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CENSORING SCIENCE IN SIXTEENTH-CENTURY ITALY: RECENT (AND NOT-SO-RECENT) RESEARCH

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Questions regarding the extent of ecclesiastical censorship in sixteenth-century Italy and its impact on the practice of science have long attracted the attention of historians of science. For many years these questions have been hard to address. Perhaps the most important obstacle facing scholars has been severely restricted access to the Archives of the Congregation of the Doctrine of Faith (ACDF), which houses many of the extant records of the Roman Inquisition and Index. Until relatively recently, only a handful of scholars were granted access to a limited range of records. Consequently, only a selection of documents, relating to a limited number of famous trials, were ever studied let alone published. Many of these obstacles were removed in 1998, when the papacy opened these archives.[1] For the first time historians have been able to access the materials necessary to assess the ambition, scale, organisation and effectiveness of the censorship conducted by the Inquisition and Index. Seizing this opportunity, Ugo Baldini and Leen Spruit have co-ordinated a project that has combed the archives looking for documents relating to the censorship of modern science, from the foundation of the Roman Inquisition in 1543 to 1808. In 2009 they published the first in a projected series of volumes of documents.[2] The materials now made available would, they hoped, permit the creation of a new picture of these institutions, one that afforded far greater sensitivity to "the slow, but significant development of the criteria, the scientific culture and philosophical mentality of members and functionaries of the Congregations, and finally as to the effects of ecclesiastical censorship".[3]

In seeking to address this last issue, the effects of censorship, Baldini and Spruit explicitly engaged with enduring and familiar arguments about the Church and its attitudes towards science. They observed that:

> Until recently, most studies on the relationship between the Catholic Church and modern science and philosophy were characterised by a strong anti-clerical flavour. It had in fact been generally assumed that ignorant censors and a fundamentally negative attitude towards modern intellectual developments would have caused the decline of science and natural philosophy in the Italian and Iberian peninsulas with respect to Protestant Europe.[4]

Baldini and Spruit here pointed to the long-standing perception that the Catholic Church was hostile to not only science, but towards modern ideas more generally. One of the most important aspects of Baldini and Spruit's work is providing the resources that will make it possible to question and re-evaluate many of these assumptions.

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Using the documents that they have located, Baldini and Spruit have begun the process of rethinking the Church's impact on science. In the section of their Introduction "The Effects of Ecclesiastical Censorship", they suggested that the extent of ecclesiastical censorship was actually far less significant than many historians had supposed previously. Having reviewed the evidence from the sixteenth century, they could identify only three trials during which individuals were "examined for philosophical and scientific views".[5] The picture concerning the censorship of books is, they noted, more complex. Baldini and Spruit's investigations have provided documents relating to seventy-six authors of "scientific" works placed into one or more of the various classes of the Index.[6] They suggest that since press-control only reached its peak between 1587 and 1596 "the major effects of ecclesiastical censorship regarding science and natural philosophy became tangible during the next century". Focusing on the sixteenth century, they concluded that the direct effects of censorship — that is trials, prohibition and *censurae* — have "probably been overstated".[7] Although less easy to quantify, they suggested that the indirect effects of censorship — the fear of censure engendered within the intellectual community — almost certainly shaped "the intellectual *milieu* in which contemporary scientific and philosophical research developed".[8]

In this manner Baldini and Spruit have used the new empirical evidence that they have found to offer a nuanced reappraisal of what they take to be the central claims of the extant historiography. While this is both a vital and highly productive undertaking, the origins of historiographical picture that they challenge so successfully are hard to establish. Indeed Baldini and Spruit do not cite any particular authors, articles or books that contain the ideas that they are seeking to refute. It is not, however, difficult to find historical accounts that argue that during the sixteenth century the Catholic Church made the Italian peninsula an increasingly hostile environment in which to practise science. Present in textbooks on early modern Italy, and numerous discussions of the Catholic Church and science, this historiographical commonplace is also frequently used to provide a context for the later Galileo Affair.[9] Yet although this belief is expressed relatively frequently in the literature, it is supported by surprisingly little empirical research. In fact prior to Baldini and Spruit few, if any, historians of science, whether Anglophone or Italian-speaking, have conducted any detailed work on the extent, effectiveness or consequences of ecclesiastical censorship of science in sixteenth-century Italy.

This situation represents an intriguing historical puzzle. If there are no empirical studies of the censorship of science in sixteenth-century Italy, where did the idea that the Church became opposed to science come from? There are of course accounts of conflict between the Catholic Church and science. Since the nineteenth century, historians have been studying the relationship between science and religion, and have discussed famous examples from early modern Italy. Yet while the likes of John William Draper and Andrew Dickson White certainly described the trials of Bruno and Galileo, they argued that these were historical instances that reflected a more-or-less permanent state of conflict between science and religion.[10] The narrative underlying

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the histories with which we are concerned is quite different. It does not suggest that there is an essential antagonism between science and religion, but that in late sixteenth-century Italy there occurred a significant and unprecedented deterioration in their relationship. One possible means to locate the source of this particular idea is to study alternative historiographical traditions. For much of the nineteenth and twentieth centuries the history of seventeenth-century Italy has been conceived as one of both economic and cultural decline. This idea was formed within a particular Italian intellectual history tradition, which I term the "Italian liberal historiographical tradition". Consisting of several generations of politically engaged historians and philosophers, the authors of this tradition sought to provide an idealist interpretation of Italian history, and to explain the, at times fitful, progress of their nation towards modernity. To achieve these ends they produced highly influential accounts of Italy's philosophical and intellectual culture, and its decline during the seventeenth century.

Within these histories, ecclesiastical censorship of philosophy was ascribed a pivotal role. According to the authors of the liberal tradition, a new regime of ecclesiastical censorship was constructed during the sixteenth century that caused the decay of the nation's philosophical culture. This development in turn delayed Italy's progress towards being a modern unified state. The advent of this new regime of censorship could, they argued, be explained as a consequence of the direction taken by the Church during the era of the Counter-Reformation. I argue that historians of science, both Italian and Anglophone have borrowed many of their key assumptions about the prevailing intellectual climate of the late *cinquecento* from the historians of the liberal tradition. Transposing these ideas in to their analyses of science, they have argued that during the sixteenth century the Counter-Reformation Church introduced a novel regime of censorship with devastating consequences. If we want to revise and rethink our histories of science we must examine these arguments, and consider whether they continue to stand up to scrutiny.

Over the last fifty years the history of Italy has been extensively revised. The decline of Italy's culture posited by the historians of the liberal tradition has been widely challenged.[11] Historians of science have shown that reports of the 'death' of Italian science have been greatly exaggerated.[12] Others have clearly shown that the Catholic Church, or at least some of its constituent parts, was a leading sponsor of 'science' throughout the sixteenth and seventeenth centuries.[13] There are also several decades of research, which has revised older perceptions of the Counter-Reformation Church and its organs of censorship. Yet in spite of these studies, the idea that the Church became hostile to science still lingers. In part this reflects the fact that these various historiographical positions have yet to be integrated into a new synthesis of the censorship of Italian science. Drawing on these studies, I will begin to sketch an alternative model for conceptualising the Church and its programme of censorship in the sixteenth century. Finally, I will draw upon relatively recent innovations in the history of science to discuss Baldini and Spruit's stated aim to investigate the Church's attitude towards modern science in the early modern period. This discussion will make it possible to reflect on how the material found by Baldini and Spruit

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and their team, and information that may subsequently be brought to light, might be interpreted.

THE ITALIAN LIBERAL HISTORIOGRAPHICAL TRADITION

The genealogy of the Italian liberal historiographical tradition can be traced back at least as far as the 1840s, to the intellectual and political ferment that directly preceded the *Risorgimento.* By this time, numerous Italians had grown dissatisfied with the condition of their *patria*, which was divided into a patchwork of political units and conspicuously un-modernized. These apparent shortcomings were thrown into clear relief when the condition of the Italian peninsula was compared to Northern Europe, where powerful, unified, modern states such as Britain and France had been established.[14] Across Italy both individuals and groups of like-minded thinkers and activists began to articulate a new vision of a future Italian nation. We are concerned here with the work of one circle of Neapolitan scholars centred on the brothers Silvio and Bertrando Spaventa. This group played a key role in the introduction of post-Enlightenment philosophy of Northern Europe into Italy. In 1844 the Spaventa brothers founded a philosophical journal, and two years later a school for instructing youth in philosophy. With their followers they began to develop a coherent and compelling account of Italy's intellectual history that aimed also to explain the political development of their homeland. The members of this circle were particularly drawn to the writings of G. W. F Hegel. His work seemed to offer a model of analysis that could furnish both an explanation for the dilapidated state of contemporary Italy, and a basis to outline a programme for effecting change.[15]

For Hegel, history progressed towards a predetermined end: Spirit's self-awareness of freedom. Reason was the force driving history towards this telos. Acting through its human agents, it not only developed Spirit's self-consciousness, but also encouraged the gradual reshaping of Man's political and social environment. According to Hegel, these developments could be charted through various stages of human history. Christianity played a central role in this scheme, for its advent first allowed Man to recognize his spiritual nature. Yet as the faith became institutionalised, reason was fettered by a medieval Church that demanded unquestioning obedience. These restraints were first loosened during the Renaissance, and then finally cast off during the Protestant Reformation. With reason freed once more, Spirit's journey of self-discovery could resume. Northern Europe progressed through the Age of Enlightenment, a movement that promised to create modern political institutions, and societies structured along rational lines. It would also produce the philosophical sophistication necessary for Hegel to recognize and account for these processes in history.[16]

Whilst the Neapolitan Hegelians accepted the main thrust of Hegel's account of history, they downplayed the relative importance of the Reformation and instead made the Italian Renaissance the fulcrum of European history. If Northern Europe had become modern, it had done so, they implied, by building directly upon the intellectual achievements of Italians. The Neapolitan Hegelians had executed an audacious reconceptualization of history and placed the philosophical traditions of

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their nation at the heart of a new narrative of the rise of modern Europe. Their bold re-evaluation of Italy's role in European history threw up a curious paradox: Italy, the well-spring of modernity, remained resolutely un-modernized. The journey of Spirit appeared to have stalled in Italy, preventing the nation's progress towards modernity and unity. The question left hanging was: 'Why?'[17]

In their effort to answer these questions certain of the Neapolitan Hegelians, notably Stanislao Gatti, pointed to the influence of the Church. Gatti's ideas, subsequently developed further by Silvio and Bertrando Spaventa, and later Francesco de Sanctis, brought the issue of censorship to the fore in accounts of Italian philosophy. Reason, he argued, was indeed freed by the thinkers of the Renaissance, and it continued to be developed in the work of various philosophers throughout the sixteenth century. Yet whilst the *cinquecento* witnessed the assertion of ever more developed ideas, philosophy had never faced greater dangers. Beset by the deleterious effect of foreign occupation of the peninsula and the stultifying influence of the Church's reaction to Protestantism, Italian intellectual life began to atrophy. Subsequently, it was all but destroyed by the machinery of Catholic censorship: the Inquisition and the Index. From the 1590s the heirs of the Renaissance, philosophers such as Giordano Bruno, Tommaso Campanella, and Galileo Galilei were reduced to silence by the Tribunal of the Holy Office. As a result of this cataclysmic series of trials and condemnations, Italy was no longer an environment conducive for Spirit to accomplish its aims. Cultural life withered, and with it the latent promise of the Renaissance.[18]

Although the climate for philosophy was bleak within Italy, Gatti argued, the system of thought born in that nation re-emerged in Northern Europe. Here in this more hospitable climate, it was free to fulfill its potential. Meanwhile, with the exception of the work of isolated individuals such as Giambattista Vico, Italy would remain culturally and intellectually barren. Only in the nineteenth century, when individuals such as the Spaventa brothers began to study the philosophy of Northern Europe, would the nation's intellectual culture be re-born. For Gatti this meant that the Italians once "masters have now been forced to become disciples". Betrando Spaventa, accepted the basic outline of Gatti's account, but gave it a more positive accent. Since all of the ideas of the Enlightenment were ultimately of Italian origin, he argued, by studying and teaching them Italians were in fact connecting with their patrimony. For Spaventa, his efforts therefore represented not the importation of foreign philosophy but the completion of a "circulation of ideas". Spaventa's use of history was partly defensive: it justified his activities to contemporaries, which for some represented an unwelcome incursion of foreign philosophy. It was also programmatic: with the circulation of ideas now finished, the Spaventas and their followers believed that they could re-start the development of Spirit in their nation. Through practising and teaching philosophy they too could create a modern unified nation state.[19]

This narrative of Italy's stalled progress to modernity has passed through various iterations over the subsequent years, notably in the work of individuals such as Benedetto Croce, Giovanni Gentile, Delio Cantimori and Luigi Firpo. Echoing the Spaventas and their followers they each argued that, following the glories of the

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Renaissance, Italy entered a protracted period of cultural, political and intellectual decadence. Like their predecessors, they blamed the Church for Italy's plight. In contrast to the earlier accounts, these later members of the liberal tradition began to invoke the term Controriforma, to characterize the Church in this period. It must be noted however, that these various historians emphasized different facets of this movement.

The first main perspective, assumed by amongst others Croce and Cantimori, was formulated in relation to the idea that Italy had in fact inaugurated its own "failed Reformation". They suggested that various Italian thinkers such as Bernardino Ochino tried in vain to advance an alternative vision of ecclesiastical reform. Distinctively Italian, this movement drew deeply upon the ideas of the Renaissance, and especially the work of Marsilio Ficino and Giovanni Pico della Mirandola. For Croce, this Italian Reformation was the true origin of not only the Enlightenment, but ultimately also the *Risorgimento*. The potential of this Reformation was not realised immediately within Italy, for by the end of the sixteenth century it was overwhelmed by a rival vision of Catholicism forcefully articulated during the Council of Trent. Nevertheless, Ochino and other like-minded thinkers chose a life of exile, taking not only their ideas, but also the legacy of the Renaissance with them. The history of this Italian intellectual diaspora was later traced in greater detail by Cantimori. Yet for Croce in particular, the humanist reform programme was destroyed only indirectly by the Church of the Controriforma. Of greater significance, he argued, was a failure of confidence within the minds of the Reformers themselves.[20]

The second interpretation of the Controriforma, can be found in the work of Luigi Firpo. He portrayed it as a movement formed in reaction to the external threat of Protestantism, and suggested that its nature and effects were made evident through its censorship of intellectual culture. His work includes studies of the trials of, amongst others, Bruno, Pucci and Campanella.[21] According to Firpo, from the 1560s the attitude of the Church as a whole became "implacably severe" towards all forms of supposedly heterodox behaviour. This was because, following a successful campaign to exclude Protestantism from Italy:

> The Church came out of [the struggle] with renewed vigour; and it could now adopt an attitude of intransigence that was a consequence, not an instrument of its success. It continued to keep its eye on theologians, as it did in the case of Baius and Carranza. But it now extended its vigilance to all manifestations of social and spiritual life — not only to religion, but also to ethics, to politics, to philosophy to art, and even to the manners and customs of the people.

Buoyed by its successful campaign against Protestantism, the Church extended its surveillance into hitherto unimagined fields, and it did so with an unprecedented severity. The impact of this extension was "well known": "Religion, first of all, degenerated into artificial devotional practices often tainted with an unctuous hypocrisy. Morality, secondly withered into exterior show and cavilling casuistry." This was the moment at which philosophy "entered its most dramatic moment".[22] Firpo continued that:

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> Free Philosophical speculation in Italy fought its decisive battle during the pontificate of Clement VIII, in the last decade of the [sixteenth] century. It suffered the condemnation of Patrizi's *Nova philosophia*, of Telesio's *De rerum natura*, and of all the works of Bruno and Campanella. It was crippled by the investigations opened against Giambattista Della Porta, Col Antonio Stigliola, and Cesare Cremonini, by the beginning of Campanella's long imprisonment, by the execution of Francesco Pucci, and by the burning of Bruno. And finally, it was completely destroyed, in spite of the heroism of its martyrs. Its last, posthumous act was played out thirty years later, in the silence of Arcetri [the villa in which Galileo was imprisoned after the conclusion of his trial in 1633, until his death in 1642].[23]

For Firpo, the trials of the 1590s and their epilogue, the Galileo Affair, marked the end of all free philosophical speculation in Italy. As a consequence of these trials the motor of progress had been shut down, and Italy was condemned to enter a protracted period of decadence.[24] Despite subtle differences of interpretation, the members of the liberal tradition did establish a clear grand narrative tracing Italy's journey from the freedom and achievements of the Renaissance, to a period of decadence created by the unwarranted interference of the Church.

As I noted in the introduction to this article, there are in fact no detailed secondary accounts of the censorship of science in sixteenth-century Italy. Several historians of science have nevertheless discussed, albeit briefly, the situation facing individuals engaged in the production of science at this time. Their accounts are in many respects strikingly similar to those offered by the authors of the Italian liberal tradition. First, the key evidence used to discuss censorship and its effects in both traditions is essentially the same. The authors of the liberal tradition established a list of trials and condemnations, dating to the latter quarter of the sixteenth century. This list was clearly articulated, indeed made canonic, by Firpo in the passage cited above. It includes the processes opened against such (now) famous philosophers as Bruno and Campanella, lesser known figures such as Francesco Pucci and Col Antonio Stegliola, and the expurgation and, in some case, *de facto* suppression of works by authors such as Bernardino Telesio, and Francesco Patrizi. When historians of science discuss the censorship of science in Italy, invariably they invoke some or all of these names. It could be argued that this indicates nothing more than the fact that an individual such as Patrizi is significant to both intellectual historians and historians of science. While this may well be true, there are further indications of borrowings from the liberal tradition.[25]

The liberal grand narrative suggested that prior to the middle of the *cinquecento* there existed relative intellectual freedom, but that it was all but destroyed by the later trials and condemnations. These events are therefore taken to be the key piece of evidence that indicates a major shift in the Church's attitudes towards philosophy. Historians of science likewise seem to agree that at this time the Church radically altered the climate in which intellectuals were working, with severely limiting, if not downright detrimental, consequences for the production of scientific knowledge.

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Remarkably, some historians of science have presented versions of this general claim as an established fact, without citing any primary or secondary evidence.[26] When historians of science have provided evidence for this proposition, it has frequently consisted of an unacknowledged recitation of the canon of trials and condemnations identified by the authors of the Italian liberal tradition.[27] On rare occasions historians of science have explicitly acknowledged this latter tradition. In his description of Italy's intellectual atmosphere in the period immediately preceding the Galileo Affair, William Shea drew heavily upon, and specifically cited Firpo's studies of these trials and condemnations.[28]

Finally, both historians of science and the authors of the liberal tradition share a common concept of the Counter-Reformation Church. This category is of course not unique to the Italian liberal historiography. It has multiple associations, but it is important to stress that it is not a neutral descriptor of a period in ecclesiastical history. As the work of Firpo cited above suggested, it signifies a Church that was reacting to, and that was fundamentally transformed by, its encounter with Protestantism. It also had a clear heuristic function for the authors of the liberal tradition. In their hands this term could be used to explain why the Church launched an assault on intellectual culture. Forced onto the defensive, it made a series of intellectual, theological and institutional innovations, which in turn unleashed a host of unintended consequences. The Church's actions are thus portrayed as historically contingent deviations from the course that it might otherwise have pursued. Historians of science have also made use of essentially the same idea of a Counter-Reformation to fulfil precisely the same function in their narratives: to explain why the Church launched a hitherto unprecedented assault on scientific investigation.[29]

Whilst the narrative established by the authors of the liberal tradition appears to have influenced the accounts of historians of science, it provides an unsatisfactory basis for making claims about the history of science for two reasons. First, while the key premise of this account, that the trials of the late sixteenth century were indicative of a watershed in the Church's attitudes to intellectual culture, is at face value compelling, it can be called into question. The canon of trials and condemnations identified by the authors of the liberal tradition may indicate that the Inquisition and Index were indeed investigating philosophy and philosophers at this time. It does not, however, provide categorical proof that the Church's desire — or indeed ability — to regulate and control philosophy was either new or increasing. I do not wish to argue here that any of these possibilities are necessarily untrue; just that they are as yet unproven. Settling these questions would require a detailed comparison of the levels of censorship across the century as a whole. Secondly, it is important to stress that the authors of the liberal tradition did not extend their analyses to science. Whilst they were trenchant in their criticisms of the Church's impact on fields of cultural endeavour such as philosophy, art or literature, they were at best equivocal about the effect of ecclesiastical censorship on physical science. Indeed Croce and Firpo actually argued that the cultural legacy of the Renaissance assaulted in so many spheres was in fact *preserved* in the physical sciences. Nevertheless historians

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of science have all too often interpreted the same cluster of trials as the proximate cause of Italian science's ruination.[30]

THE REFORMATION AND THE COUNTER REFORMATION

The idea of a Counter-Reformation was first developed in the late eighteenth century by the Göttingen jurist Johann Stephan Pütter as a concept in legal history. It was later used by Protestant historians such as Leopold von Ranke (1795–1886) to describe the Catholic Church's efforts to combat the spread of Protestantism. As we have seen, this category has also played a central role in the work of Italian liberal historians and philosophers such as Croce and Firpo. Although it has been used by many historians of science there are compelling reasons to reject its continued use. In the work of a historian such as Firpo the Counter-Reformation Church is depicted as a monolith whose actions are to be interpreted solely as a response to those of the Protestants. On the one hand it appears as an institution solely driven by a desire to respond to external events rather than one that was also pursuing its own positive agenda. On the other, many of the Church's actions in this period can be represented as novelties produced in response to the crisis precipitated by Luther's protest. This perspective has in turn caused historians to efface important continuities between earlier reforming programmes and those of the sixteenth century. It also remains embedded in accounts of ecclesiastical censorship, which have often characterized the work of the Inquisition and Index as being purely a product of the Church's reaction to Protestantism. In turn this has militated against any attempts to identify, let alone explain any long-term theological and philosophical motivations that may have driven the censorial agenda of its members.[31]

As early as 1870, German Catholic scholars rejected the reactionary and passive connotations of the label Counter Reformation and proposed in its stead alternatives such as 'Catholic Reformation', 'Catholic Reform' or 'Catholic Restoration'. The new labels reflected these historians' belief that the developments within the Church were no mere reaction to the Protestant challenge, but were instead the result of a long process of internal reform. These early critiques displaced neither the label Counter Reformation, nor the perception that in countries where it was the dominant faith Catholicism had hindered the advent of modernity. Over a century later, the German historian Wolfgang Reinhard directly tackled both of these issues in a significant article "'Gegenreformation als Modernisierung?' Prolegomena zu einer Theorie des konfessionellen Zeitalters", in which he explicitly rejected the earlier distinction between a supposedly progressive Reformation and a reactionary Counter Reformation. Seeking to re-conceptualize the Catholic Church's contribution to the development of modernity, he emphasised its similarities with the Protestant Church, developing the theory of confession building or "confessionalisation". This concept suggests that Churches on both sides of the confessional divide were trying to draw the people of Europe onto a disciplinary grid, using similar techniques of encouragement and coercion. Debate continues today over the correct label to apply to the Catholic Church in this period, and some historians retain the use of the label

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Counter Reformation while being sensitive to its potential drawbacks. In order to avoid the term's limitations, it may simply be easier to stop using it all together. John William O'Malley has suggested that the label which perhaps best captures the full complexity of this period is the relatively neutral 'early modern Catholicism'.[32]

These historiographical developments have been paralleled by relatively recent research into the debates within the early modern Italian Church. Although Italian historians have tended to retain the label Controriforma, they have created a picture of Italy's religious history during the sixteenth century that is far more subtle and complex than that which we previously possessed. In producing this work many modern scholars have taken their cue from the work of historians such as Cantimori. Pursuing the latter's belief that Italy had begun its own 'failed' reformation, these historians have focused their work on the suppression of reformist movements within the Church. They have also shown that by drawing inspiration from humanists such as Desiderius Erasmus — who was himself influenced by Ficino — these reformers demanded that greater freedom and responsibility should be given to the individual to play a role in their spiritual life. The reformers believed that this could be achieved by such radical methods as educating every person so that they could read Scripture for themselves in the vernacular. From the 1520s onwards some thinkers combined the ideas produced by indigenous reform movements with the teachings of Luther and other Northern Reformers. Known as the *spirituali* this group of leading Catholic clerics and laymen, such as Gasparo Contarini and Cardinal Morone, attempted in the years leading up to the 1540s to re-calibrate the relationship between works and faith within the Catholic Church.[33]

Further research has shown that these views were vigorously contested by another group of reformers within the Church, whom historians have often dubbed *intransigenti* or *zelanti*. Led by powerful clerics such as Gian Pietro Carafa (later Pope Paul IV), its members believed that the clergy should offer instruction in the tenets of the faith necessary for salvation, whilst restricting access to the sacred texts. In an important series of works Massimo Firpo (Luigi Firpo's son) and Dario Marcatto have shown that the *zelanti* used the Inquisition as a power base from which to eradicate the views of their opponents, and to impose their vision of Catholicism within society. This involved the active suppression of not only the ideas of the *spirituali*, but also those of the humanists. By building upon the earlier liberal tradition, Firpo and Marcatto have offered a highly sophisticated account of the Catholic Church, which highlights the existence of an intense struggle within the Church to define the parameters of orthodoxy. In turn these new historiographical perspectives offer the chance to tell a far more complex story about the history of censorship, by suggesting that the views expressed through the Inquisition's actions were not those of a monolithic 'Church', but those of a 'party' within its structure. It has also shown that the Church was not solely concerned with facing the 'external' challenge of Protestantism, but that it was also engaged in a bitterly-fought internal conflict. At stake was the 'true' definition of the Catholic faith.[34]

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THE INQUISITION AND THE INDEX OF FORBIDDEN BOOKS

Although the Inquisition and Index of Forbidden Books are known to most historians of science, few have engaged seriously with the historiography of these institutions. This observation would be unremarkable, were it not for the fact that the Inquisition played a pivotal role in one of the most notorious events in the history of science: the trial of Galileo Galilei. Historians working on this, the most famous inquisitorial trial of a philosopher, have remained largely unconcerned by the nature and operations of this institution. This situation is rendered all the more extraordinary by the existence of a formidable bibliography, which provides detailed accounts of the institutional history of both the Inquisition and the Index; accounts of how the Inquisition functioned as a judicial tribunal; assessments of the impact of Inquisitorial prosecutions and the imposition of the Index on a vast array of groups within society including heretics, witches, and Jews. Although it is fair to concede that not all of this literature is germane to the Galileo Affair, it is remarkable that this vast resource of secondary literature has not been previously tapped by any but a handful of historians of science.[35]

The Roman Inquisition was established in 1543, largely in response to the threat posed by Protestant heresy. Some, but by no means all, historians of science have acknowledged that it was a reorganized version of a pre-existing institution. Yet of those who have noted that the Inquisition has a longer history, few have worked through the implications of this fact. The Inquisition was originally established in 1184 as an episcopal institution, and it was intended to be used primarily for rooting out the Cathar heresy. By the 1230s it had been re-established as a tool of papal power, and it was staffed predominantly by members of the two most important orders of mendicant friars: the Franciscans and the Dominicans. The Papal Inquisition was in continuous existence between its establishment in the thirteenth century and its re-founding in the middle of the sixteenth, and it played a significant part in defining orthodoxy within Italian society during these years. To complete this task, inquisitors gradually developed a series of procedures and precedents for locating, identifying and dealing with heresies. These earlier ideas and practices, recorded in sources such as inquisitor's guidebooks, helped to form the basis of the Inquisition's response to suspected heretics and their beliefs and practices in the sixteenth century. To understand the Inquisition's actions in this later period, we must therefore also investigate its actions over the preceding 350 years.[36]

Attention must also be paid to the specific manner in which the Roman Inquisition and Index operated in the sixteenth century. Over the last forty years our understanding of these matters has been greatly enhanced by investigations into the manner in which they functioned as institutions. These studies were pioneered in the 1970s by John Tedeschi, who established many of the Inquisition's procedures, and offered a detailed account of how the network of inquisitorial courts functioned within Italian society.[37] Studies of the Inquisition were later taken in a new direction by the work of Paul Grendler, who began to study its role in the censorship of books. Consciously building on the writings of earlier historians such as L. Firpo and Tedeschi, Grendler

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not only set out to reconstruct the mechanisms of censorship in one city, Venice, but also to evaluate its effectiveness. To this end, he set out to assess the extent to which decrees of the Inquisition, and the various Indices were enforced, and the impact that they had upon the book trade.[38]

This body of work on the Inquisition has been complemented by renewed interest in the history of censorship. Historians including Vittorio Frajese and Gigliola Fragnito have drawn a sophisticated picture of the structures of book censorship, and provided detailed accounts of the production of the various Indices of Forbidden Books. They have also shown that the Inquisition's power over censorship was contested during the sixteenth century. Drawing on the insights of M. Firpo and Marcatto, Fragnito and Frajese have shown that during the latter half of the *cinquecento* the episcopate and the Inquisition were engaged in a protracted struggle for influence. At stake was not only the question of who should carry out the work of censorship, but also who should establish the criteria by which censors should operate. Fragnito and Frajese's work has shown that, in contrast to the Inquisition, many bishops were sympathetic to humanist ideas, such as expanding the circulation of vernacular Bibles, and that many advocated a relatively tolerant attitude towards the Talmud. They wished to construct and implement a censorial regime that embodied these values and beliefs. Their position was bolstered in the 1570s when cardinals broadly sympathetic to the aims of the bishops took control of the newly established Congregation for the Index. The scene was set for a bitter contest. By the end of the *cinquecento* the Inquisition had seized control of the whole machinery of censorship, and it used its powers of investigation and censorship to crush the humanist reforming movements.[39]

The implications that these important insights hold for the history of science have yet to be fully explored. The historians whom I have discussed above have tended not to research the censorship of philosophy or science. While some historians have made use of these insights in order to begin to rethink the history of ecclesiastical censorship of science and/or philosophy, they have not applied them to the late sixteenth century in a comprehensive or systematic manner.[40] If such a project were undertaken, it would significantly transform our understanding of these issues. Above all, historians such as Fragnito and Frajese have shown that for much of the sixteenth century there was no single centralized censorial authority. On the contrary there were multiple competing authorities, which frequently vied with one another to exercise censorial power. Consequently, a philosopher's work could be assessed by one of a variety of authorities, each potentially working to differing, and possibly contradictory, standards of orthodoxy. Given these circumstances it is perhaps unsurprising that philosophers sometimes found themselves on the wrong side of the boundaries of legitimate expression. These observations suggest that we should conceptualize the history of censorship as fluid and dynamic, and not simply static and hostile. An essential first step in writing such a history will be recovering the censorial ambitions of each of these various authorities and tracing how they developed over the course of the century.

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THE MECHANICS OF CENSORSHIP: THE WORK OF FRANCESCO BERETTA

Francesco Beretta has begun to establish the methodological tools necessary for the reconstruction of the various censorial agendas utilised in sixteenth-century Italy. Building upon the earlier studies of the institutional history of the Inquisition undertaken by historians such as Tedeschi, Beretta has sought to establish the procedures that the Inquisition adopted in order to determine whether an individual who had expressed a philosophical opinion could be convicted of heresy.[41] He has shown that once a person had fallen under suspicion of heresy and had become engaged in the Inquisitorial machinery, the Tribunal of the Holy Office's first task was to determine whether there was in fact a case to be answered. Consequently, the first stage of any investigation was to determine whether any of the propositions tendered by the accused were *effectively heretical*. This task fell to the *theologian qualificators* of the Tribunal who were required to pronounce upon the theological status of the proposition in question. This judgement was crucial because the decision to take a trial forward was made at this stage, for Inquisitorial legislation and the punishments for heresy were only applicable if the assertions of the defendant contradicted the faith in a direct or indirect manner. If the defendant's propositions were a matter of theological debate, or if they only contradicted common doctrine but not the faith, the penalties reserved for heretics were not applicable. Failure to meet these requirements meant that the accused could not be forced to abjure nor could they be subject to any physical punishment. In cases in which it was established that a suspect had indeed expressed opinions that were formally contrary to the faith, it was then necessary to establish whether the accused believed them to be true. In order for a suspect to be judged to be guilty of a crime of formal heresy the Tribunal needed to be certain that the accused persisted in maintaining the truth of their error, even after its falsity had been made clear to them.[42]

Once these stages of assessment had been fulfilled, the findings were drawn together in official form by the Notary of the Tribunal in the *Incartamento processuale*. This information was then summarised in a single document called the *summarium*, the function of which Beretta explained "was to set out all of the judicial and doctrinal elements of the case in a succinct but precise manner, before the court". This document was then sent to the actual court of the Holy Office, which would judge the accused. The summary was especially important since the court of the Tribunal of the Holy Office, composed of the pope and the Cardinals of the Inquisition, did not participate directly in the interrogation of the accused. Instead they pronounced on the case on the basis of the information that they received in the summary. The summary was also distributed to the legal and theological consultors of the Inquisition so that they could offer their opinion to the court.[43]

Beretta has subsequently demonstrated how these insights can be used to better understand how the Inquisition investigated philosophy. As he has shown, the staff of Inquisition, specifically the *theologian qualificators*, played a crucial role in determining whether or not a philosophical idea should be considered formally heretical. This draws specific attention to the manner in which these particular individuals within the

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Inquisition understood the relationship between philosophy and the Catholic faith, and hence how they determined the orthodoxy of a given philosophical idea. These standards were central to the Inquisition's work, for heterodoxy, and therefore heresy, is always defined in relation to a particular standard of orthodoxy.[44] Orthodoxy is not a historical constant; ideas of what constituted the 'true' faith have changed over time, and have been subject to dispute in every historical period. As Beretta has observed it is necessary "to understand orthodoxy as a process, as a product that is always plural and permanently evolving in the face of clashes between representatives of different conceptions of orthodoxy". The fact that standards of orthodoxy were neither fixed, nor universally recognised within the Church, but constantly subject to negotiation, conflict and change, makes it necessary to establish precisely which institution was conducting any given act of censorship. He concluded that in order to understand an event such as the Galileo Affair it was necessary to reconstruct precisely which standard of orthodoxy was being used within the Inquisition, rather than talking about orthodoxy within the Church as a whole.[45]

Pursuing this line of argument, Beretta emphasized the fact that the Inquisition was primarily staffed by members of the mendicant orders, and especially by Dominican and Franciscan friars. From the thirteenth century onwards, these orders of friars had developed distinctive approaches to philosophy, which they imported into the Inquisition. Beretta has defined their approach to philosophy as the 'scholastic orthodoxy', which was developed by several prominent friars, most notably Thomas Aquinas, during the high scholastic era at the end of the thirteenth and beginning of the fourteenth century. They developed a series of principles governing the relations between philosophy and theology, which Beretta defines as the 'scholastic criteriology', in order to address the challenges that had grown up in the wake of the re-discovery of Aristotle's philosophy. Above all, these principles were used to confront the specific threat posed by a form of secular Aristotelianism that first flourished in the University of Paris during the thirteenth century, which seemed to threaten to make the philosophical field autonomous.[46]

According to Beretta, although there were differences between the orders' specific formulation of the 'scholastic criteriology', there was broad agreement on the key points of principle. Most importantly, the orders of friars shared a belief in the Augustinian idea that there was a unity of truth, which in turn implied that theology and philosophy could never reach contradictory conclusions. Aquinas developed this point within the new scholastic understanding of Aristotelian science, arguing that the science of theology possessed a higher level of certainty than that of philosophy. This was because theologians demonstrated their conclusions by reasoning about principles revealed directly by God, whereas philosophers reached their conclusions by reasoning about principles discovered by Man unaided. According to Aquinas, the higher level of certainty possessed by theology instantiated a hierarchy of disciplines. He then used this conclusion to argue that if a theologian and a philosopher reached differing conclusions, for instance with regard to the eternity of the world, then this implied the falsity of the philosopher's arguments. Consequently, if any

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such disagreements should occur, then it was incumbent upon the philosopher to reconsider his arguments until he had reached a conclusion that was in accordance with that established in theology. For Beretta, this principle of the hierarchy of disciplines was expressed in the Parisian condemnations of the 1270s.[47]

Making use of these insights, Beretta has also begun to develop an alternative framework for considering the history of the censorship of philosophy in late sixteenth and seventeenth century Italy. Since at least the late thirteenth century, the mendicant orders had been attempting to assert their vision of the correct relations between philosophy and theology on the Church and Christian society as a whole. In Italy their efforts had not met with success. Although secular Aristotelianism had been virtually eradicated from the universities of Northern Europe, it continued to flourish in the universities of Bologna and Padua. Perhaps most notoriously, the university masters openly discussed the philosophical arguments surrounding the mortality of the individual soul. The situation was further complicated during the course of the Renaissance, when certain individuals began to develop alternative styles of philosophy rooted in ancient authorities other than Aristotle.[48]

According to Beretta, the university masters were able to continue teaching and discussing philosophical ideas in this manner because the mendicants lacked the power to impose their scholastic orthodoxy within the universities of Italy. This was because earlier condemnations and decrees, for instance those issued in Paris in the 1270s, had only local authority. The friars were therefore forced to find alternative means to control the teaching and publication of Italian university masters. From the middle of the fifteenth century, they began to take chairs in the faculty of arts and medicine of the Italian universities in an effort to influence the teaching and discussion of philosophy therein. The situation facing the mendicants changed at the beginning of the sixteenth century when the Fathers of the Fifth Lateran Council issued the decree *Apostolici regiminis* (1516). It declared that since truth could not contradict truth, philosophers should refrain from teaching as philosophically true any doctrine that contradicted the faith. Beretta observed that: "The novelty of the decree of Lateran V consists in the fact of having established in canon law the principles of the scholastic criteriology that justifies the hierarchy between philosophy and theology." It was he added like "just like the statutes of the faculty of Arts of Paris, in 1272, but with a virtually universal range". From this point forward, Beretta argued, the mendicants possessed the theoretical power to impose their conception of orthodoxy.[49]

In principle the mendicants could now seek to impose their concepts of philosophical orthodoxy, but in practice they lacked the power to use it for much of the first half of the sixteenth century. Drawing upon the recent studies of the Church discussed above, Beretta suggested that this situation changed dramatically when, in response to the various reformist threats, the papacy re-founded the Inquisition. This development gave the mendicants virtually unprecedented powers, which they began to use not only to uproot Protestant heresies, but also to impose their vision of philosophical orthodoxy on the philosophers of the schools and on the independent humanist philosophers. This new combination of legal and institutional powers not

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only allowed the mendicants to step up the pressure on secular Aristotelians such as Cesare Cremonini, but also ultimately paved the way for the prosecution of such famous trials as those of Bruno, and Galileo, and the condemnation of the work of Patrizi and Telesio.[50]

Beretta's model of analysis certainly provides an excellent basis for interpreting ecclesiastical censorship in the sixteenth century, offering methods for reconstructing censorial agendas and linking them to the broader history of the Church. These insights can be expanded in two ways. As it stands Beretta's model of analysis only applies to the censorship of philosophy. Whilst philosophy is an essential element of early modern science, the term 'science' embraces a far wider range of disciplines and arts, including astrology and alchemy. In order to talk about a history of the censorship of 'science' it will be essential to reconstruct the attitudes of the censors towards these arts and activities too.[51] Secondly, Beretta's work is overwhelmingly concerned with the Inquisition. If we are to offer a more complete picture of the various forms of ecclesiastical censorship operating during the sixteenth century, it will be necessary to reconstruct the standards of orthodoxy deployed, for instance, by episcopal censors, or by those who compiled and maintained the Index especially during periods when it was prepared independently of the Inquisition.

THE CHURCH AND MODERN SCIENCE

To conclude this article, I would like to return to discuss the collection of documents produced by Baldini and Spruit. The volume is clearly a work of remarkable scholarship, and it will certainly be a tremendous resource for generations of historians to come. Although this work's importance is beyond doubt, it is possible to criticize the analytical framework adopted to allow for the volume's production. From the title it is clear that Baldini and Spruit's intention is to ask the question: "What was the Church's attitude towards modern science in the early modern period?" This is, perhaps, the wrong question to ask. I make this observation on two grounds. The first is the fact that during the sixteenth century the Church did not possess a single, formal position on 'science', modern or otherwise. On one level this observation is a simple corollary of my earlier emphasis on the plural nature of ecclesiastical censorship: these documents will cast much light on the Inquisition and Index's censorial ambitions and practices, but this is not the same as establishing the Church's attitudes as a whole.

There is however a deeper problem concerned with the aims and the purposes of ecclesiastical censorship that must be taken into account irrespective of the specific agency by which it was conducted. If, for sake of clarity and brevity, we focus solely on the Inquisition and the Index, it is arguable that prosecuting 'science' was not an end in itself for either of these institutions. Indeed, they were not founded to investigate any particular field of human endeavour, but to root out heresy however it manifested itself. Nevertheless, in their pursuit of heresy, the Inquisition and the Index formulated a series of responses to a range of ideas and practices relating in some manner to the understanding or manipulation of the natural world. Today we may, or may not, choose to classify some of these ideas and practices as 'science', but

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it is by no means self-evident that either the Inquisition, the Church as an institution or even individual clerics considered them to constitute a single type of activity that was collectively amenable to ecclesiastical discipline. Acknowledging these points, I propose that we reformulate the question as follows: "Why at particular moments in history did ecclesiastical censors define as heretical, certain intellectual ideas, practices or philosophical teachings relating to the natural world?" Once we have answered this question, we can then ask: "Did the censors see any connections between these various domains of activity?" and if so "Do they conform in any meaningful sense to modern taxonomies of early modern activities, which we may label 'science'?"

My second ground of objection is that it is exceptionally difficult to arrive at any satisfactory definition of 'modern science' that is applicable to the early modern period. Baldini and Spruit do acknowledge this issue, but they do not discuss it at length, on the grounds that "an edition of documents is not the ideal place to discuss general and complex issues concerning nature and the sciences". To me this is a puzzling statement since settling on a definition of what counts as 'modern science' is an essential first step in the process of selecting documents for inclusion in such a volume. Nevertheless, they do give some space to these issues lest ignoring them entirely "might suggest a positivistic or anachronistic view of science".[52] Pointing to the difficulties of defining 'science' they note that using a contemporary concept of *scientia* would result in a definition at once too broad for their purposes, for it would include disciplines such as theology, but also too narrow as it would, for example, rule out Biblical commentaries on Genesis, and other areas of human activity such as magic, astrology or alchemy. They therefore decided to introduce a modern definition, albeit one that respected contemporary practices and ideas. Hence "a history of the relationship between the Catholic church and modern science should not only investigate authors and works that laid the groundwork for modern science, but also the variegated range of early modern issues and mentalities concerning nature and natural knowledge". As a consequence they note that they have adopted "essentially pragmatic criteria [of selection], endorsing a broad view of science, and accordingly of scientific activity and works". They then list fourteen general areas into which the various documents that they have discovered might fall. These include not only "Science in a 'modern' sense" which encompassed "topics which nowadays are viewed as part of some natural science" and "'Pure' and 'mixed' mathematics", but also such activities as "Astrology" and "Natural magic".[53]

At face value such views seem totally unobjectionable. I agree that the various domains of activity that they include in their discussion are all essential in any study of early modern science. My criticisms fall less on the choice of materials than the rationale governing their selection, and the implications of such a rationale. Baldini and Spruit in effect argue that we must have an eye on two interconnected types of activity. The first is a broad range of contemporary disciplines, arts and practices that in some manner relate to the natural world. For the sake of clarity I will refer to this as 'early modern science'. There is also another type of activity: modern science. It is evident that Baldini and Spruit view the relationship between these two spheres of

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activity to be complex. They argue that modern science was not only present in early modern society in forms that are more or less recognisable to we moderns, but also that "in the sixteenth century many (directly and indirectly) scientific topics were investigated in works to which the qualification 'scientific' could not be attached according to the then generally accepted epistemological standards, and it would not be possible today either". To take one example, Baldini and Spruit argue that documents relating to at least some forms of magic should be included in this volume. This was justified on the grounds that natural magic "did contain credulities, intentional illusions and false beliefs, but also more or less correct observations, useful intuitions or mechanical devices able to produce surprising or even 'supernatural' effects". In other words, although much of magic is patently false, work of genuine scientific merit could dwell within it.[54]

While this perspective does allow for the inclusion of magic in a discussion of the history of science, it has a number of limitations. By assuming this position, the historian suggests that it is possible to identify in the complex of early modern intellectual culture certain activities that can be considered to be the progenitors of, or even to be, 'modern science' and to distinguish them from others that cannot. Although magic as a whole cannot be classified as science, parts of it could, from a modern perspective, be considered to be 'scientific', and so a historian of science can legitimately study these aspects of magic. It also follows from this position that magical arts should only be included in the discussion of early modern science, if they seem to conform in some manner to a modern conception of the 'scientific'. This is, of course, a valid methodological position, but just one with which I happen not to agree. In the first instance it begs significant questions about the grounds on which we as historians of science select material for study. Assuming this position would, for example, restrict the historian of science to only considering cases of the Inquisition or the Index's prosecution of magic when (s)he finds some elements within the activities being investigated that appear to him/her to coincide with modern definitions of science. If, however, magical ideas do not resemble modern science, or if they do not appear to include 'scientific' elements, then it follows that they can be excluded from consideration. They need not be included in a collection of documents, for example. Baldini and Spruit certainly exclude documents relating to 'folk magic' on precisely these grounds.[55] I would suggest that this is an important omission, for whilst some forms of folk magic may have lacked an intellectual underpinning, the inquisitor's evaluation of these ideas and practices was rooted in philosophy and theology. Discounting these documents, would prevent us from examining the Inquisition's intellectual and institutional responses to the full range of magical activities that its members encountered.

The problems caused by assuming this position are equally pressing on an analytical level. As we saw in the introduction, in their discussion "The effects of ecclesiastical censorship", Baldini and Spruit argued that during the sixteenth century only three individuals were put on trial for practising science or philosophy. It is necessary to consider how they arrived at this conclusion. They observed that in the

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extant archival holdings they were able to identify only twelve occasions when the Church conducted trials against "authors who are significantly related to science and natural philosophy". Having examined the documents more closely, they were able to discount nine of these trials on the basis that: "In most cases, the defendant was accused of heresy (Protestantism or sympathy for the Protestants) of the possession of forbidden works or else for magic, the defence or practice of judiciary astrology and divination. Only in the trials of Borri, Bruno and Stigliola the Holy Office examined philosophical and scientific views."[56]

It is unobjectionable that an individual who happens to have written 'scientific' works, but was prosecuted for his Protestant beliefs, should not be included in an account of the censorship of science. The comments on magic appear to me more troubling. Baldini and Spruit's position implies that if a scholar were prosecuted on the basis of the magical elements contained in his work then he cannot be considered to have been prosecuted for having practised science. As a consequence, this scholar need not be included in any reckoning of the Church's impact on science. There are a number of ambiguities in this position. First there seems to be a tension between the idea that magic can be included in this collection of documents, but excluded from the analysis of the effects of censorship on modern science. If we accept that magic should be accepted as part of the field of early modern science, then it seems logical to accept that prosecutions for magic should also be included in our analysis of the effects of ecclesiastical censorship. The only explanation for Baldini and Spruit's position is that they have cast a wide net, and included documents on a broadly conceived field of early modern science, but have chosen only to analyse cases in which individuals were engaged in activities that either were modern science, or contained elements which to the modern eye appear scientific.

Such a conclusion points to a deeper problem inherent in Baldini and Spruit's analysis. Their definition of modern science ultimately governs their determination of which trials or condemnations should be included in their study. Consequently, the object of their empirical enquiry, that is the extent of ecclesiastical censorship of modern science, is the product of a category that they have constructed. The most significant implication of this observation is the fact that if any adjustments were made to this definition of 'modern science', it would alter our perception of the extent to which it was affected by ecclesiastical censorship. This introduces a degree of instability into the analysis, for, even if we accept the principle of using the category 'modern science' or even 'science' in the early modern period, it would be virtually impossible to define it in such a way as to command universal assent. Furthermore, using Baldini and Spruit's particular notion of modern science may actually distort both our understanding of the impact of censorship on both early modern science, and the long-term development of modern scientific disciplines. This is because if we did adopt their methods for assessing whether a prosecution was genuinely directed against philosophy or science — that is one that excludes *a priori* prosecutions for magic — we would exclude much relevant material from our analysis. A brief discussion of the case of alchemy will explain why.

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It is clear from Baldini and Spruit's taxonomy of early modern science, that they have an ambivalent attitude towards alchemy. In the category "Science in a 'modern' sense", they include "chemistry (including both its 'scientific' forms and alchemy)". Elsewhere they expand on this comment noting that: "from a modern point of view, alchemy can hardly be viewed as a science, as it displays a secret vocabulary and methodology, it lacks a clear cut conceptual framework, and it is largely based on arbitrary procedures." Nevertheless, they note that alchemy should be included within the broad remit of their investigation as it was a repository of ancient practical knowledge, and provided the context from which modern, that is post-1650, chemistry would emerge. Recent research has called into question the validity of drawing such radical distinctions. Notably, the work of historians such as William Newman and Lawrence Principe has radically redrawn our understanding of alchemy and its relationship to chemistry. Debunking older accounts that presented this art as a spurious activity lacking in both theory and rigour, they have outlined its intellectual bases and demonstrated its technical precision. In so doing, they have underlined its importance as a contemporary field of intellectual and practical endeavour, and they have demonstrated that the terms 'alchemy' and 'chemistry' designated a single indistinguishable sphere of activity until the middle of the eighteenth century. There were, they suggested, fundamental continuities between alchemy/chemistry practised in the medieval and early modern periods.[57]

Whilst its reputation has been rehabilitated within the history of science, alchemy nevertheless raises important questions for any understanding of the censorship of early modern science, and indeed modern science. The theological grounds justifying ecclesiastical interventions into alchemy were often different to those justifying an intervention in the field of natural philosophy. For example, a natural philosopher who held the proposition that the individual soul was mortal to be true, was explicitly contradicting Catholic teachings on the soul. In this instance, the philosopher's heresy lay in an explicit denial of doctrine. There was nothing inherently heretical about alchemy, but an individual practising this art might attract the Inquisition's attention when his feats, real or claimed, were considered too wondrous to be achievable by mere human artifice. If his works were considered to be literally incredible, some might suspect him of having made a compact with a demon in order to achieve his ends. In this instance the alchemist was considered a heretic on account of his diabolic apostasy, witting or otherwise, which was regarded to be necessary in order for him to secure a demon's assistance. In this case was the Church investigating 'science'? As we have seen, alchemy is of fundamental importance to the history of chemistry. Was the Church investigating magic? Certainly. It is simply not possible to make clear-cut distinctions between science and magic in this period. If we were to exclude prosecutions for alchemy from our analysis on the grounds that they were rooted in the Church's campaign against magic, we would be unable to consider how such prosecutions affected the practice of this art in the sixteenth century, or to assess their effects on the long-term development of modern chemistry.[58]

This leads me on to my final reason for objecting to Baldini and Spruit's aim of

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investigating the Church's relationship with modern science. Baldini and Spruit have drawn attention to the polemical context in which the idea of a Church hostile to science was formed. Nevertheless, they continue to engage with the arguments put forward by the combatants of this debate. One of the key questions at stake in their work remains: "Did the Church hinder the emergence of modern science?" Baldini and Spruit's project provides a wealth of empirical evidence that will enable a reassessment of the various claims and counter-claims of the earlier antagonistic accounts, and their framework of analysis certainly makes it possible to engage directly with this question. Yet their focus on using these archives to assess the extent of the censorship of modern science, has limited the potential of these resources to pose questions about the history of early modern science. This is because, as the case of alchemy has shown, introducing the idea of modern science leads us to ignore the issues at stake for contemporaries when discussing the legitimate boundaries of knowledge. In turn this means that it is far harder to pose questions about the Church's motives for intervening in the range of disciplines, arts and practices that constituted early modern science, and the consequences of these interventions.

In order to pose fresh questions about the Church's attitude towards science in the early modern period, we must adopt a historicist perspective that respects contemporary categories. One of the most significant turns in Anglophone history of science over the last thirty years has been to stress the methodological importance of respecting contemporary disciplinary boundaries. In practice this has led to extensive emphasis on the use of the term 'natural philosophy' rather than 'science' when discussing knowledge making in the early modern period. This effort should not be limited to swapping the term 'science' for 'natural philosophy'. In the words of Andrew Cunningham, it is also necessary to "take natural philosophy seriously". It is incumbent upon the historian to seek to understand what this activity was, why it was created and the reasons why, and the methods by which, it was circumscribed within early modern culture. This drive to define the identity or, better still, the identities of natural philosophy, also suggests the need to fully define the identities of other early modern intellectual practices. As Baldini and Spruit have noted, natural philosophy does not exhaust the range of early modern activities that touched in some manner upon the natural world.[59]

In pre-modern Europe there clearly existed a constellation of disciplines and activities that were concerned with discussing the structure, causes, and purpose of the created order. In medieval and early modern Europe this was primarily carried out through the practice of various forms of philosophy, most obviously through the interpretation of various canonical texts written by Aristotle, Ptolemy, Euclid and Archimedes along with a series of medieval commentaries. Nevertheless, from the mid-fifteenth century anti-Aristotelian philosophers were seeking to expand the range of acceptable texts and traditions to include Neoplatonic texts, as well as various magical, astrological and divinatory writings. There were also a range of arts and activities that sought to extract utility and benefit from knowledge of nature. It is simply more straightforward to accept the existence of this broad range of activities,

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which was practised and valued by many contemporaries and vigorously opposed and contested by others, than to question which of these activities either was, or even contained 'modern science'. By taking each of these activities 'seriously' it will be possible to investigate each of them on their own terms, without even necessarily concerning ourselves with whether or not they constituted a unified activity that we could describe as 'early modern science'. Indeed approaching the subject matter in this way would allow us to problematize, and question the very concept of 'early modern science'.

This approach also offers the basis to pose new questions about the Church's role in the history of early modern science. We could begin to enquire of its impact in particular areas of activity, such as prosecutions for the propounding of philosophical ideas, or the number of individuals prosecuted for practising alchemy. This would form the basis for considering wider questions about the Church's role in large-scale transformations in early modern knowledge-making practices. For example, we may wish to consider the Church's influence on the redrawing of relations between magic and natural philosophy, or to question its role in the separation of alchemy and chemistry into two distinct spheres of activity.[60] These changes were wrought by the actions of individuals and groups including both the Church as an institution, its various constituent institutions and individual clerics. If we are to consider effectively the reasons why such complex re-arrangements within and between early modern disciplines and arts occurred, it is essential to reconstruct the multiple, and often conflicting, ways in which contemporaries understood them. If we are to factor censorship into our analysis of these changes, we must determine how the censors regarded these disciplines and arts, and the effectiveness of any actions they undertook as a consequence.

CONCLUSION

Discussion of the influence that the Catholic Church's censorial regime exerted upon the development and practice of science within Italy has been shaped by a number of assumptions formed within, and sustained by several distinct historiographical traditions. In this article I have sought to identify the most significant of these assumptions, and to suggest how alternative historiographical perspectives might be combined in order to construct a new framework with which to evaluate the Church's impact on science. This review has also suggested that it is necessary to reframe the questions that we ask of the valuable archival materials identified by Baldini and Spruit. For much of the nineteenth and twentieth centuries discussion of the impact of ecclesiastical censorship on science has been framed as a debate over the extent to which the Church did or did not hinder the advent of modern science. I have suggested that such questions should be substituted for more specific and limited examinations of the differing ways in which the Church's multiple censorial organs acted upon the various disciplines and arts that constituted early modern science. Pursuing such a programme of research will require the development of new means to analyse the various ways in which early moderns thought about and sought to control knowledge

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making. Such an approach will, I suggest, force us to question the utility of many of the categories that have previously been employed both to frame, and to answer questions about the Church's historic attitudes towards science. It will also enable us to begin to form new narratives of the emergence of modern science, and of the role played by the Church in this process.

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7. Baldini and Spruit, *op. cit.* (ref. 2), 86.
8. Baldini and Spruit, *op. cit.* (ref. 2), 88.
9. See for example Gregory Hanlon, *Early modern Italy, 1550–1800* (Basingstoke and London, 2000) chap. 18, who noted that "The old Whig tradition that Italy's promising start [in science] was broken by the Inquisition is not false", p. 252. It is also a story that has been reiterated by historians of science, see for example William Ashworth, "Catholicism and early modern science", in David Lindberg and Ronald Numbers (eds), *God and nature: Historical essays on the encounter between Christianity and science* (Los Angeles and London, 1986), 136–66, pp. 152–3. For discussion of the intellectual and theological climate of late sixteenth and early seventeenth-century Italy as a context for the Galileo Affair, see for example William Shea "Galileo and the Church" also in Lindberg and Numbers, 114–35, pp. 114–18, see too the observation that Galileo's trial had the effect of "inhibiting scientific speculation" in Catholic countries, p. 132; Ernan McMullin, "Galileo on science and scripture", in Peter Machamer (ed.), *The Cambridge companion to Galileo* (Cambridge, 1998), 271–347, pp. 274–5.
10. See John William Draper, *History of the conflict between religion and science* (New York, 1874); Andrew Dickson White, *A history of the warfare of science with theology in Christendom*, 2 vols (London, 1896). On Draper and his influence, see for example William Shea and Mariano Artigas, *Galileo observed: Science and the politics of belief* (Sagamore Beach, 2006), chap. 1, 1–26.
11. For an early revision of the idea of Italian decadence, see Helmut Koenigsberger, "Decadence or shift? Changes in the civilisation of Italy and Europe in the sixteenth and seventeenth centuries", *Transactions of the Royal Historical Society*, x (1960), 1–18, see especially his comments on science as an alternative outlet for Italian culture, p. 8. There are now a number of good introductions to Italy in the *seicento*, but for an account that offers an effective overview of

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relatively recent research and engages critically with the older literature, see Domenico Sella, *Italy in the seventeenth century* (Harlow, 1997).

12. For a balanced overview of Italian science from the mid sixteenth to the end of the eighteenth century, see for example Paula Findlen, "Science and society", in John A. Marino (ed.) *Early modern Italy, 1550–1796* (Oxford, 2002), 166–87, especially pp. 182–7, see too the annotated bibliography pp. 274–6.
13. The most obvious example is the wealth of research that has been carried out on the Jesuit's science. See for example the collections of essays in Mordechai Feingold (ed), *The new science and Jesuit science: Seventeenth century perspectives* (Dordrecht, 2002); *idem* (ed), *Jesuit science and the republic of letters* (Cambridge Mass. and London, 2003).
14. For a brief discussion of the challenges facing Italy during the early nineteenth century, see for example John A. Davis. "Introduction: Italy's difficult modernization", in *idem* (ed.), *Italy in the nineteenth century* (Oxford, 2000), 1–24. See too Lucy Riall, *The Italian Risorgimento: State, society and national unification* (London, 1994), and especially chapter 1 for her reflections on the function of the *Risorgimento* in Italian historiography.
15. On the Neapolitan Hegelians, see the essays in *Gli Hegeliani di Napoli e la construizione dello stato unitario, Mostra bibliografica e documentaria* (Naples, 1987), especially the Introduction.
16. On Hegel, see for example Peter Singer, *Hegel* (Oxford, 1983), chaps 2–4 and Frederick Beiser, *Hegel* (New York and Abingdon, 2005), esp. chaps 5 and 11.
17. For a discussion of the 'circulation of ideas', see Marcel Grilli, "The nationality of philosophy and Bertrando Spaventa", *Journal of the history of ideas*, ii (1941), 339–71, pp. 356–8.
18. Grilli, *op. cit.* (ref. 17), 356–8.
19. Grilli, *op. cit*. (ref. 17), 358–69, Gatti cited by Grilli on p. 357.
20. Benedetto Croce, "A working hypothesis: The crisis of Italy in the cinquecento and the bond between the Renaissance and the Risorgimento", in Eric Cochrane (ed.), *The late Italian Renaissance, 1525–1630* (London, 1970), 23–42. For a more detailed discussion of Italy's seventeenth century 'decadence', see *idem*, *Storia del'età barocca in Italia*, *pensiero-poetico e letteratura vita morale*, 2nd edn (Bari, 1935). Amongst Cantimori's most important works is his *Eretici italiani del cinquecento* (Florence, 1939). For a discussion of Cantimori's role in the historiography of the Italian Reformation, see Anne Jacobson Schutte, "Periodization of sixteenth-century Italian religious history: The post-Cantimori paradigm shift", *The journal of modern history*, lxi (1989), 269–84.
21. Luigi Firpo, "I primi processi campanelliani in una ricostruzione unitaria", *Giornale critico della filosofia italiana*, xx (1939), 7–43; *idem*, "Il processo di Giordano Bruno" *Rivista storica italiana*, xl (1948), 542–97, and lxi (1949), 5–59, republished with a series of documents as *Il processo di Giordano Bruno* (Rome, 1993), *idem*, "Processo e morte di Francesco Pucci", *Rivista di filosofia*, xl (1949), 371–405, *idem*, "Filosofia italiana e controriforma I. La condanna dei politici. II. La condanna di Patrizi", *Rivista di filosofia*, xli (1950), 150–73; *idem*, "Filosofia italiana e controriforma III. La proibizione delle opere del Campanella", *Rivista di filosofia*, xli (1950), 390–401; *idem*, "Filosofia italiana e controriforma IV. La proibizione di Telesio", *Rivista di filosofia*, xlii (1951), 30–47. The introduction and part II of "Filosofia italiana e controriforma" have been translated into English and published as "The flowering and withering of speculative philosophy – Italian philosophy and the Counter Reformation: The condemnation of Francesco Patrizi", in Cochrane (ed), *op. cit.* (ref. 20), 266–84.
22. Firpo, "Flowering and withering", *op. cit.* (ref. 21), 270.
23. Firpo, "Flowering and withering", *op. cit.* (ref. 21), 270–1.
24. Although it must be noted that Firpo later altered his interpretation of the Counter Reformation, adopting a position closer to that of Croce in which he viewed it as a "crisis of confidence". See for example, his "Political philosophy: Renaissance utopianism", in Cochrane (ed.), *op. cit.* (ref.

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20), 149–67, especially p. 151.

25. See for example Shea, *op. cit.* (ref. 9), 117, Ashworth, *op. cit.* (ref. 4), 149; Findlen, *op. cit.* (ref. 12), 171–7; Baldini and Spruit also provide documents on most of these individuals (ref. 2); John Henry, "Religion and the Scientific Revolution", in Peter Harrison (ed.), *The Cambridge companion to science and religion* (Cambridge, 2010), 39–58, pp. 40–41.
26. Richard Blackwell observed that had Copernicus published his work either one hundred years before or after he in fact did, then the Galileo Affair probably would not have happened, "Galileo Galilei", in Gary Ferngren (ed), *Science and religion: A historical introduction* (Baltimore and London, 2002), 105–16, p. 108.
27. See for example Ashworth, *op. cit.* (ref. 9), 9.
28. Shea, *op. cit.* (ref. 9), 114–18.
29. On the depiction of the Catholic Church by historians of science, see Steven J. Harris who also briefly makes the point that the account of the Church in much of the literature on the Galileo Affair is in many respects inadequate, "Roman Catholicism since Trent", in Gary Ferngren (ed.), *op. cit.* (ref. 26) 247–60, pp. 247–8. I will restrict myself to one example of the use of the Counter-Reformation as a factor that explains the historical contingency of the Church's hardening attitude towards science in this period. In recent years there have been several highly sophisticated analyses of the role played by scriptural exegesis during the Galileo Affair, which have drawn attention to the importance afforded by key members of the Church to the literal interpretation of scripture. This preference is explained solely as a by-product of the Counter-Reformation Church adopting a "defensive'" response to the Protestant challenge. See for example Richard Blackwell, *Galileo, Bellarmine and the Bible* (Notre Dame, 1991), esp. 84–85; McMullin, *op. cit.* (ref. 9), esp. 273–4.
30. See Croce, *op. cit.* (ref. 20), 485. This view was echoed by Firpo, for although in 1950 he considered Galileo's trial to be the 'epilogue' of the condemnations of the 1590s, he later wrote that the work of reason, suppressed in the ethical and religious fields, continued in the field of the physical sciences, see *op. cit.* (ref. 24), 167.
31. For a discussion of the changing names allotted to, and the historiographical problems inherent in labelling the early modern Catholic Church, see John William O'Malley, *Trent and all that: Renaming Catholicism in the early modern era* (Cambridge Mass., 2001). Two recent synthetic accounts of the Catholic Church with useful bibliographies are Robert Birely, *The refashioning of Catholicism, 1450–1700* (Washington D.C., 1999) and R. Po-Chia Hsia, *The world of Catholic renewal 1540–1770*, 2nd edn (Cambridge, 2005).
32. Hsia, *op. cit.* (ref. 31), Introduction; O'Malley, *op. cit.* (ref. 31), 8.
33. Cantimori, *op. cit.* (ref. 20). For an introduction to the literature on Italian evangelism, see for example Eva-Maria Jung, "On the nature of evangelism in sixteenth-century Italy", *Journal of the history of ideas*, xiv (1953) 511–27; Philip McNair, *Peter Martyr in Italy: An anatomy of apostasy* (Oxford, 1967); Dermot Fenlon, *Heresy and obedience in Tridentine Italy: Cardinal Pole and the Counter Reformation* (Cambridge, 1972). For a later critique of this literature and a broader picture of reformist movements, see Elisabeth Gleason, "On the nature of sixteenth-century Italian evangelism: Scholarship, 1953–1978", *Sixteenth century journal*, ix (1978), 3–26 and more recently John Jefferies Martin, *Venice's hidden enemies: Italian heretics in a Renaissance city* (Baltimore and London, 2003), introduction.
34. The documents have been published in Massimo Firpo and Dario Marcatto (eds), *Il processo inquisitoriale del Cardinale Giovanni Morone*, *edizione critica*, 6 vols (Rome, 1981–95), and *I processi inquisitoriali di Pietro Carnesecchi (1557–1567)*, *edizione critica*, 2 vols (Rome, 1998–2000). For a summary of Firpo's research see Dermot Fenlon, "Pietro Carnesecchi and Cardinal Pole: New perspectives", *Journal of ecclesiastical history*, lvi (2005), 529–33.
35. Discussion of the Galileo Affair has been dominated by accounts which foreground its intellectual history. While the clash of ideas at the heart of Galileo's encounters with the Church is obviously

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of paramount importance, and much excellent work has been done on these matters, it represents only one facet of the problem that requires explanation. A number of works have highlighted the political and social contexts in which Galileo worked, for example Mario Biagioli, *Galileo courtier: The practice of science in a culture of absolutism* (Chicago, 1994), and Michael Shank "Setting the Stage: Galileo in Tuscany, the Veneto and Rome", in Ernan McMullin (ed), *The Church and Galileo* (Notre Dame, 2005), 57–87, but few have paid serious attention to the institutional history of the Church and its constituent parts. Francesco Beretta's work is a rare exception; see especially his, *Galilée devant le tribunal de l'Inquisition* (Fribourg, 1998). See too Baldini and Spruit's account of the structure of the Inquisition in *op. cit.* (ref. 2), 31–65. The bibliography on the Inquisition is extremely large, but for an overview of its history, see Edward Peters, *Inquisition* (1989); Andrea del Col, *L'inquisizione in Italia dal XII al XXI secolo* (Milan, 2006).

36. On the medieval Inquisition, see Peters, *op. cit.* (ref. 35), chap. 2; del Col, *op. cit.* (ref. 35), Prima Parte. For an example of the potential uses of Inquisitorial handbooks see Neil Tarrant, "Giambattista Della Porta and the Roman Inquisition: Defining nature's limits in sixteenth-century Italy", *British journal for the history of science*, published online August 2012, 9–13.
37. See for example the important collection of essays: John Tedeschi, *The prosecution of heresy: Collected essays on the Inquisition in early modern Italy* (New York, 1991).
38. Paul Grendler, *The Roman Inquisition and the Venetian press, 1540–1605* (Princeton, 1977).
39. Vittorio Frajese, "La revoca dell' index sistino e la curia romana (1588–1596)", *Nouvelles de la république des lettres* (1986), 15–49; *idem*, "La politica dell' indice dal tridentino al clementino (1571–1596)", *Archivio italiano per la storia della pietà*, xi (1998), 304–54. See also Gigliola Fragnito, *La bibbia al rogo: La censura ecclesiastica e i volgarizzamenti della scrittura* (Bologna, 1997); *idem*, "La censura libraria tra Congregazione dell'Indice, Congregazione dell'Inquisizione e Maestro del Sacro Palazzo (1570–1596)", in Ugo Rozzo (ed.), *La censura libraria nell'Europa del secolo XVI* (Udine, 1997), 163–75. Little of this literature has been translated into English, but see Fragnito, *op. cit.* (ref. 1).
40. Francesco Beretta is one of the few historians to draw on this research to help to explain the censorship of science/philosophy, see his "Orthodoxie philosophique et inquisition romaine au 16^{e}–17^{e} siècles. Un essai d'interprétation", *Historia philosophica*, iii (2005), 67–96. For a more detailed discussion of his work see below.
41. Francesco Beretta, "Giordano Bruno e l'Inquisizione Romana. Considerazione sul processo", *Bruniana e campanelliana*, vii (2001), 15–49.
42. Beretta, *op. cit.* (ref. 41), 17–20.
43. Beretta, *op. cit.* (ref. 41), 17–20.
44. For a discussion of the relationship between orthodoxy, heterodoxy and heresy, see for example Edward Peters, *Heresy and authority in medieval Europe: Documents in translation* (London, 1980), Introduction, especially p. 14; R.I. Moore, *The formation of a persecuting society: Power and deviance in Western Europe, 950–1250*, paperback edition (Oxford, 1990) pp. 68–69.
45. Beretta, *op. cit.* (ref. 40), 67.
46. Beretta, *op. cit.* (ref. 40), 68–71.
47. Beretta, *op. cit.* (ref. 40), 68–71. For a more detailed discussion of these issues, see *idem*, "Une deuxième abjuration de Galilée ou l'inaltérable hiérarchie des disciplines", *Bruniana e campanelliana*, ix (2003), 9–43, pp. 11–21.
48. Beretta, *op. cit.* (ref. 40), 71–75.
49. Beretta, *op. cit.* (ref. 40), for his reading of the novelty of *Apostolici regiminis*, see especially p. 75. For an alternative interpretation of this decree, which suggests it did little more than reiterate a longstanding position within the Church, see Eric Constant, "A reinterpretation of the Fifth Lateran

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Council Decree, *Apostolici regiminis* (1513)", *Sixteenth century journal*, xxxiii (2002), 353–79.

50. Beretta, *op. cit.* (ref. 40), 71–76.
51. For an application of Beretta's methods to the case of magic, see Tarrant, *op. cit.* (ref. 36).
52. Baldini and Spruit, *op. cit.* (ref. 2), 13.
53. Baldini and Spruit, *op. cit.* (ref. 2), for their discussion of the definition of science see pp. 13–16; for their 14 categories see pp. 16–27; quote p. 16.
54. Baldini and Spruit, *op. cit.* (ref. 2), 14.
55. Baldini and Spruit, *op. cit.* (ref. 2), 24.
56. Baldini and Spruit, *op. cit.* (ref. 2), 70.
57. See for example William Newman and Lawrence Principe, "Alchemy vs. chemistry: The etymological origins of a historiographic mistake", *Early science and medicine*, iii (1998), 32–65; *idem*, "Some problems with the historiography of alchemy", in William Newman and Anthony Grafton (eds), *Secrets of nature: Astrology and alchemy in early modern Europe* (Cambridge Mass. and London, 2001), 385–432.
58. On the Inquisition and alchemy, see Tarrant, *op. cit.* (ref. 36), esp. p. 11 and p. 21.
59. One of the first studies to demonstrate the importance of understanding contemporary disciplines was Robert Westman's "The astronomer's role in the sixteenth century: A preliminary survey", *History of science*, xviii (1980), 105–47. See too Andrew Cunningham, "Getting the game right: Some plain words on the invention of science", in *Studies in the history and philosophy of science*, xix (1988), 365–89; *idem*, "How the *Principia* got its name: Or, taking natural philosophy seriously", *History of science*, xxix (1991), 377–92; Margaret Osler, "Mixing metaphors: Science and religion or theology and natural philosophy in early modern Europe", *History of science*, xxxv (1997), 91–113.
60. These research questions have been set out by John Henry, see "The fragmentation of Renaissance occultism and the decline of magic", *History of science*, xlvi (2008), 1–48.

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