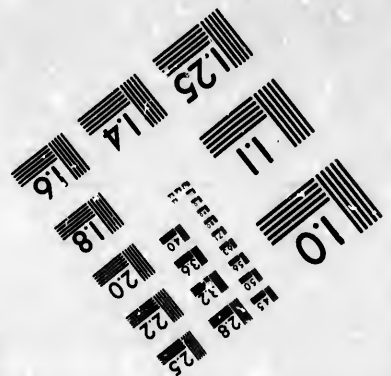
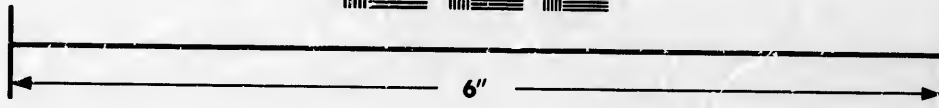
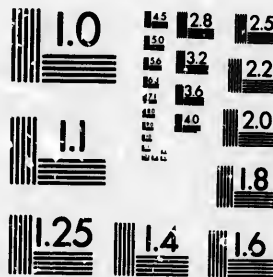


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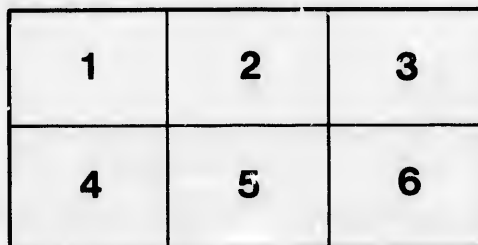
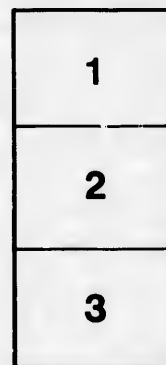
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GALILEO AND THE COPERNICAN SYSTEM,
HOW TREATED BY ROME :

A LECTURE,

DELIVERED FEBRUARY 7, 1867,

IN ST. ANDREW'S HALL, ANTIGONISH,

BY THE

REV. DR. MACGREGOR.

HALIFAX, N. S. :

PRINTED BY COMPTON & CO., 30 & 32 BEDFORD ROW,

1867.



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TO

MY SUPERIOR

DURING A PROLONGED STAY IN THE ETERNAL CITY,

THE VERY REVEREND

Philip Canon Taucioni,

IN REMEMBRANCE OF

MANY FAVORS RECEIVED BY, AND MANY KINDNESSES SHOWN TO,

THE WRITER,

THIS LECTURE

IS AFFECTIONATELY INSCRIBED.

INTRODUCTION.

At the request of those whose opinions I esteem more highly than I can well express, I give the following lecture to the press for publication. It appears substantially as it was delivered in the place and at the time specified on the title page, devoid of such remarks only as were elicited by the circumstances, in which I read it to the audience. These remarks, it is needless to say, I had forgotten for the most part before I descended from the platform. For the inelegancies of language and improprieties of speech with which it abounds, I plead a very usual, but, in my case, truthful, excuse—the urgency of my professional duties. It was written hurriedly, but with as careful a reference to facts as leaves no doubt on my own mind of their historical veracity.

I take this opportunity of tendering my thanks to Messrs. McKenzie and McDonald for the use of St. Andrew's Hall, which they put gratuitously at my disposal; and I must express the obligation that I feel I am under to the large and enlightened audience which favored me with such marked attention throughout.

THE LECTURER.

Antigonish, Feast of St. Zosimus, 1867.

LECTURE.

MR. CHAIRMAN, LADIES, AND GENTLEMEN,—

You have done me the favor on two former occasions,—one of them so recent as to render an apology necessary on my part for appearing before you to-day; the other, a longer time previously,—you have done me the favor, I say it with gratitude, to listen with considerate attention to the remarks I then had occasion to make. To public lectures, you are by no means strangers. Time and again have the eloquence and talent of the country found means of expression in your hearing. Men have come before you to impart that literary and scientific instruction which the varied riches and profundity of their knowledge made it easy to communicate, and which the education and enlightenment of their auditors made it easy to receive and retain. To them you have listened with the pleasure of earnestness; for they spoke from the abundance of knowledge. *They* are not called on to be thankful, for they deserved your attention: the merit is their own. But for me, who feel that my offering is slender, and my contribution insignificant, to express thanks for the past is a certain duty; to ask the favor of attention in the present, an anticipated obligation.

It can be said with truth that the subject I have chosen is a hackneyed one; I do not pretend to assert that it is not; but yet, I feel justified in affirming that it is one on whose merits, continued discussion seems only to have accumulated confusion. I intend, you are aware, to speak of GALILEO, and especially of the policy pursued in Rome towards the person and opinions of that eminent astronomer. The whole subject, you will perceive, is historical. There is required no speculative analysis of abstruse principles, no deep research into philosophical lore, no hermeneutical converse with the sublime teachings of holy writ, to elucidate

its several parts. All that is necessary is a careful reference to contemporary authors, to facts, and to dates; just as we refer to Flavius Josephus to learn the particulars of the final destruction of Jerusalem, or to the "commentaries" of Julius Cesar, to obtain a description of the inhabitants of ancient Gaul. History, in that part in which it is a mere narration of facts, is the most simple of the sciences, the most easily acquired, the most easily explained, if it deserve even the name of science. The veriest dunce who has the ability to read from school, and the faculty of memory from nature, can attain to a knowledge of any specified subject, without the intervention of any other mental exertion. And yet it is remarkable that a historical falsehood, if once floated into currency, is more difficult of eradication than any other inaccuracy whatsoever.

When a philologist, or an astronomer, or a mathematician, falls into error, the error lives only until it is *once* detected. No person afterwards attempts to renew it. It becomes a forgotten word, and ceases for ever to mislead succeeding inquirers; but the historical mistake survives refutation, and, even after it has been exposed, and its falsehood clearly demonstrated in various ways and by various authors, men will not be wanting, and well informed men, too, to reassert it as confidently as ever, as confidently as if it never were called into question, as confidently as if it were conceded truth. The facts connected with the name of Galileo exemplify the truth of my assertion. A false version, for of two contradictory versions one is necessarily false, was once circulated; and, although several times since refuted by reference to prior narratives and original documents, it still finds believers by the million. Men, as a usual rule, are either unable or unwilling to undergo the labor of a thorough investigation; or else, blindly confiding in the veracity of a second hand narrative, they contentedly regard as history that which never existed as fact.

Nor is the example of Galileo unique in this respect. The fable of the Pope Joanna; the legend of Robert the Bruce and the persevering spider; the extravagant description of the coffin of Mahomet, as suspended in mid air; the scem-

ingly characteristic "Up guards and at 'em" of Wellington at Waterloo; the "All is lost but honor" of the French King at the battle of Pavia; the majority of the *bon mots* current as proceeding from the lips of the first Napoleon; the pretty episode of Jessie Brown at Lucknow in the last Indian war: these, and a hundred other similar fictions, which rise to recollection faster than language can express, are truth and history in the estimation of the ordinary public, although they are, in reality, as purely creations of some imaginative author's mind as the "Topsy" of Uncle Tom's Cabin, or the "Enoch Arden" of Mr. Tennyson's last poem.

The fiction, to which on this occasion I wish to call your attention, and which, I doubt not, you all have met in your casual reading, is this; that, firstly, the astronomer Galileo was himself subjected to barbarous chastisement for attempting to prove the diurnal revolution of the earth on its axis; and, secondly, that this scientific opinion was condemned by the Church of Rome as false, if not, heretical, doctrine. I shall examine the one and the other of these two assertions, and, if I mistake not, I shall demonstrate their historical untruth. To do this, I shall necessarily have to travel over a great deal of ground, refer very often to the accounts given by writers, and touch more or less at length on various questions of minor importance in themselves, but bearing directly on the general issue. You shall pardon me if my remarks shall be couched in language devoid of every element that goes to constitute that which is called oratory; for, my aim shall be to arrive at historical truth, caring little indeed for the language in which it may be expressed. I claim the privilege of substantiating what I assert, of proving facts on irrefragable evidence. Let others, if they will, sacrifice truth to felicity of diction; I shall sacrifice rhetoric to truth, and feel little concern for the sufferings of the victim.

To sustain my latter assertion—it is usually considered first in the order of chronology—that, namely, the Church of Rome never condemned the scientific hypothesis of the earth's revolution on its own axis, I must call up some universally admitted facts for consideration. Galileo was born

in Pisa in the year 1564, and invented the telescope in 1609; that is, in the forty-fifth year of his age. This invention enabling him to obtain a more correct view of the heavenly bodies, induced him to turn his mind to the study of astronomy, a study, I need not remark, at that time, not so well understood, or reduced to such exactness of detail as it is in our day. Of the various systems excogitated to account for the several effects manifested in the physical world, and bearing reference to astronomy, he embraced that of Copernic, or Copernicus, as he is more usually called; that is, in opposition to the general opinion of the age he lived in, he expressed his adherence to a system which he did not invent, but which he found developed in the published works of Copernicus. Now Nicholas Copernic, a Catholic Clergyman and a Canon too of Franenburg Cathedral, was born at Thorn in Prussia, in the year 1473, and died at Frauenburg in 1543; that is, Copernicus died just twenty-one years before Galileo was born, and sixty-six years before he became an astronomer. Therefore the system said to have been condemned by the Church of Rome in the time of Galileo, was actually published, and in a book, too, dedicated to the Pope by Copernicus at least sixty-six years before the name of Galileo appears in the catalogue of astronomers.

The person then who invented this hypothesis reputed to be condemned was a Catholic clergyman, filling an exalted dignity in the Cathedral Church of Frauenburg, and actually dedicating a defense of the system to the Pope. We can go still farther back to the times of that virtuous and learned man, Cardinal Nicholas de Cusa, who also publicly held the same opinion in regard to the diurnal revolution of the earth on its own axis, and this too, while he is highly honored in Rome, entrusted with the most important affairs, one of the council of the Pontiff, and eligible to the tiara. The Italian author, Libri, who has done more perhaps than any other man to perpetuate a false intelligence of Galileo's case; whose sympathy for Galileo was ardent almost to enthusiasm; whose enmity to Rome and everything Roman is manifested in almost every page he writes; who neglects no opportunity of accusation; who admits nothing in favor of

the Roman Court which can by any show of decent possibility be denied, admits this much. He says: "*Era già concesso al Cardinale di Cusa di sostenere il moto della terra, et al Copernico di pubblicarne la teorica, in un' opera dedicata al Papa.*" "It had already been allowed to Cardinal de Cusa to sustain the motion of the earth, and to Copernicus to publish that theory in a work dedicated to the Pope." We know on the same authority, that the literary society of the Lincei, in Rome, and Prince Cesi, an ardent Catholic, had adopted the Copernican system, and defended it with considerable warmth, after the publication of the works of Copernicus, it is true, but before the name of Galileo was heard of. And what is of more importance, the same Libri tells us that Cardinal Bellarmin shortly before the first appearance of Galileo in the Eternal City, referred the theory to the four most learned Jesuits in Rome, the astronomer Clavius being in the number, and that they did not reject it as contrary to faith. The words of Libri are: "*La loro risposta che venne publicata fa conoscere che allora non si rispingevano le nuove scoperte.*" "Their reply which was published informs us that they did not reject the new discoveries." Now Nicholas de Cusa was born in 1401, promoted to the cardinalate in 1448, and died in 1454. In other words, Cardinal de Cusa died just one hundred and ten years before the birth of Galileo, and one hundred and fifty-five years before the invention of the telescope by the latter, and his consequent adhesion to the Copernican system. I have a right to lay great stress on these facts.

The Church of Rome is eminently watchful over the doctrines professed and promulgated by her fold, and especially by such of them as she selects for positions of honor and distinction. Take up her history from Pelagius to La Mennais, and you will find that the moment a new religious opinion is broached by any of her children, a general or provincial council is immediately held, the new opinion is examined, and formally condemned if not in accordance with her tenets. Above all, you will find that the very suspicion of heresy or infidelity in any postulant for office or rank is an insuperable bar to promotion. The case is the same in all societies, religious or otherwise. Men of suspected loyalty

are never called on to guide the councils, or lead the armies, of the nation. The Episcopalians of England never nominate a Quaker to the Archbishopric of Canterbury, nor the Kirkmen of Scotland a Baptist or Roman Catholic to the Provostship of Aberdeen. The instinct of self preservation will prevent men and communities from committing their fate into the hands of persons whose fidelity they suspect. To suppose, therefore, that an opinion deemed false by the authorities of the Church of Rome, should be publicly held for over one hundred and fifty-five years by men distinguished in her service; that she would confer her choicest honors on these men; that she would single them out even in other countries, as De Cusa was singled out for the purple from among a thousand foreign bishops; that she would never make the least remonstrance against their sentiments, never ask the least explanation of their doctrines; that she would quietly permit them to use the influence and position, which they owed to herself alone, to propagate opinions she condemned, to undermine her own faith, and consequently loosen the hold she had on the public, is simply impossible. Yet she permitted all this; she performed all this, to the promoters of the Copernican system; therefore, she did not condemn that system. The argument is, in my opinion, conclusive; and the facts on which it is based are indisputable. I quoted Libri alone to support them, because he was an open, avowed enemy. I could, if necessary, quote just as many more as there were contemporary authors, and they are perhaps two score. I did not do so simply because no writer ever denied these facts. One hundred and fifty years, besides, is a long period. Even sixty-six years is a long period in the history of scientific or religious opinion. Sixty-six years ago, no steamship had crossed the Atlantic; half that time, or thirty-three years, ago, no Mormon had appeared in the world, and to-day, like the slain of David, they are numbered by tens of thousands. It is true that Cardinal de Cusa had few disciples, it is true that the publication of his ideas excited very little discussion; but such was not the case with Copernicus. No sooner does his work, the work dedicated to the Pope, appear, than the minds of astronomers, some favor-

able, more unfavorable, to his system, are engaged in studying his hypothesis. For sixty-six years the discussion goes on in the Eternal City itself. Church dignitaries range themselves, some on one side, some on the other; and yet, there is no interference on the part of the Church. And what is more remarkable is, that Copernicus found more disciples in Rome than in any other city, and more supporters among the priests and religious orders, than among the members of any other class. Still, no friar is passed over in the election to the abbacy, no priest in that to the episcopacy, because he is a Copernican. Hence, to suppose that the Church had condemned the Copernican system, would be no more reasonable than to suppose that the sovereigns of Britain and the two Houses of Parliament, for the long space of half a century, would quietly and openly permit the first minister of the Crown to initiate unmolested a line of public policy directly and avowedly tending to subvert the throne and abolish the Parliament; or, that they would permit him to endeavor to prove by public discussion the illegality of the sovereign's title, or the nullity of constitutional laws. From the fact, therefore, that no remonstrance was ever made against Cardinal de Cusa; from the fact that Prince Cesi, the astronomer Clavius, and the members of the Lincei institute, were admitted to the fullest communion in church privileges; from the fact that the disciples of Copernicus were equally eligible as others to offices and rank in church and state, it is allowable to infer that, down to the time of Galileo, the Copernican system was properly regarded as having no connection whatever with the faith of the Catholic Church.

I have now disposed of the time preceding the era of the Florentine astronomer. So far, at least, there has been no condemnation; and, from the fact alone, that a discussion was carried on in books, in pamphlets, in colleges, in Rome itself, for so long a period, without eliciting a whisper of approval the one way or the other, I might legitimately infer that the brand of heresy or falsehood was never stamped by the Roman authorities on the positive one of the two contradictory propositions discussed. Rome does not wait for lustres of years to express disapprobation when the faith of

her children is being weighed in the balance. Not in this inert way did she act towards Berengarius, or Abelard, or Scipio Riccio, or towards Gioberti and Passaglia, in our own day. She is more energetic than that, and the least suspicion of adulterated doctrines arouses all her energies on the instant. With her in matters of faith it is yea, yea, or nay, nay, and that, too, without the delay of a moment. She knows no middle course in revelation. She exists by the principle of authority, and, however wide the latitude, however extensive the arena, she allows to scientific combatants, she promptly represses the least attempt to overstep the bounds. The province of determining what is and what is not, faith, is reserved exclusively for her head and her councils, and she never hesitates to unsheathe the spiritual sword of censure and excommunication against the trespasser on the sacred domain. This is the principle, the theory, the hidden spring of her action; and we will find that the case of Galileo does not afford an exception in fact to a canon in theory.

But I am digressing from the point at issue. From what I said it will be evident that, at the time I speak of, the Copernican system was discussed as any other scientific hypothesis, not yet a certainty, might be discussed by scientific men. It was discussed in the same manner as Dr. Gall's system of phrenology is now being discussed. It was not yet proved as a truth, nor rejected as a fallacy. The restless ambition of one celebrated man changed the aspect of the question, just as we may imagine some celebrated phrenologist to arise now in the world, and push the opinions of phrenologists to an unwarrantable extent. Suppose that some distinguished believer in Gall and Spurzheim were in our day to maintain that the truth of phrenology was revealed in Scripture, or, that the passions as defined by the protuberances of the cranium were so powerful in their influence as to conquer the resistance of the free will, or to eliminate it entirely;—suppose this, I say, and is it not evident that the status of phrenology would instantly be changed? that the question, now properly regarded as purely scientific, would assume a religious aspect, and pass from

the domain of natural belief to the province of revealed religion? Were such really to happen, is it not certain that any person maintaining the principles of phrenology thus metamorphosed would be of necessity excluded from spiritual communion with the members of any denomination that asserts the free will of man as an article of religious belief? What I here suppose as occurring to the system of Gall, under the auspices of an imaginary individual of our day, is precisely what occurred to the system of Copernicus two hundred and fifty years ago; and the person who effected the change was no other than Galileo the astronomer. It may seem strange that a man of his mighty genius and capacious intellect should busy himself in a matter so unworthy his reputation and his attainments; but, it is true as strange. Extraordinary, indeed, would it have been if Newton were to assert that the theory of fluxions is contained in the revelations of holy writ; but this is exactly similar to what Galileo asserted, and seriously insisted that mankind should believe. Let us hear what Guicciardini, the historian, the friend and contemporary of Galileo, and, at that time, the Tuscan ambassador in Rome, says; and, be it remembered, that he was the avowed defender and disciple of the astronomer, and the unscrupulous enemy of the Papal Court, as his history in nearly every page testifies. In an official despatch dated 6th March, 1819, he asserts that Galileo "demanded that the Pope and the Holy Office should declare the system of Copernicus to be founded in the Bible." "*Domando Galileo che il Papa ed il Sant' Ufficio dichiarassero il sistema di Copernico fondata sulla Biblia.*" Mallet du Pan, an impartial Protestant writer, astonished and incredulous when he first read this request, went all the way to Florence, searched the archives of the Foreign Office there, and published to the world that he found the words in the original document in the handwriting of Guicciardini. Libri, too, another of the apologists of Galileo, tells us the same thing in other words. He tells us that Galileo "wished above all things to prove that heretofore the Scriptures were falsely interpreted." "*Voleva soprattutto provare che sino allora si erano mal interpretate le Sante Scritture.*" He tells us, further,

that Galileo published this strange opinion in letters and pamphlets, which he caused to circulate among a vast number of readers. It is not for me to remark that two very incongruous assertions are combined in this opinion of the great astronomer. Who does not know that an opinion may be scientifically true, and yet to assert that it is contained in the Bible may be false? Scientific truth, I admit, can never come in collision with scriptural or revealed truth; but, at the same time, there are truths in natural science not to be discovered in the sacred pages, just as there are truths in the sacred pages not to be discovered in natural science. The error of Galileo was, not that he affirmed the Copernican system as truth, but that he affirmed it as revealed truth, and carried his assertion to the very verge of heresy. This mode of procedure on his part, naturally enough, provoked much criticism. Some men there were, more fanatical than judicious, who turned his weapons against himself. Arrayed with a vast number of texts, in which it is asserted that the sun rises and sets, performs a daily course, &c., &c., they maintained that the Copernican system was condemned by holy writ. In this, I am free to admit, they erred; but Galileo, by maintaining that the same system is actually inculcated in the Scriptures, and, particularly in the books of Joshua and Job, erred just as grossly, though in the other extreme. Others, again, like the Jesuits in Rome, and the illustrious Bellarmine, maintained, as Copernicus himself maintained sixty years before, that neither one system nor the other was revealed in the Bible; and that, consequently, the question must be left to be decided by scientific arguments. Others again, particularly Florentines, attracted by the great fame of Galileo, avowed a full belief in the *ipse dixit* of their celebrated countryman. A violent controversy was soon excited: Italy was flooded with pamphlets; France, Spain, Holland and Germany shortly after were drawn into the contest; the scientific hypothesis was little thought of, when men got wrangling about a dogma. No dispute is so bitter as a religious one, none so long protracted, none calculated to arouse more angry and vindictive feelings. Why, it is only now, after three hundred years of continual quarrelling,

that men will be found to clasp the warm hand of fellowship in furtherance of a social or scientific cause, without asking their associates whether they believe in falling from grace, or the doctrine of foreordination. These feelings, which always underlie weak human nature, were lashed into madness at that time by the unaccountable bearing of Galileo. The inquisition then, but not till then, interfered, not, as I shall show you, to condemn or to affirm a scientific truth, but to terminate a religious dispute, which was really striking at the veracity of the Bible. Silence was imposed on Galileo, in a celebrated decree, in the year 1616. Now, as it is this decree of the Inquisition, or the Holy Office, which has given origin to the impression that the Catholic Church condemned the Copernican system, or, rather, as some modern English writers confidently appeal to it to confirm that impression, I shall examine it carefully, and determine precisely what its object was, and its meaning. Libri, Mallet du Pan, Bartoli, and a host of other writers, testify that this decree was everything ever done in the way of condemning the Copernican system.

Now, what is its value as against the action of the Church? Put it at its worst and suppose that the Holy Office really wished to condemn, not Galileo's method of argumentation, but the scientific hypothesis he sustained, the Copernican system itself. Will it follow, from this, the worst possible view of the case, and a false one too, as I will shew you just now, will it follow, I ask, that the Church condemned the system itself, independent of the relation to the scriptures which Galileo's insane argumentation fastened thereto? I answer NO, decidedly not. It would indeed follow, if this view of the question were correct, that the council of the Inquisition was in error; but the inquisition is not the Church. It is simply an inferior tribunal in the Church instituted for a specific purpose, the preparatory examen of opinions; but it is not clothed with the power of giving a definitive sentence. It is analagous to a county court in Britain, whence an appeal lies to a higher tribunal, and thence to the general Parliament. What would be thought of a writer who would accuse her Majesty and the high constitutional

authorities of the realm of murder, merely because a grand jury brought in a true bill, or even because a judge at the assizes, through ignorance or malice, if you will, condemned an innocent man to the gallows? Yet equally reasonable would it be as to hold the Church of Rome responsible for a decision made by the inquisition, made by subordinate officials in the interests of that Church, in an inferior judicial capacity. Catholics indeed maintain that the solemn verdict of a general council ratified by the Pope, or even the authoritative decision of the Pope alone in his capacity as universal teacher, defines faith and admits no appeal to any power on earth, but they never dreamed of asserting that the action of any minor council or congregation, devoid of that august and supreme sanction, is infallible. Were I to assert that the Episcopal Church of England condemned the theory of the circulation of the blood, merely because Dr. Clarkson, Archdeacon of Canterbury, attacked this theory when first published by Casalpino, as leading to infidelity, I would act precisely as those act who attribute a decree of the inquisition to the Church at large. The Inquisitors are not even Bishops, much less are they the entire *Ecclesia docens*. Had Harvey not demonstrated what Casalpino previously published as an hypothesis, it is natural to infer that those who now sympathise so much with Galileo, would be accusing the Church of infidelity for not condemning Casalpino's opinion.

I do not, however, admit that the decision of the inquisition was unjust, or tyrannical, or false, or inexpedient, or even unnecessary, in any sense whatever. I believe that their action admits of a solid defense. Either they condemned the system itself, or they condemned the mode of sustaining it, inaugurated by Galileo. If the latter, I ask what course of procedure could be more just and more dignified than to terminate a controversy which engendered a vast amount of ill-feeling without tending to any good purpose imaginable, and virtually aiming, not at the denial of any Roman Catholic doctrine, but at the veracity of scripture itself? If Galileo were content that his system should be left to the arbitrament of the scientific world; content with the perfect tole-

ration heretofore shown it and its supporters; content to leave the arguments heretofore adduced, and those which chance or more extended investigation in the future would adduce to carry their own weight in its favor; content to leave the matter where it ought to be in the arena of science; if he did not endeavor to elevate it to the dignity of a dogma, the career of Cusa, Copernicus, and others, abundantly show that he would never have been interfered with except to be honored. But he chose to act otherwise. He chose to mix it up with revelation, and his action was productive of a bitter and uncharitable paper war, which degenerated from the legitimate discussion of a scientific question to a deplorable interchange of unwarrantable personalities and scurrilous epithets. The decision so much complained of actually prevented the temporary introduction of a new religious sect. That, as a matter of fact, only the method and not the system was condemned we know from the testimony of Libri, and the very tenor of the injunction communicated to Galileo by Cardinal Bellarmin, the president of the Inquisition.

Libri tells us, it is true, that Bellarmin and the inquisitors believed the Copernican system to be false, but afterwards, unwittingly, no doubt, he assures us, that Galileo applied to Bellarmin for a certificate that the system itself was not condemned, and that he received it. Contemporary authors support Libri in this, and nobody ever denied it. Now, if the inquisition condemned the system *pur et simple*, no one could naturally be better aware of the interdict, than Cardinal Bellarmin, its president, and Galileo the astronomer, whose action was the occasion of eliciting a decision at all. Yet both these illustrious personages, so much interested in the matter, are evidently in ignorance of any such condemnation; or else, they despise it if it really exists. Neither hypothesis is consistent with the fact of a contrary verdict in the Holy Office. Cardinal Bellarmin would not ignore his own action; Galileo could not ask him to assert a falsehood in anybody's favor, much less in favor of a hated heretic, as he himself on this supposition would be.

We have other means, however, of arriving at the true intelligence of this decision. Bellarmin, in his official

capacity as president, communicates the will of the council to Galileo. He does so, too, by the express command of the Pope, as he himself assures us. And what are the words of the injunction as registered in the records of the Holy Office? "*Di non parlare più di questi accordi scolastici fra i libri Santi e Copernico;*" that is, that Galileo should "not speak any more of these casuistic points of agreement (he finds) between the Holy Books and Copernicus." He further explains the injunction by saying expressly that Galileo "has not been punished," I quote his very words, "that he is not even obliged to make a retraction of the system, but that the Inquisition exacts that he desist from any further inculcation of his mode of sustaining it."

But what puts the matter beyond all doubt is the action of the same inquisition in the year 1620. In view of the fact that Galileo's method of defending the system was already censured, an explicit declaration was required by interested parties of the Holy Office as to the religious bearings of the system itself. The Inquisition again deliberates on the matter, and formally declares that everybody who chooses may sustain it as an hypothesis, but forbids anew the presumption that it is an hypothesis that can be deduced from scripture. Therefore, from what I have said, it is inferible; from the tactics pursued before and after the event by Galileo: from the testimony of Libri; from the very registered words of the injunction; and from the subsequent action of the Inquisition itself, that there never was the least intention to condemn the system independent of the doctrinal errors which Galileo contrived to engraft thereon. I may add as a concluding proof, that Galileo promised compliance, returned to Florence, continued unmolested to teach the system as an hypothesis on scientific grounds for seventeen years, but that on again renewing in 1632 and 1633 his attempt at scriptural proof, he is then, but not till then, again summoned to appear at the Holy Office. Is not the chain of evidence here complete?

Let us now again revert to the other hypothesis. Let us suppose against the evidence of history that the Inquisition, not the church, though—the distinction is of the last import-

ance—let us suppose, I say—as I supposed for argument's sake a moment ago,—that the inquisitors really believed the Copernican system to be false. Must they on that account be traduced for exceptional ignorance, and held up to the scoffs and jeers of every petty scribbler who chooses to rush into print in this nineteenth century? Far is it from my mind to utter an affirmation. To form a correct opinion of bygone times, it is necessary to call bygone circumstances to recollection. No one represents Julius Cesar or Napoleon Bonaparte as a novice in the art of war, because the former knew nothing of fire arms, and the latter was ignorant of the destructive efficacy of the needle-gun. They were still resplendent geniuses in military science.

Human knowledge fluctuates with times and with seasons. One century produces men eminent in one line of scholarship; another, in another. Astronomy and mathematics, as well as language and literature, or poetry and music, have their golden and their iron age. Shakespeare appeared three hundred years ago and never has had a successor. St. Thomas Aquin appeared five hundred years earlier, and the profoundest of philosophers since scarcely ever acquired knowledge enough to interpret him. Schools and colleges do a great deal, I admit; but God alone can furnish mankind with a prodigy. Science, it is true, has its eras of progress, but it has its dark eras also, and will have them in spite of men and their labors. Millions of men with better opportunities than either Leibnitz or Fenelon have appeared since their time; they were as industrious as they; they had advantages not then dreamed of; but, though they had lived and studied generations after their contemporaries were borne to the grave, they could not write the "Systema Philosophicum," or give to the world the inimitable Wanderings of Telemachus. That one century is more advanced in science, another more restricted, is not the fault of man, but the necessity of nature. Great scholars, like great warriors, have usually appeared in contemporaneous groups. Hence, then, if we wish to judge correctly of the scientific action of any man, or of any body of men, we must first view the circumstances in which they were placed; we must measure

their attainments by a relative, not by an absolute, standard; we must judge them according to the means at their disposal, and the opportunities permitted them to embrace. On this principle let us judge the much abused decision, supposing, but not conceding, for the moment, that it involved the condemnation of the Copernican system. Cardinal de Cusa, it is admitted, sustained it as an opinion one hundred and fifty years before; Copernicus eighty years later published it to the world; but how was it received by the learned generally? Some Jesuits in Rome, the members of the Lincei, and Prince Cesi, rather warmly defended it; others accepted it as an hypothesis, pretty much as Herschell or Bull in our days may be imagined to believe that the planets are inhabited. Tycho Brahe, the famous Swedish astronomer, pronounced it false, and made calculations independent of it—correct ones, too—which, having been developed by Kepler, are well known to every astronomer as Kepler's laws; Francis Bacon, Lord Verulam, of England's sages "the glory and the shame," laughed it to scorn, as subversive of natural philosophy altogether; Gassendi did not feel sufficiently assured of its solidity to adopt it; Des Cartes admitted only a portion; and yet who would traduce Tycho Brahe, or Kepler, or Bacon, or Gassendi, or Cartesius, as ignorant? Are they not celebrated as the great lights of science in their day and generation? Add to this, that Galileo introduced no new argument in its favor other than the pretended scriptural warrant, and the ebbing and flowing of the tide; neither of which, in the opinion of all the philosophers since, has the most remote connexion with the point to be proved. Add to this, that the salient arguments, on which later astronomers chiefly rely, were then unheard of. Nothing was known of the varying oscillation of the pendulum according to the variation of the latitude; nothing was known of either the depression of the earth at the poles, or of the tumid enlargement of the waters at the equator. It was not even hinted at, that the surrounding atmosphere revolved with the globe of the earth. The orbits of the planets round the sun were considered perfectly circular, and not elliptical; the inclination and ellipticity of the earth's axis

was yet to be discovered; and even Copernicus was obliged to suppose a vague and indefinite third motion of the earth to explain the vicissitudes of the seasons. Add to this, that eclipses were calculated, navigation exercised, and all the practical uses of astronomy perfectly understood, without any recourse to it. Add to this, that the words of Scripture taken in their literal sense would militate against it; and that it was a time-honored hermeneutical canon, dating from the days and authority of St. Augustine, always to understand Scriptures in their plain literal signification, except where proof exists that they must be understood figuratively; or, in other words, where a literal meaning would involve a palpable absurdity. Therefore, at the time of the decision, the data furnished were not such as would necessitate the concurrence of learned and judicious men. More extraordinary still, there is yet extant in the archives of Rinuncini, in Florence, an autograph document of Galileo's, in which, in his old age and in the perfect enjoyment of complete freedom, he deliberately asserts his own disbelief in the system he so long sustained. Cesare Cantu, the living Piedmontese historian, and a member of the Piedmontese Parliament, an avowed liberal in opinion, and recognized as a patriot by the Italian party now opposed to the Holy See, describes this document in these words:—

“Ho letto nel richiùssimo archivi Rinuncini a Firenze un autografo di Galileo degli ultimi anni di sua vita, dove qual che ne sia la ragione si rieder e disdice della teoria Copernicana, e mette in evidenza gli argomenti fisici che ve lo indussero. E per verità erano tali che un savio non poteva acchetarsi del tutto in questa sentenza, come sarebbe impossibile il dubitarne oggi dopo gli argomenti d' irrecusabile evidenza, che i contemporanei di Galileo ignoravano.”

Now, I will give a literal translation of these words, and I will ask you to pay special attention to the language of the writer, himself no friend of the Popes, a judicious and impartial critic, however, and perhaps the very ablest historian in modern days. The words are: “I have read in the very rich archives of Rinuncini in Florence an autograph of Galileo's, in the last years of his life, in which, let the reason be what it may, he retracts and denies

the Copernican theory, and places in evidence the arguments which induced him to do so; and, indeed, they were such that a *savant* (savio) could not acquiesce in the entire of the system; just as it would be impossible to doubt of it (in truth) to-day after the (production of) arguments of unconquerable evidence of which the contemporaries of Galileo were ignorant." This autograph reveals a great deal. It proves conclusively that the Copernican system was then a mere hypothesis, unsustained by arguments further than as many as rendered its truth merely possible. Galileo's great mind pondered over these arguments, studied them deeply for thirty years, and at the end of the time pronounced them inconclusive. If we choose to look deeply into that which constitutes real power of intellect and vastness of comprehension, we will find that this conclusion on the part of Galileo showed actually more philosophical ability than all the assertions he made in favor of the system. As a matter of fact, the proofs adduced were insufficient. Consequently, when he relied on them, he erred. The conclusion of his syllogism was truth, to be sure, but it did not follow from his premises. When he imagined that it did, he proved himself ignorant *in quantum* of logic. Not the assertion haphazard of what afterwards turns out to be truth, but the necessary deduction of effect from cause, or of cause from effect, betrays the profound philosopher. The general who wins a battle by mistake is entitled to little credit; he who attributes victory to causes that did not produce it, to none at all. But to return to the inquisitors. If they had affirmed the system, indeed, on the strength of the evidence adduced in its favor, the charge of ignorance could certainly be brought with some show of reason against them. Acting as they are supposed, in the most unfavorable view of the case, to have acted, they can only be said to have condemned what the great mind of Galileo, after a lifetime of study, condemned as cordially as themselves. That jury which gives a decision according to evidence, and yet not true in fact, is more enlightened than another, which decides against evidence, and still chances to give a truthful verdict.

So far have I spoken of the system in relation to the Church. Now I shall speak of the astronomer who sustained it in relation to the same institution. I intend to speak specifically of the impression generally received, and like the anger of Juno, *alta mente reposta*, that Galileo suffered personal torture at the hands of the Roman authorities with the connivance, and at the instigation, of the Jesuits. A letter purporting to be in the hand writing of Galileo, and addressed to his friend and disciple Father Receneri, was published towards the end of the last century by Tiraboschi; and in this letter the celebrated astronomer is made to affirm in the most unequivocal terms that he himself was subjected to the most barbarous physical torture on the occasion of his visit to Rome in the year 1634. This letter is the only evidence ever adduced to substantiate the charge against the Roman authorities. I undertake, however, to prove it false; further, I unhesitatingly pronounce it a forgery. I shall give my reasons in the sequel. The charge of forgery is a serious one I am well aware; it ought not to be made lightly; but, in the interests of truth one cannot sometimes be very choice in one's terms, or very tender of the reputation of such persons as grossly violate the laws of morality.

Let us review the facts of the case. In the year 1632, Galileo, who had been residing continuously in Florence for nearly seventeen years after the date of the celebrated decision in 1616, published a work entitled, "*Dialoghi quattro sulle sisteme massimi del mondo, il Tolemaico ed il Copernicano*;" or "Four dialogues on the great systems of the world, the Ptolemaic and the Copernican." In this work, known as the "dialogues of Galileo," the forbidden scriptural method of argumentation is renewed, contrary to the solemn pledge given by himself. Naturally enough, this proceeding on his part excited the same passions, and provoked the same style of antagonists, that made such a commotion on his first appearance in the character of a theologian. He is again cited to Rome, to answer for the consequences ensuing on his violation of his word. He is tried, and, of course, found guilty; he makes an ample retraction, not of the system—that is not required,—but of the false interpretation he made, in his

“ dialogues,” of the words of scripture to sustain it. In a word, he is tried on his merits as a theologian; not for his views as an astronomer. The current belief in some quarters is, that the punishment of his fault was personal torture. That belief is based on a false conception of facts, as I will demonstrate.

Galileo remained altogether five months in Rome. From his arrival until the 12th day of April, he is the honored guest of his firm friend Nicolini, the Ambassador of his own native country. From the 12th to the 30th of April, he is in the palace of the Trinità dei Monti by order of the Roman council, while his case is being discussed. From the 30th of April to the 20th of June, no decision having yet been determined on, he is again the guest of the Ambassador. On the evening of the 20th June, he is sent to the rooms of the inquisition, where he remains one night, and on the following morning, the 21st, he walks on foot to the Minerva Church, in which he makes a most unqualified abjuration of his error. He returns the same day to the hospitable lodgings provided for him at the palace of the Ambassador, leaves almost immediately for Florence, writes a letter to the Ambassador on the 25th of June from Viterbo while on his return, and arrives home in Florence at the end of the month. He never visited Rome afterwards. All these dates are important in the investigation; their truth is testified by all the authors, without exception, who have made reference to the subject. Now, then, if he were subjected to torture at all, it must have been either while he was the guest of the Ambassador, or sometime during the twelve days he was at the Trinità dei Monti; or, finally, it must have occurred on that one night which he passed in the inquisition. This threefold division exhausts and embraces the whole time of his stay in Rome. From it, however, I must eliminate the time of his residence with the Florentine Ambassador; for he was then altogether removed from Papal control, and the guest of a bosom friend, who, besides, had special commands from the Grand Duke of Tuscany to do the aged astronomer honor. To suppose that he then suffered torture is

impossible, and, particularly, to suppose that he suffered from the decree of a Roman tribunal is more than absurd. That he would be subject to cruelty while under an ambassador's roof, is so outrageous a supposition, that no writer whatever ever dared to affirm it. We must also eliminate the twelve days he passed at the Trinità dei Monti; firstly, because it is a thing unheard of in Roman jurisprudence that any person be punished until after his trial, and his trial was not yet concluded,—the verdict affirming the violation of his pledge was not given in until several days after he left that place of residence; secondly, because Galileo himself, immediately after his arrival in Florence, writes a long and detailed account of his sojourn and trial in Rome to his friend Receneri, and the letter, which is still extant, contains the following words: "The Pope believed me worthy of his own esteem. * * * I was lodged in the delicious palace of the Trinità dei Monti, with full permission to ramble through ample spaces, and I was served daily by the most courteous attentions of the household of the ambassador and his lady, who were most watchful to supply me with more than abundant comforts." "*Con libera ed ampla facolta di passeggiare per spazu ampli, e servito giornalmente dalla cortesissima casa del Signor Ambasciatore, e della Signora Ambasciatrice, invigilantissima in tutte le commodita, anco per me sopraabbondanti.*" Nor is this testimony of Galileo unsupported. Nicolini, the ambassador, in an official despatch to the Grand Duke, corroborates it in its entirety, adding, at the same time, that when, at his Highness' request, he asked of the Pope as a personal favor that Galileo should be treated with distinguished consideration, his Holiness replied, "*di aver fatto per ogni abilita al Signor Galileo in riguardo all'amore che essa porta al serenissimo principe;*" "that he had already ordered every attention to be shown to Galileo, on account of the high estimation in which his Holiness held his Serene Highness, the Grand Duke." Therefore, there was no torture while he was at the Trinità, on the testimony of Nicolini, and, better still, of Galileo himself, in a letter published shortly after his death, and of whose genuineness there never existed a breath of suspicion.

There remains yet that one night at the Inquisition to be accounted for, and it is fair to add that the spurious letter I before alluded to specifies this one night as the time, and the rooms of the Holy Office as the scene, of the cruelties supposed to have been inflicted.

We have, however, other data, independent of the proof of forgery, to refute the calumnious assertion. First, then, Galileo himself, in a letter certainly genuine and authentic, describes all the incidents of his Roman residence, and yet never once alludes to torture, but several times speaks highly of the reception accorded to him by orders of the Pope, and of the treatment received at the hands of the council. He never breathes a word which could show that he felt that he was unjustly dealt with; but expressly tells us that he made a voluntary retraction; secondly, Nicolini the ambassador, instructed by the Florentine Court, to give a minute account of the trial of his friend, never even hints at the suspicion of torture; thirdly, the "*atti ufficiali*" or records of the Inquisition, in which even the most minute circumstances occurring within its walls are noted down, are equally unaccountably silent; fourthly, contemporary historians and biographers of Galileo for over a hundred years, are silent on the point without a solitary exception; fifthly, the case of Galileo created a vast amount of controversy,—friends and foes, some of them in pamphlets, others in letters, flood the country, some in his defence, some to the contrary, and still, only at the end of the last century, long after the death of Galileo and all the parties concerned, when the spurious document appeared, is there mention made of torture for the first time. It may be further observed that the members of the council before whom he was tried were not members of the inquisition. They were a new and a special council, constituted by the Pope in regard to the celebrity of his character for his case alone. This special council consisted of seven Cardinals; men eminent for many illustrious qualifications; highly refined and accomplished princes of the church, who walked in the very highest paths of the most elegant society in the world; whose power was morally restrictive rather than physically coercive. Galileo himself praises them for

the urbanity of their conduct. They were men, of whom of all men living it would be most unreasonable to expect cruelty, barbarity, or even harshness, particularly after the injunction received by the Pope to use every leniency towards the celebrated individual on whose conduct they were to sit in judgment. Besides, Galileo never saw the interior of the Inquisition at all, until, under the direction of this council, he appeared there on the evening before he made his retraction in the Minerva Church in presence of a large audience. Hence, it is presumable that they had previously come to a mutual understanding as to the time and manner of the retraction; for, otherwise it is impossible to account for the large crowd that collected to hear it. If so, and if a retraction was all they required, which the fact proves to be the case, then, it is incredible that they should order *him* to be tortured after he had acceded in the most satisfactory manner to their request. If not, how can we explain the fact that all Rome crowded to hear the retraction in the morning if Galileo had determined to make it only on the compulsion of torture during the night—a few hours—before. Another observation is, that Galileo at the time was an old man of seventy years, worn down by the infirmities of age and by long severe fits of previous sickness. Now, as Signor Alberi well remarks, he would not if tortured be physically able to go on foot the following morning from the Holy Office to the Minerva—no short distance as I well recollect—remain there for two hours on his knees, depart almost immediately on his journey home, and write three days after as Galileo writes from Viterbo to the Ambassador Nicolini, that he walked for recreation's sake, "*quattro miglia a piedi con un tempo Freschissimo ed in assai buona salute*"—"four miles on foot—in most excellent health."

Lastly, the very words of the sentence of the council were written down at the time, and are still extant. They have been often published. They are that Galileo should make a retraction; or else, in default, should say the seven penitential psalms once a week for three years. Thus, then, the entire time of his stay is accounted for, and his punishment proved to be, not the application of the thumb-screw, or cat-o'-nine

tails, but a very salutary, though mitigated, hebdomadal dose of the Bible. Torture, there was none. Imprisonment even, in the strict sense of the word, there was none. The punishment was as mild as was by any possibility compatible with the reiterated violation of a solemn pledge in very aggravating circumstances. The singing of a Jacobin song in England a century later, or of a secession ditty, two years ago in the United States, would be followed by consequences much more terrible, and yet Englishmen and Americans sometimes affect to shudder at the atrocities committed by the Jesuits on Galileo. If it be asked, by what right the council called a foreigner to account, I answer, by the laws of Florence and Rome, laws whose validity the Florentine Ambassador acknowledged, and in whose justice Galileo acquiesced by a voluntary fulfilment of their provisions.

I do not intend here to utter one word either as to the expediency or in expediency of the legislation that rendered a foreigner personally amenable for his published opinions to a Roman tribunal. I simply regard the action arising out of this juridical proviso, as I would regard the law process of any other court, that is, with a view to its formality and its justice. Waiving, for a moment, the consideration of religion's right, let me examine it as an article of international law. It is certainly competent for the authorities in any state in certain cases to leave their subjects to the jurisdiction of neighboring governments. An American who contracts debts in England may be incarcerated in an English jail in default of payment, even although imprisonment for debt is abolished in his own native state. The case of General Fremont a few years ago in London proves this; and, at the same time, it shows that the American government considered the procedure just; for, the Secretary of State at Washington, when applied to, refused to interfere in the matter. Many American citizens have been condemned as Fenians a month ago in Canada for actions, it is true, perpetrated on British soil. But is it not competent for the United States to make them amenable, if they choose, to British justice for these same actions perpetrated on American soil? During the secession war British seamen were

held responsible to American tribunals for exploits, whose locality was the Indian Ocean. Nobody, however, denies the legality of the international provision. If then the Courts of Florence and Rome combine in making Tuscans personally amenable to a Roman tribunal, what jurist will justly deny that they have a legal right to do so? That the practice of to-day is to the contrary, and does not exemplify the procedure, proves, not that the right does not exist, but that statesmen do not deem it expedient to exercise it. Practices change in international law, but the rights of the supreme authority are immutable. I make these remarks merely to meet an objection, not directly referring to my thesis, but still not altogether unconnected therewith. Thus, then, end my remarks on the fiction of the torture, and the history of the sojourn of Galileo in Rome.

But what of the pretended autograph published by Tiraboschi, and asserting the existence of torture? If I prove it a forgery, all the usual rhodomontado about cruelty falls to the ground, independent of the other proofs I adduced; for, on its authenticity alone does the entire accusation rest. No other contemporary writer whatsoever insinuates a word to sustain this accusation; the first writers who make the charge lived a century later than Galileo, and appeal to it, and to it alone, for a substantiation of the assertion. This letter bears, I admit, a certain resemblance to the handwriting of Galileo. Let this much be said in favor of its authenticity. But against it there stands the fact, that we have a series of letters from Galileo, to the same Receneri who is correspondent in this,—letters published long before this, and revealing a number of statements directly the reverse; we have letters, too, of Galileo's to other parties equally irreconcilable in their statements, to those of the letter in question; against it stands the testimony of Nicolini, the ambassador, and eye-witness of all the transactions; against it stands the sentence inserted in the records of the Holy Office; against it stands the silence of all the contemporary historians and annalists, that noted down all the incidents of the trial as of a *cause celebre*; against it stands the silence of all the biographers of Galileo for over one hundred years after

his death, several of whom were intimately acquainted with him during the last days of his life; against it stands the deservedly suspicious circumstance that it never appeared in print for upwards of a century, while many of his other letters were made *juris publici*, almost immediately after he died; against it stands the unaccountable supposition it contains, that, namely, Galileo, whose name was in every body's mouth, whose science was the theme of every body's praise, should be tortured in a public court of justice, and the entire world remain ignorant of the fact, until after three generations had been carried to the grave, and this, too, in the full blaze of a historic age. *Credat Judeus?* In its favor nothing can be said but a certain resemblance in the hand-writing, which, however, if well considered, amounts to nothing at all in the circumstances; for was there ever a forger who was not expert at imitation? To say that it is a forgery is simply to say that it must be like the handwriting of the person whose name it bears. On the ability to make a good resemblance, and on that alone, must the forger always rely for success. Forgery could never be proved as a crime, if a resemblance in handwriting were proof of innocence. There is then nothing in favor of the document, but what could be urged with equal reason in favor of every other forged document that ever existed in the world. There is against it all the considerations to which I have already referred; and, lastly, there is against it the fact that, if it were genuine, Galileo would have ruined his own character for veracity, *chez Receneri*, *chez* the very man, and that man a bosom friend and a priest, whose good opinion he wished above all others to conciliate. Am I not right in pronouncing this document a forgery?

One question more remains to be investigated. What was the connection of the Jesuits with the affair? My answer is, simply, none whatever. Libri himself, the avowed enemy of the order, testifies that in the beginning they were favorable rather than otherwise to the hypothesis of Copernicus; that the four Jesuits consulted by Cardinal Bellarmine did not reject the system. At the second, or last, convocation of a council in the affair, the judges were seven

Cardinals, no one of whom was a Jesuit, for the very good reason that there was no Cardinal of the order at the time. Libri mentions the names of those who opposed Galileo; they are Grazia, Colombo, Corrempo and others, but there is no Jesuit in the entire catalogue. Galileo never alludes to them. Contemporary authors assert that they took no part in the matter whatsoever, further than that one of the order, Schreiner by name, and a Dutchman by birth, and living, not in Rome, but in Holland, published a work in opposition to the Copernican system. This work was never recognized by the society as embodying any other than the author's views. It made very little noise in the great paper war carried on at the time, and soon after fell into oblivion. It was not directed against Galileo, nor had it any connexion with his appearance before the council of Cardinals in 1634. The fact is, that the Jesuits exhibited the proverbial prudence of the order in the whole transaction. They did not reject the opinion of Copernicus because succeeding discoveries might be made to substantiate it; they did not accept it because so far the proofs were not sufficient to put it beyond doubt, and the objections against it were not satisfactorily solved. The learned among them studied it, but hazarded no conclusion; until, shortly afterwards, Jesuit astronomers astonishing the world by the variety, the profundity, and the correctness of their astronomical knowledge, removed the last prudent doubt of its truth by the sanction of their authority.

My task might well end here. I believe that I have demonstrated on indisputable authority, that the Catholic Church never condemned the Copernican system; that the action of the inquisition did not extend so much to the system itself, as to the unwarrantable method adopted by Galileo in its defence; that, even if it did so extend, the Church generally cannot be held responsible for the error; that the error, if error there were in the action of the Inquisitors was natural enough in the circumstance, and not by any means a reproach to their memory; that Galileo, instead of being cruelly tortured, was treated with signal clemency according to his own showing; and, lastly, that the Jesuits had no part or act in the transaction one way or the other.

All this I have deduced from the testimony of men adverse to the court of Rome in the matter; from the official despatches of the two Florentine Ambassadors; from the letters of Galileo himself; from the elaborate investigations of Mallet du Pan; from the admissions of Libri; from the researches of Alberi and Cantu. I have not quoted one line from any writer who could be suspected of partiality to the Roman authorities. They were not needed. They could be had, men of stainless reputation for truth, and distinguished for industry, but I passed them by. My case was good without their aid. Such men alone, as cannot believe anything good in Nazareth, will, on a careful reference to authorities, reject the conclusions which I have established.

There yet remains a few remarks to be made, which, perhaps, are not demanded by the nature of the question I intended to treat, nor yet are they entirely alien to the subject. If you will have patience with me a few moments longer, I shall give you a short account of the life of the eminent man whose action has elicited this lecture. I shall be very brief. Galilei Galileo was the illegitimate son of Vincent Galileo, a Florentine nobleman, celebrated for his knowledge of two seemingly incompatible sciences, mathematics and music. Towards the future astronomer, notwithstanding the stain on his birth, he always exhibited a most tender paternal affection. He procured for him the best masters in his own favorite sciences, and, what is remarkable in Italy, he found his child totally incapable of acquiring a good knowledge of music. The first intention was to educate the youthful philosopher for the medical profession, but the study of mathematics had too many attractions for the bent of his mind, and, we find that during a vacation he resolved to abandon medicine for ever and devote himself exclusively to mathematical pursuits. He carried his resolution into effect. At the age of twenty-four he obtained a professorship of philosophy in Padua, the duties of which he filled with increasing applause for eighteen continuous years, during which interval he made several discoveries, the hydrostatic balance, the thermometer, and, according to some authors, the rules regulating the oscillation of the pendulum

being among the number. From Padua he came to Florence, under the patronage of Cosmas II., the grand Duke of Tuscany, who conferred on him an annual pension and almost regal honors. While in Florence he heard of a new specimen of the lens, or spectacles, as we usually call them; and thence in one sleepless night of thought conceived the idea of the telescope which he invented and completed in 1609. By the aid of this instrument he discovered several stars hitherto unknown—the four satellites of Jupiter, the planet, the ring of Saturn, the revolutions of Venus, and the configuration of the surface of the moon. At this period of his life he adopted the Copernican system, and instantly became its most famous supporter, more, it must be confessed, on account of the novelty of the idea, than of any reasonable conviction of its truth, as his own private opinion, written in his old age, unfortunately for his memory, too abundantly testifies. At the age of seventy he appears before the council in Rome; at the age of seventy-five he was afflicted with blindness, and, at the age of seventy-eight he died, in the year 1642. He was interred in the church of the Santa Croce, in Florence, and a magnificent masoleum was erected in his honor in 1737.

In person he was of prepossessing appearance. His conversation was agreeable, sprightly and humorous. Science owes much to his labors; geography was improved by his astronomical investigations; mechanics by his discovery of the theory of acceleration. His son, from the training received from him, first applied the pendulum to the use of time-keeping. His disciple Torricelli, whom he brought from Rome, invented the barometer, and explained the true theory of the pump. His moral character was good; but here his eulogy ends. His scientific ambition knew no bounds; he aspired to all knowledge; he brooked no contradiction. If he asserted a theory never so absurd, he expected the world to fall on bended knees and accept it without a word of remonstrance, without a particle of previous examination. He was Galileo, and he knew it. He forgot that science, after all, is but human, and apt to mislead the incautious and too adventurous votary. His very

defence of the Copernican system betrays the weakness of the great man. He adduced no new arguments, or such only as were worthless; he believed them not himself; and, yet, he asked that other men almost equally learned and more cautious would swear to their truth at his bidding. The attempt to constitute himself a hermeneutical commentator on the Scripture provokes a smile of pity that his undoubtedly great genius was not regulated by a more judicious and prudent—by a well-balanced—mind. He was a great man, it is true, but great only in natural science. He was the first astronomer of his time; and, yet, he died disbelieving in his heart the system of Copernicus. Such was Galileo. Merits he possessed, transcendent ones; faults too he had, inexcusable ones. Men must regret that, while it was so easy for him to avoid the faults of his life, he still committed them; but, at the same time, they must remember that the sterling brilliancy of his career in other respects makes more than amends for the spots that stain his escutcheon. Had he been possessed of the piety of Fenelon or the wisdom of Newton, men had never, perhaps, beheld a more noble specimen of the human race. We all have our failings,—and, if truth compels us to say that Galileo had faults, charity whispers that we endeavor to palliate them. If we draw a veil over his vanity, we will behold a man such as the world ought to delight to honor; if we raise it again, we will discover all the inconsistencies, weaknesses and blemishes, which are ever attached to humanity. Although I have spoken as the censor of his faults, yet, no one is more ready than myself to revere his virtues; and, although, I have described the great scientific lapse of his life, yet, no one is more happy to do homage to his mighty intellect, and the grasp of his gigantic mind.



