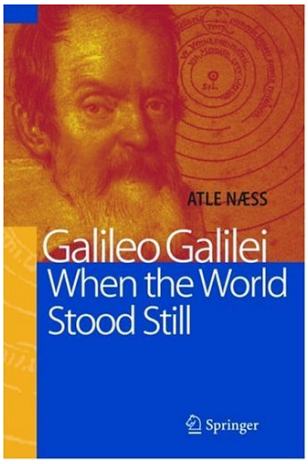
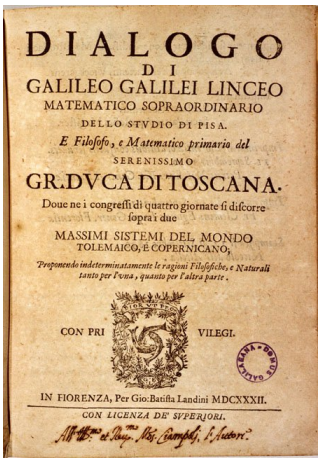
Atle Næss *Galileo Galilei – When the world stood still*, Springer Verlag, Berlin, 2005 (221 p.) ISBN 3-540-21961-7.



It was in January 1633 that Galileo at the age of 69 had to travel to Rome, summoned by the inquisition to appear before the Holy Office without further delay. The result of the trial was that Galileo had to solemnly swear that he 'abjured, cursed, and detested all the errors and heresies' that he had written in his recently published book *Dialogo sopra i due massimi sistemi del mondo* (*Dialogue concerning the two chief world systems*). In that book, he had written down the dialogues of three men –a not unusual format in those days– who discuss during three days their views on the solar system. The characters are a wise man (Sagredo) who invites two scientists (Salviato and Simplicio sic!) to have a scientific meeting in his premisses. Salvatio is defending the Copernican view where the earth is moving and the sun is the center, and Simplicio defends the Aristotelian view where the earth is the center with all planets with the sun circling around it.

Galileo knew that he was skating on thin ice since the Catholic Church did not accept the Copernican system, because of literal interpretion of some phrases in the bible. Formally, Galileo did nothing wrong by letting these fictitious characters discuss the two world systems. So he had somewhat reluctantly received the official Roman imprimatur to have the book published in Florence. However, Galileo made it very clear on which side he was. Simplicio was a simple minded character who was ridiculized by the others, while Salvatio was the witty one. There were several reasons why the book was condemned after all, one of which being the opposing forces of Jesuits and Dominicans, and the political situation at the time. The Jesuits where very eager in bringing Galileo down because of their conservativism and some scientific enemies that Galileo had among them from previous scientific disputes.


DIALOGO
DI
GALILEO GALILEI LINCEO
MATEMATICO SOPRAORDINARIO
DELLO STVDIO DI PISA.
E Filosofo, e Matematico primario del
SERENISSIMO
GR. DVCA DI TOSCANA.
Doue ne i congressi di quattro giornate si discorre sopra i due
MASSIMI SISTEMI DEL MONDO
TOLEMAICO, E COPERNICANO,
Proponendo indeterminatamente le ragioni Filosofiche, e Naturali tanto per l'vna, quanto per l'altra parte.
CON PRI VILEGI.
IN FIORENZA, Per Gio: Batista Landini MDCXXXII.
CON LICENZA DE' SVPERIORI.

title page of the *Dialogo*



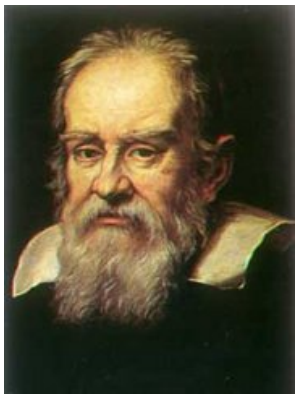
Galileo's tomb in Florence

The Pope in function at the time of the trial was Urban VIII, who was a former admirer of Galileo (as a cardinal he had written several letters to Galileo which he had signed *con fratelo* i.e. like brothers). But he too was in a difficult position and had to choose the side of the jesuits because he needed them like he also needed conservative Spain and France to fight the protestants in Germany.

The condemnation of Galileo was based on a document (actually a Papal decree of February 25, 1616) that researchers long believed to be forged, but recent investigations show that it is probably not. The decree concerned a previous meeting of Galileo with the cardinals Bellarmine and the Jesuit Segizzi where Bellarmine (an admirer of Galileo) had given a moderate warning to Galileo, to be careful and not to come into conflict with Rome. He did that after he had sent Segizzi away who was all too eager to disgrace Galileo. But the decree, which is some kind of minutes of that meeting, says that Galileo

was forbidden to "hold, teach or defend in any way" that the earth was moving. When that almost forgotten document unexpectedly showed up during the trial, that was the end of Galileo's defense.

It is hard to believe that only in the 19th century the vatican partially opened up their archives about Galileo. Even during the Second Vatican Council in the 1960s, the Galileo affair was only alluded to in vague terms. It was the Polish Pope John Paul II Wojtyla (a compatriot of Kepler) who, in 1992 on the occasion of 400th anniversary of Galileo's appointment at the University of Padua, admitted the Church's error. Kepler, being a German protestant, and thus not threatened by the Roman Church, was also defending the Copernican system, but for obvious political and religious reasons, there was little contact with Galileo.



The whole story, of which I made an incomplete summary, is explained in great detail in this pleasantly reading book. All the politics and the delicate interplay between science and theology, between friendship and envy, observation and theory, professional and private duties, and all other subtleties are so marvelously introduced in a way that they keep you reading with eagerness. It is mainly an accumulation of facts, but it reads like a novel where Galileo is the "good guy" that in the end the reader wants to "win and live happily ever after". Unfortunately, that is not the way history goes. It is clearly difficult to reconstruct with certainty the character of Galileo, and there are some controversial opinions about it, expressed by other authors. Everything here is based on objective facts, and reality may only deviate from what is described here by misinterpretation, not by unlimited phantasy of the author. Næss sketches Galileo as an ambitious scientist. Nowadays he would probably be called an engineer. He did many experiments and made many observations, and produced several instruments. He improved the telescope with which he discovered moons of Jupiter, and studied sunspots. He was rather keen on being the first to discover and publish something, and he was not always the most considerate for his admirers. He must have made several scientific enemies in his glory days. Besides his lifelong professorship at the university of Padua, he was the court mathematician the de Medicis who were Grand Dukes of Tuscany, and he became member of the Roman *Accademia dei Lincei* (Academy of the Lynxes – because lynxes have sharp eyes) founded by prince Cesi.

A simple search on the web will reveal many interesting sites devoted to Galileo. There is the site of the Galileo Project at `galileo.rice.edu` giving hypertextual information about Galileo and the science of his time to viewers of all ages and levels of expertise. Much information with transcription of the minutes of the trial can be found at a site about famous trials: `www.law.umkc.edu/faculty/projects/ftrials/galileo/galileo.html`. Besides detailed texts from the trial, there is a lot of other information too like e.g. the text of the decree of 1616, and the text of Galileo's *Dialogues*. About the Galilean moons of Jupiter, you can read at `www2.jpl.nasa.gov/galileo/ganymede/discovery.html`, and there are lots and lots of websites devoted to Galileo and his work as an astronomer, physicist, and mathematician.

Adhemar Bultheel