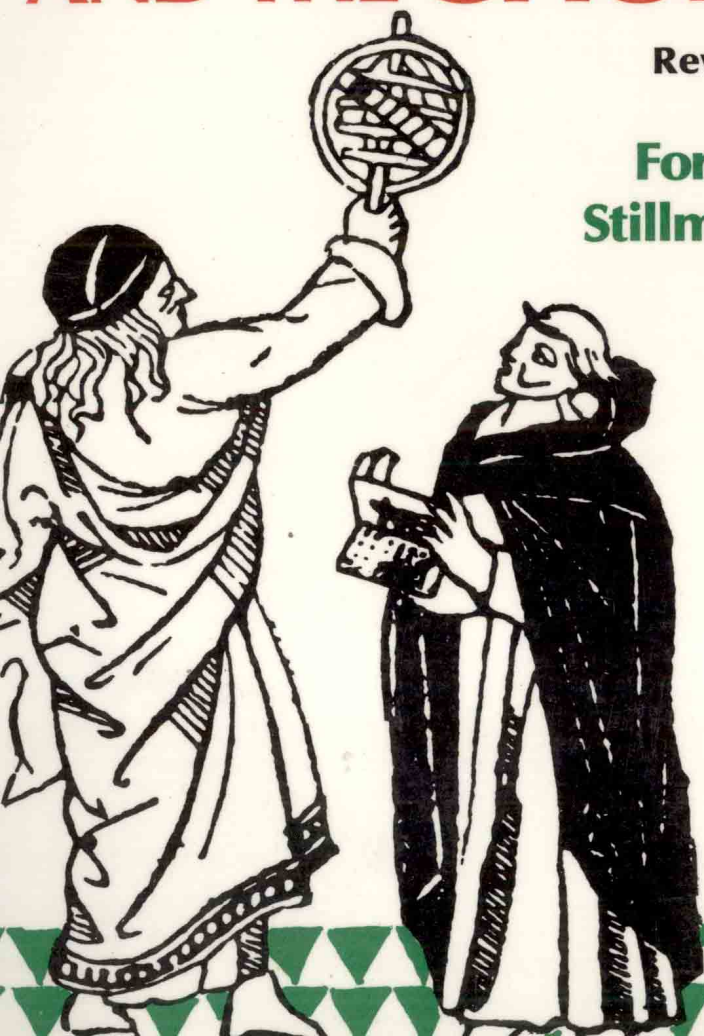


**JEROME J. LANGFORD**

# **GALILEO SCIENCE AND THE CHURCH**

**Revised Edition**

**Foreword by  
Stillman Drake**



**Ann Arbor  
Paperbacks**



# GALILEO, SCIENCE AND THE CHURCH

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Jerome J. Langford

REVISED EDITION

Foreword by Stillman Drake

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## *Galileo, Science and the Church*

✧ *To My Parents* ✧

## FOREWORD

In society as a whole, there are no dead issues. When we think there are, it is only because each of us moves in a necessarily restricted circle and remains untouched by the labors of persons outside it on matters that are of no interest to us and our immediate associates. The American Civil War has recently been reopened in our literature to a degree that astounds those of us who thought it to be a dead issue. Doubtless those who avidly read that literature are equally astonished by the current revival of interest in the Galileo affair.

But as Father Langford points out in his opening sentence, the Catholic Church has not been allowed to regard its ancient condemnation of Galileo as a dead issue. The effective prohibition of a scientific thesis which later became an established truth has stood ever since as a symbol. It is a considerable part of Father Langford's task to unravel the various threads that have been woven into that symbol over the centuries. With this part of his task I have great sympathy, for it seems to me that many of the most formidable problems of contemporary society stem from unfortunate forms taken by symbolic modes of expression. Galileo's condemnation was the first of two outstanding events in modern times that have come to symbolize the conflict of religion and science. Indeed, without the treatment accorded to the views of Galileo and Darwin, the very concept of such a conflict might never have been formulated. Once conceived, however, the inevitability of such a conflict has grown to the status of a commonplace, despite many highly articulate protests in our own time by men eminent in either discipline.

Being neither a scientist nor a religious man, I have no direct way of knowing whether or not there is an inherent conflict between the two modes of thought. Galileo seems to be an example to the contrary; certainly a first-rate scientist, he regarded himself as a good Catholic, and the Church itself, in the very document by which it condemned him, acknowledged that he had behaved as one throughout his trial.

On the other hand, I do know that there is an inherent conflict between established authority and independent thought. The independent thinker is always condemned, one way or another, by established authority, which usually asserts that it does this not only for the sake of truth and the good of society, but also for his own good. The social patterns of the time may determine whether this benefit is conferred on its recipient by execution, imprisonment or merely social disapproval, but the fact of antagonism does not change. Now before the birth of modern science, there was no objective way to tell whether

a particular independent thinker was a genius or a crank, and the safest course for established authority was to suppress him on general principles, leaving it to posterity to determine whether he had been a prophet or a madman. The procedure is not unknown today in the absence of objective criteria; that is, outside the truly scientific fields. That is why I think that if Galileo's case symbolizes anything, it symbolizes the inherent conflict between authority and freedom rather than any ineradicable hostility of religion toward science. It was an accident of Galileo's time that authority happened to be vested in a particular religious institution and that his field of independent thought happened to be the creation of modern science. If that is so, then I see no reason why that institution as it exists today, which I suppose to be rather different from what it was three or four centuries ago, should be singled out for its having put into practice in his case the only general principle by which unquestioned authority can be maintained by those so unfortunate as to possess it. No more should it be singled out for credit in having kept alive what science there was during the ten or fifteen centuries immediately preceding, though this is perhaps something that should be explained by those who believe in the inherent conflict of religion and science.

Of course it has always been irksome to independent thinkers, whether geniuses or cranks, to have limits placed by established authorities on their activities. Whether on the whole the imposition of such limits has been good for truth and for society is another question. Probably a man's opinion on that question is directly proportional to his abilities as an independent thinker, or at any rate to his own estimate of those abilities. What is too often overlooked is that most men are not independent thinkers, and would prefer not to be bothered by them. It is probably this that accounts for the fact that Galileo still has plenty of enemies today, a fact which used to puzzle me but for which I am very grateful, as otherwise I should have nothing to write about. Mr. Arthur Koestler is perhaps the best living representative of the pro-authority and anti-Galileo forces, though he is no spokesman for the Church; if I understand his writings correctly, he believes that the Church authorities were on the whole better able than Galileo to conduct the affairs of his time, and that we might do well to follow their example and suppress the intrusion of daydreaming scientists into public affairs in our own day. It is interesting to see that Father Langford, on the other hand, believes that the Church made a mistake in the case of Galileo, and reasonably asks that the circumstances be properly understood, so that the Church of today may be spared further attacks based on an error of such venerable age. One may hope that after another four centuries, the institutions which manage to survive their current authoritarian mis-

takes in the name of truth and society will in their turn ask our descendants not to judge them by the actions of their remote ancestors who suppressed independent thought and unproved theories.

Galileo, of course, did not attack the Church, but the Church felt that its authority was threatened by his views. Galileo thought the precise opposite, and went to much trouble to warn it of the probable consequences if it officially condemned a theory which might later be proved true. This aspect of Galileo's behavior in 1614-1616, when his warnings put him in some personal peril, is neglected by most writers, who read his warnings as demands. Thus Father Langford, like Mr. Koestler, sees the theme of Galileo's *Letter to Christina* as a shift in the burden of proof. To my mind, that document was exclusively a plea against the possible prohibition of the Copernican theory, and was by no means a plea for active support of that theory by the Church. Galileo was not a man to plead for support, though he was one to fight against interference. And he said quite clearly at the time that what he opposed was not the prohibition of Copernicus's book, but its prohibition without so much as a reading of it. Like most independent thinkers, he was confident that others would come round to his views in the same way he had arrived at them, if only they were permitted to do so.

Closely relevant to this is a point of great interest that is discussed at length in the present book; namely, the cogency of proof that should be possessed by an independent thinker before he ought to urge his views against established tradition. Father Langford himself believes that it was not only imprudent but illogical of Galileo to come forward without demonstrative proofs—proofs which, he points out, had to wait more than a century. But if a man's proofs must be so overwhelming that others will speedily accept them against established authority, then few independent ideas, especially in science, will ever be brought forth, for most really new ideas require the research and the contributions of many men before rigorous proofs are to be found. I think that all that should be required is sufficient weight in the mind of the advocate himself that he will offer himself up to possible general ridicule. Galileo's proofs had at least that much weight for him before he spoke out, and rightly so; his two attempted physical proofs, though not conclusive, were far stronger than many of his critics will allow them to be. I refer to the seasonal variation of sunspot paths and to Galileo's theory of the tides. It would indeed be difficult to explain either of those phenomena without attributing some motion to the earth.

Well, Galileo was not successful with his proofs, and in 1616 the earth's motion was pronounced to be a rash view, philosophically false and contrary to Scripture. That was the opinion of the theological



qualifiers called in to decide the point. But the decree then published against certain books did not go so far, as Father Langford has astutely pointed out. The only book to be prohibited outright was not that of Copernicus, but Foscarini's book, which attempted to reconcile the Copernican theory with the Scriptures, and the ban applied only to "others which teach the same." This point, overlooked by nearly all other writers, is essential to an understanding of the later events. Galileo understood it well enough, and his *Dialogue* of 1632 in no way violated the published decree, for he studiously avoided any further attempt (after the unpublished *Letter to Christina*) to show how Copernicus might be reconciled with the Bible. His trial and condemnation hinged on quite another matter than the decree of 1616; namely, his alleged violation of a personal instruction delivered to him in that year.

Now the question whether Galileo did receive an instruction not to hold or defend this view "or teach it in any way, orally or in writing," is the subject of continuing debate because of conflicts among the documents of the case itself. Father Langford believes that Galileo received such an instruction, and consequently that he must have perjured himself in the trial. Many eminent scholars, led in our time by Professor Santillana, are convinced that Galileo never received such an instruction, and view the only concrete evidence that he did as probably a contemporary falsification. It is my own opinion that there was neither falsification by churchmen nor perjury by Galileo; that it was utterly impossible to establish at the trial in 1633 the precise events of 1616, and that those events included an illegal act by an overzealous Commissary of the Inquisition, an act that Galileo had been instructed by a Cardinal to treat as having never happened. The whole affair was, I think, a tragedy of errors. It should now be recognized as one, rather than as the symbol of irresponsible science meddling with society, as Mr. Koestler would have it, or the symbol of an inherent religious intolerance of science, as Professor Santillana maintains.

It is to be hoped that the present candid recognition by a Catholic scholar that the Church's theologians made a mistake in the condemnation of Galileo will open a new era in which writers on this issue, of whatever persuasion, will move toward moderation and objectivity and will show a more rounded understanding of the circumstances which surrounded that great historical drama.

Stillman Drake

*April, 1965*

*San Francisco*

# INTRODUCTION

The question of Galileo and the Roman Catholic Church seems destined never to die out. Three centuries of myths, prejudiced accounts, and apologetics have distorted the facts and issues of the conflict and made the condemnation of Galileo a subject of enduring prominence. Charges and denials were especially vehement less than one hundred years ago. The spirit of the nineteenth century, with its accent on unbounded intellectual freedom, encouraged historians to produce a graven image of Galileo as the great and courageous scientist whose thoughts were chained by a tyrannical Church. Many historians used Galileo's name as a battle cry in their polemics against the Church of Rome. Catholic scholars, in answering these attacks, often went to the other extreme. Many times what began as an explanation ended as a justification of the condemnation. Facts were overlooked or denied, documents were soft-pedalled, new meanings were concocted for the word "heretical."

The debate continues today. Unfortunately, so does the misunderstanding. An ever-increasing number of books on the history of science are content to repeat the same old charges or their time-worn answers. Critical readers, Catholic and non-Catholic alike, find it annoying to learn that there are still some writers, who, usually in a paragraph or two relating to the famous case, insist on magnifying an admitted mistake into an irretrievable manifestation of unfounded authority and rank stupidity. One can still find those who use the Galileo affair to argue against the doctrinal authority of the pope and to infer that the Church was, and is, a sworn enemy of modern science and human progress.

The old charges are not made as boldly as they once were. In a way, that is unfortunate. It is far easier to answer an argument than it is to dismiss a silent, well-placed implication. For example, even in Professor Wolf's excellent *History of Science, Technology, and Philosophy in the 16th and 17th Centuries*, one reads the misleading statement that:

The *Dialogue* and other Copernican works remained on the Index until 1822, when at long last the College of Cardinals declared it permissible to teach the Copernican theory in Catholic countries. So the infallible Church had to recant its earlier view.<sup>1</sup>

<sup>1</sup> A. Wolf, *A History of Science, Technology, and Philosophy in the 16th and 17th Centuries* (New York: Harper Torchbooks, 1959), I, p. 37.

Now it is perfectly true that the prohibition against Copernican works was not removed formally from the Index until 1822. But it is not true that only in that year did it become permissible to teach the Copernican theory in Catholic countries. As we will see, Catholics were always allowed to teach it as a theory. Nor was there any question of the infallibility of the Church involved in the Galileo case. This is but one of many examples which could be cited to illustrate the point. It is not unusual to come across references to the condemnation of Galileo in articles and books on various subjects, some as far afield as economics, by authors who presumably have no intention of attacking the Church. But many times their remarks are based on legend rather than fact. And almost always, they miss the real lesson of the Galileo conflict, a lesson which is of paramount importance today.

Perhaps the most influential book on the case today is Giorgio de Santillana's *Crime of Galileo*. It is well-written and based on extensive research. But it often seems to show a lack of historical understanding. As Ernan McMullin, no friend of inquisitorial injustice, has noted:

The unpleasant polemics between historians of science and Catholic apologists which were so common in an earlier day have more or less subsided . . . but passions still run strong sometimes, even in historians . . . de Santillana's work is one which is likely to perpetuate a shaping of the Galileo symbol one had hoped dead with the nineteenth century.<sup>2</sup>

Intrigue, authoritarianism, ignorance, lies, envy, stubbornness: these abounded. But, the *Crime of Galileo* seems to tell us, these, along with falsified documents, were the ultimate and real causes of the conflict. The intellectual issues are swept into a corner. Rarely is there any attempt at a scientific examination of Galileo's proposed proofs for the Copernican system. The scientific, philosophical, and theological problems are too far in the background to be of much value in de Santillana's version of the case. Yet the science, philosophy, and theology of the seventeenth century each had an important part in the condemnation. To slight any one of these areas is to neglect an element necessary for a complete understanding of the famous conflict.

Whenever historical facts are lifted from their human-temporal context and woven to fit the pattern of preconceived outlooks, one is stretching the facts to fit the thesis. Such a method precludes true and valid understanding of a past event. Human history takes place in unique circumstances. Historical accuracy demands as a prerequisite a thorough knowledge of the people, loves, fears, culture, trends

<sup>2</sup> Ernan McMullen, "Galileo and His Biographers," *The Furrow*, 1960, p. 796.

of thought, and traditions surrounding a past event. Lack of insight into the context of the Galileo case is the glaring defect in most of the writings which deal with it.

Let me say at the outset that this book is not intended to be a Catholic apologia for the decisions of the Holy Office in 1616 and 1633. I am not trying to rob the Galileo case of its relevance. But I do think it is time to correct some of the doctrinal and historical misconceptions which have found unopposed acceptance in much of the literature on Galileo. The condemnation of Galileo was not inevitable. Nor is it the very nature of theology to do battle with modern science. Yet the condemnation is a historical fact. We must examine how it could and did happen and what its meaning is for us today.

If the present work supplies a few insights into the mental milieu of the seventeenth century, if it succeeds in showing the errors that were committed by the principals on both sides in the controversy, errors that must be guarded against today, it will more than have rewarded the years of study and labor that have gone into its preparation. May this book contribute in some way to better understanding among men of good will.

I wish to express my deep gratitude to Father James A. Weisheipl, O.P., D. Phil. (Oxon.), who as professor and friend has been of invaluable assistance in the preparation of this book, and to Mr. Stillman Drake for commenting on the manuscript and contributing the Foreword.

J.J.L.

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## CHAPTER I

### *The Age of Galileo*

The cultural environment and human needs of any age provide both the challenges and the possibilities of success to those chosen few who are destined to alter significantly the course of human history. The greatness, the spirit of any individual who so influences his fellow men can be understood only by those who first see the setting in which he lived and made his contribution. Without some grasp of the cultural, political, social, scientific, philosophical, and theological milieux surrounding a great figure of the past, any attempt to understand the issues which he faced and the content and manner of his response would be doomed to failure.

It is not easy to capture in words the temper of an age. Still the attempt must be made even if the result is imperfect and incomplete. The complexity of factors which foster a typical attitude toward such things as love, learning, life, progress and death does not lend itself to minute analysis or to a neat but sweeping synthesis. Especially is this true of the sixteenth and seventeenth centuries during which Galileo lived. This period has been described with good reason as the "Age of Adventure."

## 2 *Galileo, Science and the Church*

Much like our own day, the Age of Galileo was a time of discovery or rediscovery, of rapid change and anxiety. There were those who considered change as a goal rather than a process, and others who saw the need for true progress and were willing to pay the price to promote it. Then as now, there were long-standing traditions which could not be ignored even though they were bound to be overcome. Some who lived in the Age of Galileo feared excess and desired only that change respect what was essentially unchangeable. But there were also members of that breed of men, still to be found, who seemed to view change as an evil and true freedom as a catastrophe. However one felt about change, he had to admit that it was in the air.

By the dawn of the sixteenth century the average man was probably still somewhat unaccustomed to the startling knowledge that man had conquered the sea and discovered new worlds. The voyage that had been shrugged off for ages as impossible had been navigated by Columbus, and soon armies, such as those of Cortes and Pizarro, would be sent to subjugate peoples whose very existence had always seemed somewhat improbable. Much as children today imagine themselves rocketing to the moon, youngsters of that day probably dreamed of sailing the oceans and discovering new lands which they could claim for their king. As science fiction today speculates on the inhabitants of far-off planets, that age must have had its story tellers who described in great detail the natives of the new world. The impact of Columbus's discovery is greater the more we realize that, unlike the moon or Mars, the New World had actually been touched upon and its inhabitants seen with human eyes.

Portugal, England, and France soon followed Spain in a race to discover and explore. Men willingly sailed unknown seas for God, gold, and glory, though not always in that order. In 1497, John Cabot of England reached Newfoundland. A year later, Vasco de Gama found a sea route around the Cape of Good Hope to India and opened the way for vast trading operations. In 1519 Magellan's ships began a three-year trip around the world.

Jacques Cartier, in 1534, explored the St. Lawrence region for France. These events contributed to a growing spirit of national pride. But it was Spain that led the way. By the middle of the sixteenth century she had colonized large portions of Latin America and royalties were flowing back into the coffers of the Spanish King.

Newly-opened trade markets with the East and the New World hastened the rise of manufacturing techniques, which in turn drew more and more people into the cities and helped weaken the old feudal order. The coinage system began to replace the bartering basket as the accepted vehicle of economy. Bankers in Germany and the Netherlands developed networks of credit which encouraged competitive trade and investment.

Politically, as the Reformation destroyed papal influence in some countries and seriously weakened it in others, the power of the ruling monarch, whether prince or king, was increased. The principle of Machiavelli's *Prince*, that a ruler could use any means he desired in attempting to achieve his political goals, was widely put into practice. The once-powerful Holy Roman Empire was on the verge of collapse. Political alliances were formed and broken almost at will. Thus France during this period was to be allied with and opposed to, at one time or another, the pope, the emperor, the Protestant princes and even the Turks.

Education, which during the Middle Ages had been limited, for all practical purposes, to clerics, nobles, and the wealthy, gradually became more universal. By the sixteenth century it was theoretically possible for students from all classes of society to obtain an education. Italy led the way in the number and importance of its new universities. The Protestant revolt, however, had a harmful effect on the field of learning. The number of students decreased. Church funds set aside for school support were confiscated or diverted to other uses. Many grammar schools attached to monasteries were closed when the monasteries were suppressed by Protestant authorities. In England, for example, there were less than half the number of schools at the end of the sixteenth



## 4 *Galileo, Science and the Church*

century as there had been at the beginning. Only after the Council of Trent was education at the pre-university level able to recoup its losses. The Council ordered the establishment of elementary schools and a number of religious communities were established to provide the teachers. The Jesuits, approved by Pope Paul III in 1540, were especially effective in the field of teaching.

The invention and improvement of the printing press was of singular importance in the progress of learning. By the beginning of the Age of Galileo, thousands of works which had been difficult if not impossible to obtain, were made available to scholars and students through the growth of personal and public library collections. New theories which had been refused a hearing in the great universities could now be published and contest established teachings. Each of these factors certainly played a large part in the development of a new age. But it was two movements, the Protestant Reformation and the Renaissance, that made the most critical contributions to the Age of Galileo.

The Reformation was not a sudden outburst against the Catholic Church begun only when Luther posted his 95 theses on the door of the Wittenberg Church in 1517. Nor was it merely a theological break. For decades conditions favoring a revolt had been solidifying. The rise of nationalism, which was opposed to the old theocratic system whereby the papacy was deeply involved in the secular rule of Christian nations, together with a strong desire on the part of rulers to be free of Roman financial and moral interference, explains the welcome which many princes gave to the reformers. In Germany, to take one example, it is estimated that the Church and its clerics controlled approximately one third of the wealth of the entire nation. Some clerics (and even non-clerics) amassed numerous benefices, that is, financial taxes paid to the pastor of an endowed parish. The idea behind benefices was that the pastor would always have a regular means of self support. In return for his labors on behalf of the parish, he was entitled to a sufficient salary. By means of political pull or financial inducements, however, one was able to gain title to