galileo

There is an additional Galileo legend to point out where Galileo is not viewed as an honest scientist but rather as a traitor. This myth can be traced back to Bertold Brecht’s play entitled *Life of Galileo*,²⁰⁹ in which Brecht presents Galileo as a conscious parallel to the moral failure of the discoverers of the atom bomb.

*“In our age and well beyond the German-speaking realm, the picture of Galileo is largely determined by Brecht’s *Life of Galileo* and in the process likewise shaped from a moral point of view.”*²¹⁰

Gerhard Szczesny has contrasted Brecht’s work with reality in the comprehensive investigation *Dichtung und Wirklichkeit* (Translation of the title: *Literature and Reality*; German full title *Bertold Brechts “Leben des Galilei” Dichtung und Wirklichkeit*; originally addressed in *Das Leben des Galilei und der Fall Bertolt Brecht* – full title of the original in English *The Case against Ber-*

told Brecht: *With Arguments drawn from his 'Life of Galileo'*). Brecht turned Galileo upon his head in order to propagate his political aims.

Annotation Anmerkungen

¹1990 original 1990 “Und sie bewegt sich doch!” und andere Galilei-Legenden.“ Factum 3/4/1990: 138–145; almost completely unchanged reproductions: *Galilei-Legenden und andere Beiträge zur Schöpfungsforschung und zur Chronologie der Kulturgeschichte 1979–1994. Biblia et symbiotica* 12. Verlag für Kultur und Wissenschaft: Bonn, 1995. pp. 11–37; *Professorenforum-Journal* 1 (2000) 1: 3–17; *Ichthys* 33 (Jan 2002): 15–31; “Und sie bewegt sich doch!” und andere Galilei-Legenden.“ pp. 4–22 in: Peter Zöllner-Greer, Hans-Joachim Hahn (eds.). *Gott nach der Postmoderne. Journal des Professorenforums* Bd. 1. Münster: Lit, 2007; “Und sie bewegt sich doch!” und andere Galilei-Legenden. *MBS Texte 115 (Theologische Akzente)*. Bonn: Martin Bucker Seminar, 2009, also downloadable at www.bucer.eu/mbstexte.html as well as several other download possibilities on the internet; English: “But it does move!” and other Legends about the Galileo-Affair.“ pp. 153–173 in: Andrew Sandlin (ed.). *A Comprehensive Faith: An International Festschrift for Rousas John Ruschdoony*. Friends of Chalcedon: San Jose (CA), 1996; Legends About the Galileo-Affair. 2. expanded edition. RVB: Hamburg, 2001.; 2008.² S. 8–31; abridged: “The Galileo Affair: History of Heroic Hagiography?” *Creation ex nihilo Technical Journal* (Australia) 14 (2000) 1: 91–100.

²Matthias Dorn. *Das Problem der Autonomie der Naturwissenschaften bei Galilei*. Sudhoffs Archiv Beihefte 43. Stuttgart: Franz Steiner, 2000. p. 11.

³Olaf Pedersen. *Galileo and the Council of Trent*. Vatican Observatory Publications: *Studi Galileiani* 1/6. Vatikanstadt: Specola Vaticana, 1991. p. 1.

⁴Arthur Koestler. *The Sleepwalkers: A History of Man's Changing Vision of the Universe*. London: Hutchinson Publ., 1959. p. 432.

⁵Zdenko Solle. *Neue Gesichtspunkte zum Galilei-Prozeß*. Wien: Verlag der Österreichischen Akademie der Wissenschaften, 1980. P. 6.

⁶*Galileo Galilei, Schriften, Briefe, Werke*. 2 Bände. (Ost-)Berlin: Verlag Rütten & Loening, 1987 and München: C.H. Beck, 1987 (equivalent pages).

⁷Klaus Fischer. *Galileo Galilei*. München: C. H. Beck, 1983. Fischer does an excellent job of familiarizing the reader who is less well versed in the natural sciences with the extent of concrete scientific advances achieved by Galilei during his lifetime.

⁸Arthur Koestler. *The Sleepwalkers*. op. cit., pp. 357–504; comp. Note 17.

⁹Arthur C. Custance, “History Repeats Itself,” pp. 152–167 (chapter 3 of) “The Medieval Synthesis and the Modern Fragmentation of Thought,” pp. 99–216 in: Arthur C. Custance, *Science and Faith, The Doorway Papers Vol. VIII*, Academic Books, Zondervan Publishing House, Grand Rapids/USA 1978.

¹⁰Zdenko Solle. *Neue Gesichtspunkte zum Galilei-Prozeß*, (with new files from the Beheimian Archives). Issued by Günther Hamann. Österreichische Akademie der Wissenschaften. *Philosophisch-historische Klasse, Sitzungsberichte, 361. Band. Veröffentlichungen der Kommission für Geschichte der Mathematik, Naturwissenschaften und Medizin. Heft 24*. Wien: Verlag der Österreichischen Akademie der Wissenschaften, 1980.

¹¹William R. Shea, Mariano Artigas. *Galileo Galilei: Aufstieg und Fall eines Genies*. Darmstadt: Wissenschaftliche Buchgesellschaft, 2006; Philip J. Sampson. *Six Modern Myths: Challenging Christian Faith*. Leicester: Inter-Varsity Press, 2000. pp. 27–46; Lydia La Dou. *Galileo Galilei: Zur Geschichte eines Falles*. Topos plus Taschenbücher 613. Kevelaer: topos, 2007; Rivka Feldhay. *Galileo and the Church: Political Inquisition or Critical Dialogue*. Cambridge: Cambridge University Press, 1995; Ernan McMullin (ed.). *The Church and Galileo*. Notre Dame (IN): University of Notre Dame Press, 2005; Matthias Dorn. *Das Problem der Autonomie der Naturwissenschaften bei Galilei*. Sudhoffs Archiv Beihefte 43. Stuttgart: Franz Steiner, 2000; Walter Brandmüller. *Galilei und die Kirche: Ein "Fall" und seine Lösung*. Aachen: MM Verlag, 1994; Walter Brandmüller. *Galilei und die Kirche: Das Recht auf Irrtum*. Regensburg: Friedrich Pustet, 1982; Walter Brandmüller. "Galilei – Ein Forscher im geistesgeschichtlichen Spannungsfeld des Barock." pp. 113–130 in: Uta Lindgren (ed.). *Naturwissenschaft und Technik im Barock: Innovation, Repräsentation, Diffusion*. Köln: Böhlau, 1997; Walter Brandmüller, Ingo Langner. *Der Fall Galilei: und andere Irrtümer*. Augsburg: Sankt Ulrich, 2006 (Interviews with Brandmüller).

¹²A good abbreviated presentation without sources is found in the mentioned contribution by Gerhard Prause. From the viewpoint of the Catholic Church, there have also been comprehensive presentations and justifications regarding the trial of Galileo which have appeared and which have not been taken into consideration. However, they tend in a similar direction, for example B. G. V. Coyne, M. Heller, J. Zycinski (eds.). *The Galileo Affair: A Meeting of Faith and Science: Proceedings of the Cracow Conference 24 to 27 May 1984*. Vatikanstadt: Specola Vaticana, 1985.

¹³The first critical investigation from the church on the Galileo myth is found in James Brodric'1928 *The Life and Work of blessed Robert Francis Cardinal Bellarmine S. J.: 1542–1621*. 2 vols. London: Oates & Washbourne, 1928; similar and later Jerome J. Langford. *Galileo, Science and the Church*. Ann Arbor (MI): University of Michigan Press, 1971; 1971²; South Bend (GB): St. Augustine's Press, 1998³.

¹⁴Arthur Koestler. *The Sleepwalkers*. op. cit. p. 431.

¹⁵Klaus Fischer. *Galileo Galilei*. München: C. H. Beck, 1983. p. 9 estimates that including the 5562 and 350 titles in the bibliographical list on Galileo up to 1964 (information on p. 222), by 1983 there were seven to eight thousand works on Galileo. Additional biographical literature is in *ibid.*, p. 222 and a good overview of the literature in *ibid.*, p. 225–230.

¹⁶The complete Italian edition *Le Opere di Galileo Galilei*. Edizione Nazionale, ed. by Antonio Favaro. 20 Bände. Firenze (Florenz) 1890–1909. Vol. XIX. which also contains both of the oldest Italian biographies, is, however, not complete. The volumes are listed in Klaus Fischer. *Galileo Galilei*. op. cit., pp. 223–224, additional English and German editions in *ibid.*, pp. 224–225 and additional Italian editions in Johannes Hemleben. *Galileo Galilei*. Reinbek: Rowohlt, 1969. p. 173.

¹⁷Anna Mudry. "Annäherung an Galileo Galilei: Einführung der Herausgeberin." Vol. 1. pp. 7–41, here p. 8 in: *Galileo Galilei. Schriften, Briefe, Dokumente*. 2 Bände. (Ost-)Berlin: Verlag Rütten & Loening, 1987 and München: C.H. Beck, 1987 (equivalent number of pages).

¹⁸For instance Philip J. Sampson. *Six Modern Myths*. op. cit., p. 28 or Walter Brandmüller. *Galilei und die Kirche*. op. cit., p. 184.

¹⁹Siehe Philip J. Sampson. *Six Modern Myths*. op. cit., p. 39 on Bertrand Russel. *History of Western Philosophy*. London: Unwin, 1947. p. 556.

²⁰Comp. the examples in Walter Brandmüller. *Galilei und die Kirche*. 1994. op. cit., pp. 124–125, 165.

²¹Hans Mohr. "Naturwissenschaft und Ideologie." From *Politik und Zeitgeschichte* (supplement to the weekly newspaper *Das Parlament*) No. B15/92 (April 3, 1992): p. 12.

²²Ernan McMullin (ed.). *The Church and Galileo*. Notre Dame (IN): University of Notre Dame Press, 2005. p. 1.

²³Matthias Dorn. *Das Problem der Autonomie der Naturwissenschaften bei Galilei*. op. cit., p. 13.

²⁴David Whitehouse. *Galileo: Leben und Schicksal eines Renaissance-Genies*. Köln: Evergreen, 2009. p. 11.

²⁵Johannes Hemleben. *Galileo Galilei mit Selbstzeugnissen und Bilddokumenten*. rowohlts monographien 156. Reinbek: Rowohlt, 1969. In the end, Hemleben sees the path from Galileo via Newton into the modernity as being on the wrong track. As an alternative, he offers the path via Novalis and Goethe to Rudolf Steiner.

²⁶Ernst Schmutzer, Wilhelm Schütz. *Galileo Galilei. Biographien hervorragender Naturwissenschaftler, Techniker und Mediziner 19*. Leipzig: B. G. Teubner, Leipzig 1983–5.

²⁷Siegfried Fischer-Fabian. *Die Macht des Gewissens*. München: Droemer Knauer, 1987. pp. 149–200 (fourth chapter: “Galilei oder ‘Eppur si muove’”). Fischer-Fabian begins his chapter on Galileo by pointing out which legends about Galileo have long since been refuted (p. 149). Then, however, he lets them stand as anecdotes, which expose the core of the matter (p. 150). Despite repeated reference to legends (e.g., p. 193; Galileo was not tortured), the chapter falls into a herization of the controversial scientist.

²⁸For example, the adoration of Galileo, with its many remaining legends in the book for young people by the French physics professor Jean-Pierre Maury. *Galileo Galilei: Und sie bewegt sich doch! Abenteuer – Geschichte 8*. Ravensburg: Otto Maier, 1990 [comp. my discussion in *Querschnitte 4* (1991) 1 (Jan-March): 23], e.g., Using a telescope, Galileo allegedly discovered „irrefutable evidence for the Copernican world view“ (Jean-Pierre Maury. *Galileo Galilei*. op. cit., p. U4).

²⁹Hans Christian Freiesleben. *Galilei als Forscher*. Darmstadt: Wiss. Buchgesellschaft, 1968. p. 8.

³⁰E. g., complete *ibid.*; Hans Mohr. “Naturwissenschaft und Ideologie.“ From *Politik und Zeitgeschichte* (Supplement to the weekly newspaper *Das Parlament*) No. B15/92 (April 3, 1992): pp. 10–18, in part. pp. 11–12.

³¹However, see Matthias Dorn. *Das Problem der Autonomie der Naturwissenschaften bei Galilei*. op. cit., p. 164–165 who points out that there is for the first time possible evidence from the life of Galilei himself, since the said phrase was found behind a picture frame from the alleged property of Galileo.

³²Chapter heading in Alexander Koyré. *Galilei: Anfänge der neuzeitlichen Wissenschaft*. Kleine kulturwissenschaftliche Bibliothek. Wagenbach: Berlin. 1988. p. 59 (pp. 59–69); comp. William A. Wallace. “Galileo’s Concept of Science: Recent Manuscript Evidence.“ pp. 15–40 in: George V. Coyne, Michal Heller, Jozef Zycinski (eds.). *The Galileo Affair: A Meeting of Faith and Science: Proceedings of the Cracow Conference 24 to 27 May 1984*. Vatikanstadt: Specola Vaticana, 1985.

³³Alexander Koyré. *Galilei*. op. cit., p. 59.

³⁴*Ibid.*, p. 68, Note 1.

³⁵Examples in *ibid.*, pp. 59–62.

³⁶Emil Wohlwill. “Die Pisaner Fallversuche.“ *Mitteilungen zur Geschichte der Medizin und Naturwissenschaft 4* (1905): 229–248; Emil Wohlwill. *Galilei und sein Kampf für die copernicanische Lehre. Erster Band: Bis zur Verurteilung der copernicanischen Lehre durch die römischen Kongregationen*. Hamburg: Leopold Voss, 1909. p. 115; Emil Wohlwill. *Galilei und sein Kampf für die copernicanische Lehre. Zweiter Band: Nach der Verurteilung der copernicanischen Lehre durch das Decret von 1616*. Hamburg: Leopold Voss, 1926. p. 260 ff.

³⁷Translation of the decisive section in Alexander Koyré. *Galilei*. op. cit., p. 63.

³⁸*Ibid.*, p. 64.

³⁹*Ibid.*

⁴⁰Arthur Koestler. *The Sleepwalkers: A History of Man’s Changing Vision of the Universe*. London: Hutchinson Publ., 1959, reprint 1989; first German translation: Arthur Koestler. *Die Nachtwandler: Das Bild des Universums im Wandel der Zeit*. Bern/Stuttgart: Alfred Scherz Verlag, 1959 (pages are equivalent with the 1980 paperback edition quoted here). Koestler above all treats Copernicus, Kepler, and Galileo and marshals many new and much discussed theses; comp. the literature for and against in Joachim Hemleben. *Galileo Galilei*. op. cit., p. 159 and in Arthur C. Custance. “History Repeats Itself.” op. cit., p. 152f, part. Note 106. Custance refers a lot to Koestler and sees in his work an excellent workup of the files of the trial. However, he does not share Koestler’s philosophical starting point of a split between faith and reason in Galilei.

- ⁴¹Arthur Koestler. *The Sleepwalkers*. op. cit., p. 358 with omission of emphases. Klaus Fischer. *Galileo Galilei*. op. cit., p. 34, however, correctly points out that even if all the doubtful inventions and discoveries were traceable back to Galileo, Galileo's meaning would not yet be thereby even closely captured.
- ⁴²Part. Gerhard Prause. *Niemand hat Kolumbus ausgelacht: Fälschungen und Legenden der Geschichte richtiggestellt*. Düsseldorf: Econ, o. J.⁷ (1966¹ expanded edition).
- ⁴³Gerhard Prause. "Galileo Galilei war kein Märtyrer." *Die Zeit* No. 46 (November 7, 1980): 78. Comp. the entire article and the more detailed version in Gerhard Prause. *Niemand hat Kolumbus ausgelacht*. op. cit., chapter 7: "Galilei war kein Märtyrer." pp. 173–192.
- ⁴⁴Comp. Arthur Koestler. *The Sleepwalkers*. op. cit., pp. 362–363.
- ⁴⁵Arthur C. Custance. "History repeats itself." op. cit., p. 154 with references; comp. postscript in Arthur Koestler. *The Sleepwalkers*. op. cit., p. 503.
- ⁴⁶Nicolas Copernicus.
- ⁴⁷Anna Mudry. "Annäherung an Galileo Galilei." op. cit., p. 29.
- ⁴⁸Details in Philip J. Sampson. *Six Modern Myths*. op. cit., p. 41.
- ⁴⁹Arthur Koestler. *The Sleepwalkers*. op. cit., pp. 464–465. Koestler refers to the point that many books were brought into the index without this always having disadvantages for the authors. Thus the index also contained books by censors and cardinals who condemned Galileo.
- ⁵⁰Joachim Hemleben. *Galileo Galilei*. op. cit., p. 167.
- ⁵¹Jochen Kirchhoff. *Nikolaus Kopernikus mit Selbstzeugnissen und Bilddokumenten*. Hamburg: Rowohlt, 1985. p. 53.
- ⁵²Arthur Koestler. *The Sleepwalkers*. op. cit., p. 432.
- ⁵³Comp. William R. Shea, Mariano Artigas. *Galileo Galilei*. op. cit., pp. 57–58.
- ⁵⁴*Ibid.*; comp. p. 433; comp. in detail on the visit Emil Wohlwill. *Galilei und sein Kampf für die copernicanische Lehre. Erster Band*. op. cit., pp. 366–392.
- ⁵⁵Jean-Pierre Maury. *Galileo Galilei*. op. cit., p. 96. A completely false presentation is found in Hans Christian Freiesleben. *Galilei als Forscher*. op. cit., p. 8, who writes the following about the time beginning in 1610: "From this point onwards, Galileo attempted to aid the Copernican teaching to reach recognition, also in particular through ecclesiastical authorities. Unfortunately he achieved just the opposite."
- ⁵⁶Details in Annibale Fantoli. *Galileo: For Copernicanism and for the Church*. Vatikan Stadt: Libreria Editrice Vaticana, 2003³. pp. 186–187.
- ⁵⁷Arthur Koestler. *The Sleepwalkers*. op. cit., pp. 437+439.
- ⁵⁸*Ibid.*, p. 449.
- ⁵⁹Matthias Dorn. *Hintergründe und Entwicklungen des Galileo-Prozesses*. op. cit., p. 12.
- ⁶⁰Thus in part. Gerhard Prause. *Niemand hat Kolumbus ausgelacht*. op. cit., pp. 182–183.
- ⁶¹Gerhard Prause. "Galileo Galilei war kein Märtyrer." op. cit., p. 78.
- ⁶²Comp. David F. Siemens. "Letter to the Editor." *Science* 147(1965): pp. 8–9. Siemens refers to Bernard Barber. "Resistance of Scientist to Scientific Discovery." *Science* 134 (1961), p. 596ff; comp. Arthur C. Custance. "History repeats itself." op. cit., p. 157. Emil Wohlwill presents this thesis in most detail. *Galilei und sein Kampf für die copernicanische Lehre. Erster Band: Bis zur Verurteilung der copernicanischen Lehre durch die römischen Kongregationen*. a. a. O. belegt.
- ⁶³Arthur Koestler. *The Sleepwalkers*. op. cit., p. 375.
- ⁶⁴Lydia La Dous. *Galileo Galilei*. op. cit., p. 111, see also pp. 101, 154.
- ⁶⁵Walter Brandmüller. *Galilei und die Kirche*. op. cit., p. 156.
- ⁶⁶Alfred North Whitehead. *Wissenschaft und moderne Welt*. Zürich: Conzett & Huber, 1949. p. 22.
- ⁶⁷Matthias Dorn. *Das Problem der Autonomie der Naturwissenschaften bei Galilei*. op. cit., pp. 36–37, 44.
- ⁶⁸Lydia La Dous. *Galileo Galilei*. op. cit., p. 33.
- ⁶⁹Quoted in Arthur Koestler. *The Sleepwalkers*. op. cit., pp. 459; comp. the corresponding quote by the Tuscan envoy in the introduction.

- ⁷⁰Galileo Galilei. *Schriften, Briefe, Dokumente*. ed. by Anna Mudry. 2 vols. (Ost-)Berlin: Verlag Rütten & Loening, 1987 and München: C.H. Beck, 1987 (equivalent pages).
- ⁷¹Anna Mudry. “Annäherung an Galileo Galilei.” op. cit., p. 8.; comp. an additional quote by the envoy to Thesis 4.
- ⁷²In addition to the following quotes there are additional examples of reactions of rage: Arthur Koestler. *The Sleepwalkers*. op. cit., pp. 438 + 439ff + 445 + 367–368.
- ⁷³Ernst Schmutzer, Wilhelm Schütz. *Galileo Galilei*. op. cit., p. 28.
- ⁷⁴Ibid., p. 374.
- ⁷⁵Ibid., p. 459.
- ⁷⁶Zdenko Solle. *Neue Gesichtspunkte zum Galilei-Prozeß*. op. cit., p. 9.
- ⁷⁷Arthur Koestler. *The Sleepwalkers*. op. cit., p. 474.
- ⁷⁸Klaus Fischer. *Galileo Galilei*. op. cit., pp. 128–129; comp. to the dispute of Thesis 10.
- ⁷⁹Arthur Koestler. *The Sleepwalkers*. op. cit., p. 368.
- ⁸⁰Ibid.
- ⁸¹Arthur C. Custance. “History repeats itself.” op. cit., p. 153.
- ⁸²Ibid.
- ⁸³According to Lydia La Dous. *Galileo Galilei*. op. cit., pp. 59, 91.
- ⁸⁴Olaf Pedersen. *Galileo and the Council of Trent*. op. cit., p. 17.
- ⁸⁵Arthur Koestler. *The Sleepwalkers*. op. cit., p. 375–376.
- ⁸⁶Ibid., p. 381.
- ⁸⁷Ibid., p. 383.
- ⁸⁸Ibid., pp. 382–383.
- ⁸⁹Klaus Fischer. *Galileo Galilei*. op. cit., p. 169.
- ⁹⁰Arthur Koestler. *The Sleepwalkers*. op. cit., p. 444; comp. the subsequent section.
- ⁹¹William R. Shea, Mariano Artigas. *Galileo Galilei*. op. cit., p. 45.
- ⁹²Arthur Koestler. *The Sleepwalkers*. op. cit., p. 493.
- ⁹³Ibid., pp. 499.
- ⁹⁴Klaus Fischer. *Galileo Galilei*. op. cit., p. 94.
- ⁹⁵Arthur Koestler. *The Sleepwalkers*. op. cit., p. 362; comp. p. 437.
- ⁹⁶Ibid., Thesis 1.
- ⁹⁷E. g., Klaus Fischer. *Galileo Galilei*. op. cit., p. 138.
- ⁹⁸Klaus Fischer. *Galileo Galilei*. op. cit., p. 53.
- ⁹⁹Quoted by Arthur Koestler. *The Sleepwalkers*. op. cit., p. 467.
- ¹⁰⁰William R. Shea, Mariano Artigas. *Galileo Galilei*. op. cit., p. 84.
- ¹⁰¹Matthias Dorn. *Hintergründe und Entwicklungen des Galileo-Prozesses*. op. cit., p. 8; similarly Matthias Dorn. *Das Problem der Autonomie der Naturwissenschaften bei Galilei*. op. cit., p. 47.
- ¹⁰²Comp. Klaus Fischer. *Galileo Galilei*. op. cit., p. 123; comp. Arthur C. Custance. “History repeats itself.” op. cit., pp. 157+154–155.
- ¹⁰³Klaus Fischer. *Galileo Galilei*. op. cit., p. 122.
- ¹⁰⁴Walter Brandmüller. *Galilei und die Kirche*. op. cit., p. 152.
- ¹⁰⁵Walter Brandmüller. “Galilei – Ein Forscher im geistesgeschichtlichen Spannungsfeld.” op. cit., p. 119.
- ¹⁰⁶Walter Brandmüller. *Galilei und die Kirche*. op. cit., p. 153.
- ¹⁰⁷Nach Lydia La Dous. *Galileo Galilei*. op. cit., p. 138.
- ¹⁰⁸Matthias Dorn. *Hintergründe und Entwicklungen des Galileo-Prozesses*. op. cit., p. 4.
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- ¹¹⁰Walter Brandmüller. *Galilei und die Kirche*. op. cit., p. 155. Regarding the letter see Annibale Fantoli. *Galileo*. op. cit., pp. 142–144. The text of the letter is in *Galileo Galilei, Schriften, Briefe, Werke*. Bd. 2. op. cit., pp. 46–48.
- ¹¹¹Walter Brandmüller. “Galilei – Ein Forscher im geistesgeschichtlichen Spannungsfeld des

- Barock.“ pp. 113–130 in: Uta Lindgren (ed.). *Naturwissenschaft und Technik im Barock: Innovation, Repräsentation, Diffusion*. Köln: Böhlau, 1997. p. 116.
- ¹¹²Text in Annibale Fantoli. *Galileo*. op. cit., p. 146 and *Galileo Galilei, Schriften, Briefe, Werke*. Bd. 2. op. cit., pp. 48–50.
- ¹¹³Hans Mohr. *Strittige Themen im Umfeld der Naturwissenschaften: ein Beitrag zur Debatte über Wissenschaft und Gesellschaft*. Berlin: Springer, 2005. pp. 94–95.
- ¹¹⁴*Ibid.*, p. 95.
- ¹¹⁵*Ibid.*
- ¹¹⁶Hans Mohr. “Naturwissenschaft und Ideologie.“ From *Politik und Zeitgeschichte* (supplement to the weekly newspaper *Das Parlament*) No. B15/92 (April 3, 1992): p. 11.
- ¹¹⁷*Ibid.*, p. 456; comp. on the entire controversy pp. 452–458, especially 456–457.
- ¹¹⁸Klaus Fischer. *Galileo Galilei*. op. cit., p. 148.
- ¹¹⁹Arthur Koestler. *The Sleepwalkers*. op. cit., p. 443.
- ¹²⁰Arthur Koestler. *The Sleepwalkers*. op. cit., p. 443.
- ¹²¹*Ibid.*; comp. the entire section.
- ¹²²Matthias Dorn. *Hintergründe und Entwicklungen des Galileo-Prozesses*. op. cit., p. 13.
- ¹²³Alfred North Whitehead. *Wissenschaft und moderne Welt*. Zürich: Conzett & Huber, 1949. pp. 237–238; comp. similarly Lydia La Dous. *Galileo Galilei*. op. cit., p. 29.
- ¹²⁴Alfred North Whitehead. *Wissenschaft und moderne Welt*. op. cit., p. 472.
- ¹²⁵*Ibid.*, pp. 472–474; comp. what was said on the seasonal theory in Thesis 10.
- ¹²⁶*Ibid.*, p. 461.
- ¹²⁷Matthias Dorn. *Hintergründe und Entwicklungen des Galileo-Prozesses*. op. cit., p. 4.
- ¹²⁸Matthias Dorn. *Hintergründe und Entwicklungen des Galileo-Prozesses*. Lecture at the Ludwig Maximilian University of Munich, July 3, 1992 (Manuscript), now available at: http://home.arcor.de/matthias.dorn/downloads/dorn_hintergruende_galilei_prozess.pdf. S. 3.
- ¹²⁹William A. Wallace. “Galileo’s Concept of Science: Recent Manuscript Evidence.“ op. cit.
- ¹³⁰Jean Dietz Moss. “The Rhetoric of Proof in Galileo’s Writings on the Copernican System.“ pp. 41–65 in: G. V. Coyne, M. Heller, J. Zycinski (eds.). *The Galileo Affair: A Meeting of Faith and Science: Proceedings of the Cracow Conference 24 to 27 May 1984*. Vatikanstadt: Specola Vaticana, 1985.
- ¹³¹Nach Walter Brandmüller. “Galilei – Ein Forscher im geistesgeschichtlichen Spannungsfeld.“ op. cit., p. 118.
- ¹³²Arthur Koestler. *The Sleepwalkers*. op. cit., p. 485.
- ¹³³Matthias Dorn. *Das Problem der Autonomie der Naturwissenschaften bei Galilei*. op. cit., p. 58.
- ¹³⁴Arthur Koestler. *The Sleepwalkers*. op. cit., p. 433.
- ¹³⁵Walter Brandmüller. *Galilei und die Kirche*. op. cit., p. 153.
- ¹³⁶Klaus Fischer. *Galileo Galilei*. op. cit., p. 139; comp. p. 123.
- ¹³⁷*Ibid.*, p. 121.
- ¹³⁸Comp. *ibid.*, pp. 128–129; the quote therefrom on Thesis 4 and Arthur Koestler. . op. cit., p. 483.
- ¹³⁹Walter Brandmüller. *Galilei und die Kirche*. op. cit., p. 152.
- ¹⁴⁰Comp. beyond Thesis 5: Arthur Koestler. *The Sleepwalkers*. op. cit., p. 383 and Arthur C. Custance. “History repeats itself.“ op. cit., p. 154.
- ¹⁴¹Arthur Koestler. *The Sleepwalkers*. op. cit., pp. 470–473 + 459–461.
- ¹⁴²Zdenko Solle. *Neue Gesichtspunkte zum Galilei-Prozess*. op. cit., p. 14; comp. Arthur Koestler. *The Sleepwalkers*. op. cit., p. 475. Numerous additional examples are found in Arthur Koestler. *The Sleepwalkers*. op. cit.; Klaus Fischer. *Galileo Galilei*. op. cit.
- ¹⁴³Arthur Koestler. *The Sleepwalkers*. op. cit., p. 447–449.
- ¹⁴⁴Rudolf Fischer-Wollpert. *Lexikon der Päpste*. Regensburg: Friedrich Pustet, 1985. p. 118.
- ¹⁴⁵Arthur Koestler. *The Sleepwalkers*. op. cit., p. 478.

- ¹⁴⁶Ibid. p. 478–479; similarly Klaus Fischer. *Galileo Galilei*. op. cit., p. 145–146.
- ¹⁴⁷Zdenko Solle. *Neue Gesichtspunkte zum Galilei-Prozeß*. op. cit., p. 58.
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- ¹⁵⁰S. Annibale Fantoli. *Galileo*. op. cit., p. 275.
- ¹⁵¹Arthur Koestler. *The Sleepwalkers*. op. cit., pp. 490–491.
- ¹⁵²Enrico Belloine. *Galileo Galilei*. op. cit., p. 88.
- ¹⁵³Ludwig Pastor. *Gesichtspunkte zum Galilei-Prozeß*. a. a. O. S. 38–39.
- ¹⁵⁴Ibid., p. 64 and the entire book; comp. Thesis 6.
- ¹⁵⁵Klaus Fischer. *Galileo Galilei*. op. cit., p. 126 (with additional references).
- ¹⁵⁶Arthur Koestler. *The Sleepwalkers*. op. cit., p. 490.
- ¹⁵⁷Nach Zdenko Solle. *Neue Gesichtspunkte zum Galilei-Prozeß*. op. cit., p. 45.
- ¹⁵⁸Ibid., p. 22.
- ¹⁵⁹Klaus Fischer. *Galileo Galilei*. op. cit., p. 144.
- ¹⁶⁰Zdenko Solle. *Neue Gesichtspunkte zum Galilei-Prozeß*. op. cit., p. 25; comp. Klaus Fischer. *Galileo Galilei*. op. cit., p. 144.
- ¹⁶¹Zdenko Solle. *Neue Gesichtspunkte zum Galilei-Prozeß*. op. cit., p. 26–27.
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- ¹⁶³Zdenko Solle. *Neue Gesichtspunkte zum Galilei-Prozeß*. op. cit., p. 54.
- ¹⁶⁴Ibid, p. 55.
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- ¹⁶⁹Ibid, p. 62.
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- ¹⁷³Zdenko Solle. *Neue Gesichtspunkte zum Galilei-Prozeß*. op. cit., pp. 64–71.
- ¹⁷⁴Comp. in detail Walter Brandmüller. *Galilei und die Kirche*. op. cit., pp. 178–180, 184; Walter Brandmüller. “Galilei – Ein Forscher im geistesgeschichtlichen Spannungsfeld des Barock.” op. cit., p. 128.
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- ¹⁸⁰William R. Shea, Mariano Artigas. *Galileo Galilei*. op. cit., p. 71. The text is unfortunately not in *Galileo Galilei, Schriften, Briefe, Werke*. Vol. 2. op. cit.
- ¹⁸¹Matthias Dorn. *Hintergründe und Entwicklungen des Galileo-Prozesses*. op. cit., p. 10.
- ¹⁸²Galileo’s letters on the question of the Bible are discussed most in detail in Annibale Fantoli. *Galileo: For Copernicanism and for the Church*. Vatikan Stadt: Libreria Editrice Vaticana, 2003³. See Castelli 129–137 (to Castelli) and 146–167 (to Christina) and Ernan McMullin. “Galileo’s Theological Venture.” pp. 88–116 in:

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¹⁸³ Enrico Belloine. *Galileo Galilei*. op. cit., pp. 71–72.

¹⁸⁴ Olaf Pedersen. *Galileo and the Council of Trent*. op. cit., p. 30.

¹⁸⁵ Examples *ibid*.

¹⁸⁶ Above all *ibid.*, p. 20.

¹⁸⁷ In agreement Olaf Pedersen. *Galileo and the Council of Trent*. op. cit., p. 30; Annibale Fantoli. *Galileo*. op. cit., pp. 149–153, 156–157; Ernan McMullin. "Galileo's Theological Venture." op. cit., pp. 90–99; H. J. Lee. "Men of Galilee, why stand gazing up into Heaven: Revisiting Galileo, Astronomy, and the Authority of the Bible." See 103–116 in: *Journal of the Evangelical Theological Society* 53 (1010): 65–79.

¹⁸⁸ William R. Shea, Mariano Artigas. *Galileo Galilei*. op. cit., p. 71.

¹⁸⁹ William R. Shea, Mariano Artigas. *Galileo Galilei*. op. cit., p. 64.

¹⁹⁰ Olaf Pedersen. "Galileo's Religion." See 75–102 in: G. V. Coyne, M. Heller, J. Zycinski (eds.). *The Galileo Affair: A Meeting of Faith and Science: Proceedings of the Cracow Conference 24 to 27 May 1984*. Vatikanstadt: Specola Vaticana, 1985. Especially pp. 88–92 on Galileo's belief in God and pp. 92–100 on Galileo's affiliation with the Catholic faith and his rejection of all non-Catholic 'heresies.' See also Matthias Dorn. *Das Problem der Autonomie der Naturwissenschaften bei Galilei*. op. cit., pp. 75–91 (additional authors on the topic p. 75) and Olaf Pedersen. *Galileo and the Council of Trent*. Vatican Observatory Publications: *Studi Galileiani* 1/6. Vatikanstadt: Specola Vaticana, 1991.

¹⁹¹ *Ibid.*, p. 88–94. As the clearest testimony next to additional quotes (pp. 90–92) Pedersen sees on p. 89 Galileo's third letter on sunspots

to Markus Welser, Augsburg, December 1612 (*Gesammelte Werke V*, pp. 191–192).

¹⁹² *Ibid.*, pp. 97–98.

¹⁹³ Zdenko Solle. *Neue Gesichtspunkte zum Galilei-Prozeß*. op. cit., p. 9.; comp. the judgment to Thesis 7 quoted by Klaus Fischer. *Galileo Galilei*. op. cit., p. 114–115.

¹⁹⁴ Comp. Galileo's positive stance on the Bible in Emil Wohlwill. *Galilei und sein Kampf für die copernicanische Lehre. Erster Band*. op. cit., pp. 485–524 + 542–555, especially p. 543.

¹⁹⁵ Albrecht Fölsing. *Galileo Galilei: Prozess ohne Ende: Eine Biographie*. München: Piper, 1983. p. 414; comp. further pp. 414–415.

¹⁹⁶ Ludwig Pastor. *Geschichte der Päpste*. 16 vols. Freiburg: Herder, 1931–1933, her vol. 13, p. 630 and often, and critically thereto Zdenko Solle. *Neue Gesichtspunkte zum Galilei-Prozeß*. op. cit., p. 38.

¹⁹⁷ *Ibid.*, p. 7.

¹⁹⁸ Emil Wohlwill. *Galilei und sein Kampf für die copernicanische Lehre. Erster Band*. op. cit., pp. 552–555; Olaf Pedersen. "Galileo's Religion." op. cit., pp. 92–100.

¹⁹⁹ William R. Shea, Mariano Artigas. *Galileo Galilei*. op. cit., p. 146.

²⁰⁰ Michael H. Shank. "Setting the Stage: Galileo in Tuscany, the Veneto, and Rome." pp. 57–87 in: Ernan McMullin (ed.). *The Church and Galileo*. Notre Dame (IN): University of Notre Dame Press, 2005. p. 73. On p. 58 reference is made to the fact that Galileo wrote Italian but was not an 'Italian,' and that such an idea did not arise until the 19th century. He also refers to the fact that Galileo never crossed the Alps and geographically remained solely restricted to Italy.

²⁰¹ Matthias Dorn. *Hintergründe und Entwicklungen des Galileo-Prozesses*. . op. cit., p. 6.

²⁰² Klaus Fischer. *Galileo Galilei*. . op. cit., p. 114.

²⁰³ *Ibid.*, p. 115.

²⁰⁴ Matthias Dorn. *Das Problem der Autonomie der Naturwissenschaften bei Galilei*. Sudhoffs Archiv Beihefte 43. Stuttgart: Franz Steiner, 2000.

²⁰⁵Especially so in Walter Brandmüller. “Galilei – Ein Forscher im geistesgeschichtlichen Spannungsfeld des Barock.“ . op. cit., p. 120.

²⁰⁶Brandmüller. “Galilei – Ein Forscher im geistesgeschichtlichen Spannungsfeld.“ . op. cit., p. 119.

²⁰⁷Lydia La Dous. *Galileo Galilei*. . op. cit., p. 7.

²⁰⁸Lydia La Dous. *Galileo Galilei*. . op. cit., p. 68.

²⁰⁹Written 1938/1939; paperback edition: Bertolt Brecht. *Leben des Galilei*. edition Suhrkamp. Berlin: Suhrkamp, 1963.

²¹⁰Anna Mudry. “Annäherung an Galileo Galilei.“ . op. cit., p. 9.

The Author

Über den Autor



Thomas Schirmacher (*1960) earned four doctorates in Theology (Dr. theol., 1985, Netherlands), in Cultural Anthropology (PhD, 1989, USA), in Ethics (ThD, 1996, USA), and in Sociology of Religions (Dr. phil., 2007, Germany) and received two honorary doctorates in Theology (DD, 1997, USA) and International Development (DD, 2006, India). He is professor of ethics and world missions, as well as professor of the sociology of religion and of international development in Germany, Romania, USA and India, and is president of Martin Bucer Theological Seminary with 11 small campuses in Europe (including Turkey). As an international human rights expert he is board member of the International Society for Human Rights, spokesman for human rights of the World Evangelical Association and director of the International Institute for Religious Freedom. He is also president of *gebende Hände gGmbH* (Giving Hands), an internationally active relief organisation. He has authored and edited 74 books, which have been translated into 14 languages. Thomas is married to Christine, a professor of Islamic Studies, and father of a boy and a girl.

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