

“But it does move!”, and other Legends about the Galileo-Affair¹

by Dr. Thomas Schirmacher

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“The bland scholar and the bland university is similarly a myth, as is the apparent United Nations ideal of the bland man. No person or institution possesses the ability to be neutral and objective, to transcend itself and its historical context. This is no less true of science. Some would claim for the instruments of science, if not for scientists, this capacity for neutrality. But do scientific instruments make for objectivity? They are the refinement of a perspective, namely, that the truth or utility of a thing rests in measurement, a highly debatable proposition. Scientific instruments are helpful, towards accuracy for a perspective, but they do not thereby give it truth, objectivity or neutrality.” (Rousas John Rushoony)²

Galileo and Creationism

The process against Galileo Galilei in the 17th century is frequently used as an argument against Creationist scientists and theologians, who make their belief in the trustworthiness of the Bible the starting point of their scientific research. Absolute faith in the Bible, critics say, blinds Creationists for scientific progress and hinders science. Thus, Hansjörg and Wolfgang Hemminger wrote in their book against Creationism:

“Today's Creationism, in rejecting the radical experimental orientation of Scriptural research, turns against the great Christian naturalists of the 15th and 16th century, against Copernicus, Galileo, Kepler and Newton. It repeats the proceeding against Galileo and argues in principle with the Inquisitors, for the issue at the trial was, among other things, whether the natural scientist had the freedom to set experimentation and observation above Scripture, which was understood to be natural history and was interpreted according to Aristotolian principles. Today's Creationists in principle have the same

1 Updated translation of “‘Und sie bewegt sich doch!’ und andere Galilei-Legenden”. *Factum* 3/4/1990: 138-145; reprinted from “‘But it does move!’, and other Legends about the Galileo-Affair”. S. 153-173 in: Andrew Sandlin (Hg.). *A Comprehensive Faith: An International Festschrift for Rousas John Rushdoony*. Friends of Chalcedon: San Jose (CA), 1996.

2 R. J. Rushdoony, *The Nature of the American System* (Fairfax, VI, 1978/1965), 76-77.

standpoint as the Inquisitors because they follow their empirical-biblicistic method.”³

This, of course is nonsense. One could view the situation just the other way round in favor of the Creationists, even though this probably would be just as one-sided: Galileo was a scientist believing in the trustworthiness of the Bible and trying to show that the Copernican system was compatible with it. He was fighting against the contemporary principles of Bible interpretation, which, blinded by Aristotelian philosophy, did not do justice to the Biblical text. Galileo was not blamed for criticizing the Bible but for disobeying Papal orders. Even today, most Creationists are natural scientists who allow themselves to read the Bible differently from the contemporary school of Biblical interpretation, i. e. higher criticism, and therefore are criticised by the theological establishment, especially by the huge liberal churches and by other established natural scientists. (Hansjörg Hemminger, quoted above, is, for example, paid by the German liberal state churches to fight sects and fundamentalist endeavors.)

But here we will discuss a different topic. The picture of the Vatican process against Galileo Galilei, used by the Hemmingers and others is not drawn from historical research but from heroic hagiography. The picture of a life-and-death battle between a completely narrow-minded Christian Church and the ingenious and always objective natural science in the Galileo-affair depends on too many legends.

Examples of hagiographies on Galileo full of legends are the biographies of the Anthroposophical author, Johannes Hemleben,⁴ the official Galileo-biography of the former GDR by Ernst Schmutzer and Wilhelm Schütz,⁵ and the chapter on Galileo in Fischer-Fabian's book "The Power of Conscience".⁶

There are many examples of a virtually religious “adoration”⁷ of Galileo, in juvenile⁸ as

3 Hansjörg Hemminger, Wolfgang Hemminger, *Jenseits der Weltbilder: Naturwissenschaft, Evolution, Schöpfung* (Quell Verlag, Stuttgart, Germany, 1991), 201-202.

4 Johannes Hemleben, *Galileo Galilei, mit Selbstzeugnissen und Bilddokumenten dargestellt*, rowohlts monographien 156 (Rowohlt Verlag, Reinbek, Germany, 1969). Hemleben in the end regards the line from Galileo through Newton up to modern times detour and offers the line to Novalis and Goethe up to the occultist and founder of Anthroposophy, Rudolf Steiner. Hemleben has written several volumes in the famous biographical series 'Rororo-Bildmonographien'. Especially his volumes on Biblical persons are heavily influenced by Anthroposophy. Probably the publisher is very close to Anthroposophy himself, which is true for many other German publishers and book stores, as one can see looking into their bookshelves.

5 Ernst Schmutzer; Wilhelm Schütz, *Galileo Galilei, Biographien hervorragender Naturwissenschaftler, Techniker und Mediziner 19* (B. G. Teubner Verlagsgesellschaft, Leipzig, Germany, 1983).

6 S. Fischer-Fabian, *Die Macht des Gewissens* (Droemer Knauer, Munich, Germany, 1987), 149-200 (chapter 4: “Galilei oder 'Eppur si muove'”). Fischer-Fabian starts his chapter on Galileo with examples of legends on Galileo, which have long been disproved (p. 149). Nevertheless he wants to use them as anecdotes, which are not historical but contain a grain of truth (p. 150). Even though he frequently speaks about Galileo-legends (e. g. on p. 193 he shows that Galileo never was tortured), his chapter on Galileo is a pure hagiography full of heroism.

7 Hans Christian Freiesleben, *Galilei als Forscher* (Darmstadt, Germany, 1968), 8.

8 E. g. the hero-worship with many legends on Galileo in the book for the youth by the French professor

well as in scientific literature.⁹

I know of only one printed answer by a Creationist to the misuse of Galileo's trial by Evolutionists, in the *Doorway Papers* by Arthur C. Custance,¹⁰ even more extended comment by Creationists on the Galileo-affair is necessary. This article will give a first evaluation and list important literature, but can only help to start discussion, because Koestler is right when he states:

“Few episodes in history have given rise to a literature as voluminous as the trial of Galileo.”¹¹

In view of more than 8000 titles on the Galileo-affair and the twenty volumes of the complete works of Galileo himself, one article cannot discuss all aspects of the whole issue.

Galileo-Legends

“The most popular Galileo-legend, which put the courage saying 'But it does move!' into the mouth of the Florentine scholar, after his denial under oath of the teaching of the moving earth in 1633, dates back to the time of Enlightenment. Apart from this glorifying picture, every epoch created the Galileo it needed: Galileo, the pioneer of truth, or the renegade, the martyr of science, or the cunning and tactical zealot, in short: the positive or negative ... hero”.¹²

With these words, Anna Mudry starts her introduction into the German collection of works and letters by Galileo Galilei.¹³ She goes on:

“In reality, the biography of the co-founder of modern science contains many shifts, inconsequences, and withdrawals, which had already been realized by Galileo's contemporaries. On the one hand they praised the 'Columbus of new

of physics Jean-Pierre Maury, *Galileo Galilei: Und sie bewegt sich doch!, Abenteuer - Geschichte 8* (Ravensburg, Germany, 1990) (cf. my review in *Querschnitte* Jan/Mar 4 (1991) 1 (Jan-Mrz), p. 23). Galileo is said to have discovered through his telescope “irrefutable proofs for the Copernican world-view” (viz. backcover)!

9 E. g. viz. (the whole book); Hans Mohr, “Naturwissenschaft und Ideologie”, *Aus Politik und Zeitgeschichte* (Beilage zur Wochenzeitung *Das Parlament*) Nr. B15/92 April, 3, 1992, pp. 10-18, especially 11-12.

10 Arthur C. Custance, “The Medieval Synthesis and the Modern Fragmentation of Thought”, in Arthur C. Custance, *Science and Faith, The Doorway Papers VIII* (Grand Rapids, MI, 1978), pp. 99-216, here chapter 3: “History Repeats Itself”, 152-167.

11 Arthur Koestler, *The Sleepwalkers: A History of Man's Changing Vision of the Universe* (London, 1959), 425.

12 Anna Mudry, “Annäherung an Galileo Galilei”, editors introduction, in Galileo Galilei, *Schriften, Briefe, Dokumente*, 2 vol., (Berlin and Munich, Germany, 1987), 1:7-41, quoted p. 8.

13 G. Galilei, op. cit.

heavens', on the other hand they reacted openly against his inner conflict. 'A clever man he will be, wanting and feeling what the Holy Church wants and feels. But he ignites himself on his own opinions, has irritable passions in himself and little power and wisdom to overcome them ...' This reports the Tuscan ambassador of the prince, Piero Guicciardini, on the 4th of March 1616 to Florence with little benevolence, but with an intelligent awareness of Galileo's inner conflict."¹⁴

Similarly, Arthur Koestler starts the section on Galileo in his famous and much discussed history of astronomy, "The Sleepwalkers":¹⁵

“The personality of Galileo, as it emerges from works of popular science, has ever less relation to historic fact than Canon Koppernigk's. In his particular case, however, this is not caused by benevolent indifference towards the individual as distinct from his achievement, but by more partisan motives. In works with a theological bias, he appears as the nigger in the woodpile; in rationalist mythography, as the Maid of Orleans of Science, the St. 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 of 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';¹⁶ and he 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.”¹⁷

Gerhard Prause, author of several books and articles on famous legends in historical research,¹⁸ writes about the view that the Galileo-affair was the greatest scandal of Christianity and proof for the backwardness of the Church:

14 A. Mudry, op. cit., 8; see a further quotation of the ambassador in the explanation to Thesis 4.

15 A. Koestler, op. cit. Koestler discusses Copernicus, Kepler and Galileo and formulated many new heavily discussed theses; cf. the literature in favor or against Koestler in J. Hemleben, op. cit., 159 and A. C. Culance, op. cit., 152f, especially footnote 106. Culance often appeals to Koestler and views his book as an excellent discussion of the original records. He does not agree with Koestler's philosophical starting point, that Galileo was the first one really to grasp and promote the incompatibility of faith and reason.

16 'But it does move!'

17 A. Koestler, op. cit., 353. But K. Fischer, *Galileo Galilei*, op. cit., 34 shows, that even if all of Galileo's doubtful inventions and discoveries really would be Galileo's, this would not match the real Galileo and his importance.

18 Especially Gerhard Prause, *Niemand hat Kolumbus ausgelacht: Fälschungen und Legenden der Geschichte richtiggestellt* (Düsseldorf, Germany, without year 7).

“The truth is that this is a primitive stereotype, a falsifying story book tale, a legend which seems to be immortal, even though it has long since been corrected by historians. These corrections have been made widely known by bestselling authors - most impressively by Arthur Koestler.”¹⁹

The Leaning Tower of Pisa The best example of a Galileo-legend aside from the never-uttered legendary sentence “But it does move!” is Galileo's supposed experiment on the leaning tower of Pisa. Alexander Koyré has written an article “The Experiment of Pisa: Case-History of a Legend”²⁰ in which he shows that Galileo never carried out this experiment, yea, he even could not have done so! He writes: “The average reader of today connects Galileo's name firmly with the picture of the leaning tower”.²¹ “The history of the 'experiments' of Pisa meanwhile is part of our heritage. It can be found in handbooks and guides.”²² Even scientific literature is no exception,²³ although E. Wohlwill already in 1909 proved the legendary character of the experiments beyond doubt.²⁴

The battleground pro and con on this legend is a text of the early biography of Galileo by Vincenzo Viviani,²⁵ which was written sixty years after Galileo's death. Alexander Koyré writes:

“Neither Galileo's friends nor his enemies mention it [i. e. the experiments]. Nothing is more improbable than such a silence. We would have to suggest that Galileo, who describes experiments he had only thought about as experiments which he carried out, at the same time purposely concealed a glorious actual experiment.”²⁶

Koyré has shown, that Galileo could not even have imagined such experiments, as he held to a physical theory different to the one those experiments would have proved (and did prove later on).

19 Gerhard Prause, “Galileo Galilei war kein Märtyrer”, *Die Zeit* Nov, 7, 1980, p. 78; cf. the whole article and the full version in Gerhard Prause. op. cit. chapter 7: “Galilei war kein Märtyrer”, pp. 173-192.

20 Chapter heading in Alexander Koyré, *Galilei: Anfänge der neuzeitlichen Wissenschaft, Kleine kulturwissenschaftliche Bibliothek* (Berlin, 1988), 59 (cf. p. 59-69); cf. also William A. Wallace, “Galileo's Concept of Science: Recent Manuscript Evidence”, in ed. G. V. Coyne, M. Heller, J. Zycinski, *The Galileo Affair: A Meeting of Faith and Science: Proceedings of the Cracow Conference 24 to 27 May 1984* (Vatican City, 1985), pp. 15-40v.

21 A. Koyré, op. Cit., 59.

22 Viz. 68, footnote 1.

23 Examples in viz. 59-62.

24 Emil Wohlwill. “Die Pisaner Fallversuche”, *Mitteilungen zur Geschichte der Medizin und Naturwissenschaft* vol. 4 (1905): 229-248; Emil Wohlwill, *Galilei und sein Kampf für die copernicanische Lehre*, vol. 1: Bis zur Verurteilung der copernicanischen Lehre durch die römischen Kongregationen (Hamburg, 1909), 115; vol. 2: Nach der Verurteilung der copernicanischen Lehre durch das Decret von 1616 (Hamburg, 1926), 260ss.

25 A translation of the original text can be found in Alexander Koyré, *Galilei*, op. Cit., 63.

26 Viz. 64.

16 Theses on the Galileo-Affair

The following 16 theses will show why the Galileo-affair cannot serve as an argument for any position on the relation of religion and science. Thereby I mainly follow Galileo's own writings,²⁷ K. Fischer's biography,²⁸ A. Koestler's research on the original documents of the Galileo-process,²⁹ the Creationist essay by A. C. Custance³⁰ and the scientific research of the Czech author Zdenko Solles.³¹

The intent of the theses can be summarized with Koestler's judgement:

“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.”³²

It goes without saying that the 16 theses neither intend to defend the Inquisition nor aim at denying any scientific value of Galileo's thinking or research. But Solle is correct, when he writes:

“The picture full of contrast, showing a heroic scientist in front of the dark background of Inquisition will develop many different nuances.”³³

1. The Ptolemaic system had been denied by many high officials and Jesuit astronomers even before Galileo was born. Many of them followed the Copernican system.

An open defence of the Copernican system in principle was without danger, as the example of the Imperial Court astronomer, Johannes Kepler, proves.³⁴

“The Jesuits themselves were more Copernican than Galileo was; it is now well recognized that the reason why Chinese astronomy advanced more rapidly than European astronomy was simply because Jesuit missionaries

27 Galileo Galilei, op. cit..

28 K. Fischer, op. cit. Fischer discusses very well how far Galileo produced real scientific progress in his times.

29 A. Koestler, op. cit., 352-495; cf. footnote 12.

30 A. C. Custance, op. cit.

31 Zdenko Solle, *Neue Gesichtspunkte zum Galilei-Prozeß*, (mit neuen Akten aus böhmischen Archiven), ed. Günther Hamann, Österreichische Akademie der Wissenschaften, Philosophisch-historische Klasse, *Sitzungsberichte* 361, Veröffentlichungen der Kommission für *Geschichte der Mathematik, Naturwissenschaften und Medizin* 24 (Vienna, 1980). A very good introduction (without footnotes) into an alternative view of the Galileo-affair can be found in the mentioned texts of Gerhard Prause. Catholic historians have produced several refutations and justifications on the Galileo-affair which have not been used in our article, although they argue similarly, see e. g. several articles in G. V. Coyne, M. Heller, J. Zycinski, op. cit., and Walter Brandmüller, *Galilei und die Kirche: Ein 'Fall' und seine Lösung* (Aachen, Germany, 1994).

32 A. Koestler, op. cit., 426.

33 Z. Solle, op. cit., 6.

34 Cf. A. Koestler, op. Cit., 355-358.

communicated to them their Copernican views.”³⁵

“While Martin Luther called the author of 'De revolutionibus orbium coelestium' [i. e. Nicolaus Copernicus] a 'fool', which will turn 'the whole art of Astronomiae upside down', the book had not been fought by the Vatican. It was seen as 'mathematical hypothesis', but had already been used as an aid in astronomical calculations for a long time. Only some time after leading Jesuit scientists like Pater Clavius had agreed to the trustworthiness of Galileo's observations, Copernicus and his followers became 'suspicious'.”³⁶

The book by Copernicus was not placed on the Vatican Index until 1616 to 1620 and was readmitted to the public after some minor changes.³⁷ Only Galileo's 'Dialogue' remained on the Index from 1633 till 1837.³⁸

2. Until the trial against him, Galileo stood in high esteem among the Holy See, the Jesuits and especially the Popes of his lifetime. His teachings were celebrated.

“The visit” in Rome in 1611, after he had published his “Messenger from the Stars”, “was a triumph”.³⁹ “Pope Paul V welcomed him in friendly audience, and the Jesuit Roman College honored him with various ceremonies which lasted a whole day.”⁴⁰ Jean-Pierre Maury writes about this visit:

“Now Galileo's discoveries have been acknowledged by the greatest astronomical and religious authorities of his time. Pope Paul V received him in private audience and showed him so much reverence, that he did not allow him to kneel down in front of him, as was usual. Some weeks later the whole Collegio Romano gathered in the presence of Galileo officially to celebrate his discoveries. At the same time, Galileo met all the Roman intellectuals, and one of the most famous among them, Prince Federico des Cesi, asked him to become the sixth member of the Accademia dei Lincei (Academy of the Lynxes), which he had founded.”⁴¹

Galileo's first written statement in favor of the Copernican system, his “Letters on Sunspots”, were met with much approval and no critical voice was heard. Among the cardinals who congratulated Galileo, was Cardinal Barberini, the later Pope Urban VIII,

35 A. C. Custance, op. cit., 154 with further literature; cf. the addendum in A. Koestler, op. Cit., 495.

36 Anna Mudry, op. cit., 29.

37 A. Koestler, op. cit., 457-459. Koestler shows that in Galileo's time many books were put on the 'Index' without any disadvantages for the authors. He proves that even books from the cardinals and censors judging Galileo were on the 'Index'.

38 J. Hemleben, op. cit., 167.

39 A. Koestler, op. Cit., 426.

40 Viz. 426; cf. 426-428; cf. about the visit E. Wohlwill, op. cit., 1:366-392

41 J.-P. Maury, op. cit., 96. Totally wrong is the outlook of H. C. Freiesleben, op. cit., 8, who writes, concerning the time after 1610: “From this time on Galileo tried to get the Copernican system to be acknowledged especially by representatives of the Church. Unfortunately he had the opposite result.”

who would sentence him in 1633.⁴² In 1615 an accusation against Galileo was filed but denied by the Court of Inquisition. From 1615 till 1632 Galileo enjoyed the friendship of many cardinals and the different Popes.⁴³

3. The battle against Galileo was not started by Catholic officials, but by Galileo's colleagues and scientists, who were afraid to lose their position.

The representatives of the Church were much more open to the Copernican system than the scientists and Galileo's colleagues. Galileo did avoid and delay an open confession in favor of the Copernican system in fear of his immediate and other colleagues, not in fear of any part of the Church.⁴⁴

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

“Not in fear of those above him in the Church—as is often wrongly stated—, but because he was afraid to be 'laughed at and to be hissed off the stage' - as he formulated it himself— by the university professor, did he refuse to publish his work 'De revolutionibus orbium coelestium' for more than 38 years. Only after several Church officials, especially Pope Clemens VII, had requested it, did Copernicus finally decide to publish his work.”⁴⁵

Only few scientists living in Galileo's time confessed publicly that they followed Copernicus. Some did so secretly, but most denied the Copernican system.⁴⁶

“Thus, while the poets were celebrating Galileo's discoveries which had become the talk of the world, the scholars in his own country were, with a few exceptions, hostile or sceptical. The first, and for some time the only, scholarly voice raised in public in defence of Galileo, was Johannes Kepler's.”⁴⁷

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

Galileo's case confronts us with the heaviness and clumsiness of scientific changes due to the social habits of the scientific community, which Thomas Kuhn has described in his

42 A. Koestler, op. cit., 431, 432.

43 Viz. 442-443.

44 So especially G. Prause, *Niemand hat Kolumbus ausgelacht*, op. Cit., 182-183.

45 G. Prause, “Galileo Galilei war kein Märtyrer”, op. Cit., 78.

46 Cf. David F. Siemens, “Letter to the Editor”, *Science* 147(1965), 8-9. His authority is Bernard Barber, “Resistance of Scientist to Scientific Discovery”, *Science* 134(1961), pp. 596 ss; cf. A. C. Custance, op. cit., 157. The best argument for this thesis can be found in E. Wohlwill, op. cit. vol. 1.

47 A. Koestler, op. cit., 369-370.

famous book 'The Structure of Scientific Revolution'. More than once, it was not the Church withholding scientific progress but the scientific community!

4. Galileo was a very obstinate, sensitive, and aggressive scientist, who created many deadly enemies by his harsh polemics even among those who no longer followed the Ptolemaic world-view.

Galileo had already earned the nickname “the wrangler”⁴⁸ during his student days. Koestler repeatedly demonstrates that this personal aspect of many of Galileo's battles made it impossible for other scientists to work with him.⁴⁹

Koestler writes about Galileo's answer to the critics of his “Messenger from the Stars”:

“Galileo had a rare gift of provoking enmity; not the affection alternating with rage which Tycho aroused, but the cold, unrelenting hostility which genius plus arrogance minus humility creates among mediocrities. Without the personal background, the controversy which followed the publication of the Sidereus Nuncius⁵⁰ would remain incomprehensible.”⁵¹

A. Koestler adds more generally:

“His method was to make a laughing stock of his opponent - in which he invariably succeeded, whether he happened to be in the right or in the wrong. ... It was an excellent method to score a moment's triumph, and make a lifelong enemy.”⁵²

Z. Solle states it similarly:

“Galileo was not afraid of personal attacks and mockery against others, but this was the easiest way to create enemies.”⁵³

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

“When Galileo read the treatise, he had an outburst of fury. He covered its margine with exclamations like 'piece of asinity', 'elephantine', 'buffoon', 'evil poltroon', and 'ungrateful villain'. The ingratitude consisted in the fact that the treatise did not mention Galileo's name—whose only contribution to the

48 E. Schmutzer, W. Schütz, op. cit., 28.

49 Cf. beside the quotations in the text further examples for Galileo's fury in A. Koestler, op. cit., 431-432, 433-436, 362-363.

50 'Messenger from the Stars'.

51 Viz. 368.

52 Viz. 452.

53 Z. Solle, op. cit., 9.

theory of comets has been a casual endorsement of Tycho's views in the Letters on Sunspots.”⁵⁴

K. Fischer comments on the same event:

“It is hard to decide what the most remarkable side of this debate is: the open proceeding of the Jesuits against the Aristotelian physics of the heavens, the almost devote bowing of Horatio Grassi before Galileo's authority, Galileo's measureless aggressiveness, which destroyed everything that Grassi had said, or Galileo's genial rhetoric, which he used with a great skill against Grassi and Brahe, so that especially Grassi seemed to be a pitiable figure, who did not know what he was talking about ...”⁵⁵

Koestler writes on a vile and vulgar writing by Galileo against B. Capra:⁵⁶

“In his later polemical writings, Galileo's style progressed from coarse invective to satire, which was sometimes cheap, often subtle, always effective. He changed from the cudgel to the rapier, and achieved a rare mastery at it ...”⁵⁷

A. C. Custance mentions as an example for Galileo's oversensibility his reaction against the rumor that a seventy-year old Dominican had cast doubts on his thesis in a private conversation. Galileo wrote a harsh letter and called him to account. The Dominican answered that he was too old and would not have enough knowledge to judge Galileo's thesis, and that he only had made some private remarks in a conversation in order not to be called ignorant. Galileo still felt that he had been "attacked".⁵⁸

The Tuscan ambassador in Rome, under whose protection Galileo lived, characterized Galileo in a letter to the Prince of Tuscany:

“... He is passionately involved in this quarrel, as if it were his own business, and he does not see and sense what it would comport; so that he will be snared in it, and will get himself into danger, together with anyone who seconds him ... For he is vehement and is totally 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 our protection and responsibility...”⁵⁹

54 A. Koestler, op. cit., 467.

55 K. Fischer, op. cit., 128-129; cf. Thesis 10 on this battle.

56 A. Koestler, op. cit., 363.

57 Viz.

58 A. C. Custance, op. cit., 153.

59 A. Koestler, op. cit., 452-453; cf. the quotation of the Tuscan ambassador in the quotation from Anna Mudry (with footnote 9).

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

“Judging by Galileo's correspondence and other records of his opinion of himself, he was fantastically selfish intellectually and almost unbelievable 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 as Kepler any of his own findings or insights; he actually claimed to be the only one who ever would make any new discovery! In writing to an acquaintance he expressed himself as follows: 'You cannot help it, Mr. Sarsi, that it was granted to me alone to discover all the new phenomena in the sky and nothing to anybody else. This is the truth which neither malice nor envy can suppress'.”⁶⁰

Galileo's relationship to Johannes Kepler is a good example for this thesis (as well as an example for Thesis 4). Galileo had shared his belief in the Copernican system with Kepler at an early stage of their acquaintance and Kepler had blindly, without proofs, accepted Galileo's book 'Messenger from the Stars'.⁶¹ But Galileo refused to give Kepler one of his telescopes, although he gave them to many political heads of the world.⁶² Kepler could only use a Galilean telescope after the Duke of Bavaria lent him one.⁶³ Galileo wrote his discoveries to Kepler only in anagrams, so that Kepler could not understand them but Galileo later could prove that these were his discoveries.⁶⁴ After this, Galileo broke off all further contact with Kepler. He totally ignored Kepler's famous book 'Astronomia Nova' even though it was only a further development of Copernicus and of Galileo's discoveries⁶⁵ (cf. Thesis 10).

“For it must be remembered that the system which Galileo advocated was the orthodox Copernican system, designed by the Canon himself, nearly a century before Kepler threw out the epicycles and transformed the abstruse paper-construction into a workable mechanical model. Incapable of acknowledging that any of his contemporaries had a share in the progress of astronomy, Galileo blindly and indeed suicidally ignored Kepler's work to the end, persisting in the futile attempt to bludgeon the world into accepting a Ferris wheel with forty-eight epicycles as 'rigorously demonstrated' physical reality.”⁶⁶

60 A. C. Custance, op. cit., 153.

61 A. Koestler, op. cit., 370.

62 Viz. 375.

63 Viz. 378.

64 Viz. 376-377.

65 K. Fischer, op. cit., 169.

66 A. Koestler, op. cit., 438; cf. the next paragraph 438-439.

6. Galileo contradicted himself not only during the trial. In oral discussion he denied the Copernican system, which he had defended in earlier writings.

A. Koestler writes on the trial and on Galileo's defence:

“To pretend, in the teeth of the evidence of the printed pages of his books, that it said the opposite of what it did, was suicidal folly. Yet Galileo had had several month's respite in which to prepare his defence. The explanation can only be sought in the quasi-pathological contempt Galileo felt for his contemporaries. The pretence that the Dialogue was written in refutation of Copernicus was so patently dishonest that his case would have been lost in any court.”⁶⁷

“If it had been the Inquisition's intention to break Galileo, this obviously was the moment to confront him with the cupious extracts from his books - which were in the files in front of the judge - to quote to him what he had said about the sub-human morons and pygmies who were opposing Copernicus, and to convict him of perjury. Instead, immediately following Galileo's last answer, the minutes of the trial say: 'And as nothing further could be done in execution of the decree, his signature was obtained to his deposition and he was sent back.' Both the judges and the defendant knew that he was lying, both the judge and he knew that the threat of torture (*territio verbalis*) was merely a ritual formula, which could not be carried out ...”⁶⁸

But these discrepancies and even hypocrisy can be found during the whole of Galileo's life. In the beginning, about the years 1604/1605, when a highly visible supernova soon became weaker and it was not possible to show a parallax any longer, Galileo sometimes even doubted the Copernican system himself.⁶⁹ In 1613, in his 50th year, Galileo for the first time stated in printed his conviction that it was true. But in 1597 he had stated the same in a private letter to Kepler. For 16 years "in his lectures he not only taught the old astronomy of Ptolemy, but denied Copernicus explicitly".⁷⁰ This was the case even though there would have been no danger at all in presenting the Copernican system.⁷¹ He confessed his belief in Copernicus in private discussions and letters only. Several authors have correctly explained this by his fear from mockery of other scientists. Only after Galileo had become famous through his discoveries in the area of mechanics, dynamics and optics, did he admit his Copernican position in print.

K. Fischer occasionally indicates that Galileo could write things contrary to his own opinion,⁷² namely in order to harm other people.

67 A. Koestler, op. cit., 485.

68 Viz. 492.

69 K. Fischer, op. cit., 94.

70 A. Koestler, op. cit., 357-358; cf. 431.

71 Viz.; cf. Thesis 1.

72 E. g. K. Fischer, op. cit., 138.

7. Galileo was not a strictly experimental scientist.

K. Fischer writes on Galileo's book 'De Motu' ('On motion'):

“One can doubt whether Galileo had made many experiments to prove his theories. If that had been the case, it is hard to understand why he never changed his position that light objects are accelerated faster in the beginning of their natural motion than heavier ones. According to Galileo's own understanding, such tests were neither necessary to prove his theory nor enough to disprove it. His proceeding was axiomatically orientated.”⁷³

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 (cf. Thesis 8).

“Contemporary empiricists, had they lived in the sixteenth century, would have been the first to scoff out of court the new philosophy of the universe.”⁷⁴

8. Galileo did not and could not have proofs for his theory, as the first real proofs were found 50 to 100 years later. But Galileo always acted as if he had all proofs, but did not present them, as he said, because no one else was intelligent enough to understand them.

Koestler writes:

“He employs his usual tactics of refuting his opponent's thesis without proving his own.”⁷⁵

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

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

“How can he refuse to produce proof and at the same time demand that the matter should be treated as if proven? The solution of the dilemma was to pretend that he had the proof, but to refuse to produce it, on the grounds that his opponents were too stupid, anyway, to understand.”⁷⁶

73 K. Fischer, op. cit., 53.

74 Quoted by A. Koestler, op. cit., 461.

75 A. Koestler, op. cit., 478.

76 Viz. 449; cf. 445-451, especially 449-450 for the whole debate.

Galileo reacted in a similar way after the Pope himself asked for proofs.⁷⁷

Koestler writes about an earlier letter from 1613:

“But Galileo did not want to bear the burden of proof; for the crux of the matter is, as will be seen, that he had no proof.”⁷⁸

Virtually all researchers agree that Galileo had no physical proof for his theory.⁷⁹ Some parts of Galileo's theory even could not be proven at all because they were wrong and already outdated by Kepler's research (cf. Theses 10 and 5).

Fischer summarizes:

“He did not have really convincing proofs such as the parallax shift or Foucault's pendulum.”⁸⁰

One must not forget that the Copernican hypothesis itself was never denied by the Inquisition, but that it only was not allowed to be presented as a scientifically proven theory or as a truth.

“In fact, however, there never had been any question of condemning the Copernican system as a working hypothesis.”⁸¹

The Copernican system was just “an officially tolerated working hypothesis, awaiting proof”.⁸²

As Galileo came more and more under pressure, he finally invented a “secret weapon”,⁸³ the totally erroneous theory that the tides were caused by the turning of the earth. This easily disprovable theory was said to be the absolute secure proof of the Copernican system!⁸⁴

“The whole idea was in such glaring contradiction to fact, and so absurd as a mechanical theory - the field of Galileo's own immortal achievements—that its conception can only be explained in psychological terms.”⁸⁵

William A. Wallace used recently discovered manuscripts to show,⁸⁶ that Galileo knew

77 K. Fischer, op. cit., 148.

78 A. Koestler, op. cit., 436.

79 Cf. K. Fischer, op. cit., 123; cf. A. C. Custance, op. cit., 157+154-155.

80 K. Fischer, op. cit., 122.

81 A. Koestler, op. cit., 437.

82 Viz.; cf. the whole paragraph.

83 Viz. 464.

84 Viz. 464-467; cf. Thesis 10 on the tidal theory.

85 Vz. 454iz. 454.

86 W. A. Wallace, op. cit..

exactly that the final proof for the Copernican system was lacking and that he was covering this under his rhetoric. Jean Dietz Moss has done research on this kind of rhetoric⁸⁷ and makes clear how Galileo's own texts show, that Galileo knew that he had to fill the missing evidence with rhetoric.

9. In Galileo's time science no longer had to decide between Ptolemy and Copernicus. Ptolemy was no longer a real option. Rather it is important, "that the choice now lay between Copernicus and Brahe",⁸⁸ because everybody believed that the earth was moving around the sun. The question was, whether or not the earth was moving itself or was staying in the center of the universe.

"Nearly no expert believed in Ptolemaic astronomy any longer. The conflict was between Tycho Brahe and Copernicus."⁸⁹

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

"The arguments and observations which Galileo referred to, were acknowledged, but they denied only the Ptolemaic system, but did not favor in the same way the Copernican system. They were compatible with the Tychonian system, which had the advantage that the central position of the earth was maintained."⁹⁰

Galileo never took a position on this issue nor presented arguments against Tycho Brahe with the exception of his polemical and totally distorted description of Brahe's system in his work against Horatio Grassi.⁹¹

10. Galileo fought very stubbornly not only for the Copernican system but also for several hypotheses, which, compared to other scientists of his time, were out of date and a relapse into the old system.

This thesis was already contained in Theses 5, 8 and 9. Galileo defended the "epizycloids" of Copernicus, even though Kepler already had presented a much better theory.⁹²

His already mentioned erroneous explanation of the tides was used as his major proof for the Copernican system, even though it was untenable and Kepler had discovered the real

87 Jean Dietz Moss, "The Rhetoric of Proof in Galileo's Writings on the Copernican System", in ed. G. V. Coyne, M. Heller, J. Zycinski, op. cit., pp. 41-65.

88 A. Koestler, op. cit., 427.

89 K. Fischer, op. cit., 139; cf. 123.

90 Viz. 121.

91 Cf. viz. 128-129; see the quotation from this section under Thesis 4; cf. A. Koestler, op. cit., 467-468.

92 To expand *Thesis 5*, cf. A. Koestler, op. cit., 378 and A. C. Custance, op. cit., 154.

cause of the tides in the power of attraction of the moon.⁹³

In 1618, Galileo explained some visible comets in a fiery work as reflexions of light, so that nobody believed the Jesuit astronomer Grassi, who realized that the comets are flying bodies.⁹⁴

Many further examples have been discussed by A. Koestler and K. Fischer.⁹⁵

11. Under Pope Urban's (VIII) predecessor and his successor no trial against Galileo would have taken place.

The arguments for this thesis can be found under Theses 3 and 16. We should not forget, that in 1615 a first trial against Galileo before the Court of Inquisition was decided in favor of Galileo, because of a benevolent expert evidence of the leading Jesuit astronomers.⁹⁶

12. Galileo was the victim of the politics of Pope Urban VIII, who had been very much in favor of him earlier. This was due to the political situation as well as to Galileo's personal attacks on the Pope, never to religious reasons. The Pope had initiated the proceedings, while the Court of Inquisition calmed the whole matter down instead of stirring up the flames.

Thesis 12 discusses the personal aspect, Thesis 13 the political one, although it is not easy to distinguish between them.

Galileo's process took place under a ruthless and cruel Pope. A dictionary on the Popes says:

“Within the Church the pontificate of Urban was burdened with unlimited nepotism. Urban VIII was a tragic figure on the Popal throne. His reign was full of failures, for which he was himself responsible.”⁹⁷

Koestler writes at the end of his description of Pope Urban VIII, the former Cardinal Barberini, who for Koestler was “cynical, vainglorious, and lusting for secular power”:⁹⁸ 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

93 A. Koestler, op. cit., 464-467, 453-454.

94 Z. Solle, op. cit., 14; cf. A. Koestler, op. cit., 467.

95 A. Koestler, op. cit.; K. Fischer, Galileo Galilei, op. cit.

96 A. Koestler, op. cit., 441-442.

97 Rudolf Fischer-Wollpert, *Lexikon der Päpste* (Verlag Friedrich Pustet, Regensburg, Germany, 1985), 118.

98 A. Koestler, op. cit., 471.

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 as basis of mutual adulation—a type of relationship which, as a rule, comes to a bitter end.”⁹⁹

This Pope also was a danger to science:

“The Pope paralysed scientific life in Italy. The center of the new research came to the Protestant countries in the North.”¹⁰⁰

Thus the Galileo-affair was mainly an inner-Catholic and inner-Italian problem, but surely no gigantic battle between Christianity as such and science as such. The Court of Inquisition did not accuse Galileo of teaching against the Bible, but disobeying a Papal decree.

Urban VIII had favored Galileo as Cardinal (cf. Thesis 1) and had even written an ode to Galileo.¹⁰¹ After he had become Pope in 1623, his love for Galileo even increased.¹⁰²

Only a short time before the trial Urban's friendship turned into hatred. This was not only due to the political situation (cf. Thesis 13), but to Galileo's personal carelessness, not to say insults. Galileo obtained the right to print his major work “Dialogue” from the Pope personally in case some minor corrections were to be made. Galileo cleverly circumvented this censorship, and put Urban's main argument for the Copernican system (!) into the mouth of the fool “Simplicio”, who, in the “Dialogue” of three scientists, always asks the silly questions and defends the Ptolemaic view of the world.

“But it did not require much Jesuit cunning to turn Urban's perilous adulation into the fury of the betrayed lover. Not only had Galileo gone, in letter and spirit, against the agreement to treat Copernicus strictly as a hypothesis, not only had he obtained the imprimatur by methods resembling sharp practice, but Urban's favorite argument was only mentioned briefly at the very end of the book, and put into the mouth of the simpleton who on any other point was invariably proved wrong. Urban even suspected that Simplicius was intended as a caricature of his own person. This, of course, was untrue; but Urban's suspicion persisted long after his fury had abated ...”¹⁰³

L. Pastor, a defender of Papal infallibility, has tried to show that the Pope only played a minor role in Galileo's trial and that the (anonymous) Inquisition judged harsher than the

99 Viz. 471; similarly K. Fischer, op. cit., 145-146.

100 Z. Solle, op. cit., 58.

101 A. Koestler, op. cit., 472.

102 Viz.

103 Viz. 483.

Pope as a good friend of Galileo's would have liked them to do.¹⁰⁴ Z. Solle has given convincing proof that, in reality, it was just the other way round.¹⁰⁵ The Pope initiated the trial for personal reasons, while the Inquisitors were quite lax. Some of the ten judges seem to have been mainly interested in their own forthcoming, while others applied the brakes. In the end, the final decision lacked three signatures, at least two of them out of protest. The only Cardinal who zealously pushed the trial forward was the Pope's brother.

“That the whole trial was questionable could not be hidden to insiders. There was much resistance by high Church officials and from the Jesuit party.”¹⁰⁶

Koestler also comes to the conclusion that the Pope initiated the process:

“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.”¹⁰⁷

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

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

“The council of the General-Inquisitors became a reflexion of the battles between the different parties within the Church. Neither under Borgia nor under Urban was the issue astronomy or the faith of the Church, but always politics.”¹⁰⁸

“We have to return to the political situation in Rome, which lead to the transformation of an unpolitical astronomer into a criminal.”¹⁰⁹

Fischer holds a similar viewpoint:

“Now the care for the people's souls surely was not the only motive for the Church's actions. The Thirty Years' War had begun in 1618 and finished the time of verbal debate. The Church found itself in the hardest battle over its existence since its earliest history.”¹¹⁰

104 According to Z. Solle, op. cit., 38-39.

105 Viz. 64 and the whole book of Solle; cf. Thesis 6.

106 K. Fischer, op. cit., 126 (with additional literature).

107 A. Koestler, op. cit., 482.

108 According to Z. Solle, op. cit., 45.

109 Viz. 22.

110 K. Fischer, op. cit., 144.

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

In 1627-1630 Italy underwent the additional Mantuan War of Succession. At the same time the two Catholic powers, Spain and France, which both were allies of the Pope, started to fight each other. The head of the Spanish opposition in the Holy See, Cardinal Borgia, came into conflict with the Pope over political topics in 1632, because a peace treaty was in view, while the pope wanted the war to go on.¹¹¹ A tumult among the Cardinals resulted, after which the Pope began a great political purge in the Vatican, which more or less by chance struck all those favorable to Galileo.¹¹² The Pope initiated many trials by the Inquisition and became an increasingly cruel ruler.

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

- The close connexion to the family of the Medicis, from which the Tuscan prince came, and which, together with Venice,¹¹³ fought against the Pope and were only rehabilitated after his death in 1644;¹¹⁴
- The connexion with Austria¹¹⁵ and Emperor Rudolf II through Kepler, as the Pope together with France and Sweden fought against the Catholic German Emperor. The Prince of Tuscany and the German Emperor were close friends.¹¹⁶

Z. Solle has shown in detail that it was the beginning of 'modern' nationalism, which left Galileo between the fronts of the nationalistic Pope, the Italian cities and the parties of the Thirty Years' War.¹¹⁷

“Thus it was not the shadow of a dying and dark night, which put pressure on the scientist (i. e. Galileo) ... but the beginning of modern times.”¹¹⁸

J. Hemleben, who favors Galileo, has argued, that he would not have had to undergo any trial, if moved from Padua to Florence, since Padua depended on Venice, but Florence on Rome.¹¹⁹ Padua allowed great freedom for scientific research, because Venice was

111 Z. Solle, op. cit., 25; cf. K. Fischer, op. cit., 144.

112 Z. Solle, op. cit., 26-27.

113 About the open resistance of Venice cf. K. Fischer, op. cit., 144.

114 Z. Solle, op. cit., 54.

115 Viz. 55.

116 Viz. 57.

117 Viz. 64-64.

118 Viz. 65.

119 J. Hemleben, op. cit., 62-64 u. a.

independent of Rome.¹²⁰ Even Protestants studied there,¹²¹ which was impossible in Florence. One of Galileo's best friends, Giovanni Francesco Sagredo (1571-1620), had already warned Galileo in 1611 against moving to Florence, because there he would be dependent on international politics and on the Jesuits.¹²² But Galileo ignored this and all later warnings.

14. Galileo died in 1642, two years before the death of his great enemy, Pope Urban VIII, in 1644. In 1644 the whole situation in Italy changed and the family of the Medicis came back to honor. Galileo would surely have been rehabilitated¹²³ (cf. Thesis 13).

15. Galileo was not a non-Christian scientist of the Enlightenment, but a convinced Catholic.¹²⁴ It was indeed his endeavor to show the compatibility his teachings with the Bible, which among other things brought him into conflict with the Catholic establishment.

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

“As a deeply believing scientist, Galileo could not live with a discrepancy between science and faith, which seemed to arise when he started to interpret the Bible. As layman, he experienced much resistance by theologians ... His attempts to interpret the Bible were one of the reasons which led to the trial. Another reason was his attempt to popularize the Copernican system.”¹²⁵

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

The preface of his major work “Dialogue” contains clear statements that Galileo did not want to stand in opposition to the Bible¹²⁶ or to the Catholic Church. Albrecht Fölsing writes:

“Many of Galileo's admirers in the 19th and 20th century could understand this preface only as a concession to censorship. Some interpreted it as a

120 Viz. 62.

121 Viz. 32.

122 Viz. 63-64.

123 Z. Solle, op. cit., 64-71.

124 This has been proved most clearly by O.laf Pedersen. “Galileo's Religion”, in ed. G. V. Coyne, M. Heller, J. Zycinski, op. cit., pp. 75-102, especially pp. 88-92 on Galileo's faith in God and pp. 92-100 on his Catholic faith and his rejection of all non-Catholic 'heresies'.

125 Z. Solle, op. cit., 9.; cf. the judgement by K. Fischer, op. cit., 114-115, quoted in the explanation to Thesis 7.

126 Cf. on the positive attitude of Galileo to Scripture E. Wohlwill, op. cit., 1: 485-524 + 542-555, especially 543.

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.”¹²⁷

As a defender of Papal infallibility, L. Pastor has stated that the Pope saw a Protestant danger in Galileo, but others have doubted this.¹²⁸ On the one hand one of Galileo's first critics was a Protestant pastor from Bohemia,¹²⁹ on the other hand Galileo's writings were published and printed in Protestant states and thus became known. Besides, Galileo himself was a declared enemy of Protestantism.¹³⁰

16. Result: Galileo was not a scientist who denied any metaphysics or favored the separation of faith and science (cf. Thesis 15).

Discussing a quotation in Galileo's 'Letters on Sunspots', Fischer speaks in more general terms:

“In those last sentences, one can hear a somewhat different Galileo from the picture of Galileo which the traditional interpretation paints. The main line of the historiographs of science from Wohlwill to Drake presents Galileo as an 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 promotor of a separation of faith and science. And now we hear a confession of love to the great Creator being the final goal of all our work, thus including our scientific work! Science as perception of God's truth! ... The ruling historiography of science cannot be freed from the reproach that they have read Galileo's writings too selectively.”¹³¹

A little later Fischer writes about the misinterpretation of Galileo's work:

“This misinterpretation led to the inability to evaluate correctly Galileo's early writings ('Juvenilia'), to ignoring many sections with speculative and metaphysical content scattered all over Galileo's writings, yea, even to a

127 Albrecht Fölsing, *Galileo Galilei, Prozess ohne Ende: Eine Biographie* (Munich, Germany, 1983), 414; cf. Also 414-415.

128 Following Z. Solle, op. cit., 38.

129 Viz. 7.

130 E. Wohlwill, op. cit., 1:552-555; O. Pedersen. “Galileo's Religion”, op. cit., 92-100.

131 K. Fischer, op. cit., 114.

misinterpretation of Galileo's understanding of the relationship between science and faith ...”¹³²

132 Viz. 115.