

Appendix A: The connections between Bacon's law and his scientific method in the literature

This appendix provides evidence for the validity of three claims made in the Introduction of the paper. First, we show that the arguments about the existence of a connection between Bacon's scientific methodology and his jurisprudential background, made by a small subset of Bacon scholars, have been neither widely considered nor widely accepted in the vast literature on Bacon. In fact, the claims of such a connection remain contentious. More generally, we document that scholarship on the origins of Bacon's ideas about the scientific method has devoted remarkably little attention to the possible influence of Bacon's legal background. This point is important because the genesis of Bacon's ideas about scientific methodology has been a topic of enduring interest for Bacon scholars, generating much controversy. For example, many scholars portray Bacon as a one-of-a-kind genius alone as the 17th century began (see, e.g., Rees 2004, Urbach 1987: 24, Jardine 1974: 2). Others suggest that Bacon's ideas were heavily influenced by factors such as his religious beliefs, alchemy, magic, natural crafts, and classical philosophy, rhetoric, and science (see, e.g., Peltonen 2004, Rossi 1968: xii, 15, 39, 71; Zagorin 1998: 28; Henry 2002: 11). Our claim, therefore, is not that the broad Bacon scholarship has simply ignored the connection between Bacon's law and his scientific methodology, while somehow accepting it. Rather, one must conclude that much of the extant literature either has not even considered this connection to be a possibility or, alternatively, has deemed any such influence to be of no substantive importance.

The second claim on which this Appendix provides evidence is that among those few scholars who have commented on a possible connection between Bacon's legal background and his scientific methodology there exists considerable heterogeneity concerning which specific aspect of Bacon's scientific methodology may have been influenced by his immersion in law. Therefore, even for those accepting a connection between Bacon's law and his scientific methodology, there remains controversy concerning the answer to the question of which elements of Bacon's scientific methodology have their origins in law. This question is in need of further investigation, to which our paper makes a contribution.

The third claim is that there is a lack of agreement about which aspect of Bacon's jurisprudence was most influential, even among that small subset of scholars who have noted the existence of a connection between Bacon's scientific methodology and his jurisprudential background. The most important disagreement is whether it is Bacon's knowledge of the civil law tradition that is important or whether his immersion in the common-law was the crucial factor.

To collect the supporting evidence for our claims, we conducted a detailed search of the literature on Bacon published within the last 30 years. Specifically, we searched for all JSTOR entries in which the word 'Bacon' appears in the title and that are classified in any of the following fields: British Studies; Classical Studies; Economics; General Science; History; History of Science and Technology; and Political Science. We examined all identified articles. Given the central role of book reviews in many of these fields, this process allowed us to identify books published in the last 30 years that focused on Bacon. We examined these books also. In addition, where the

identified articles or books referred to any other articles and books that might have been relevant to this exercise (regardless of the publication date), we examined all so-identified publications.

Our survey of the literature shows that the scholarship on Bacon can be organized into the following four broad strands. The first (strand I) consists of an overwhelmingly large number of contributions that either do not devote any attention to Bacon's legal background or, alternatively, mention Bacon's legal background but do not connect it to any aspect of his scientific methodology. The second (strand II) includes contributions that explicitly dismiss the possibility that Bacon's legal background may have shaped his scientific methodology. The items in strand II therefore support our claim that the link between Bacon's legal background and his scientific methodology is not well accepted and, hence, worthy of further examination. The third strand (strand III) comprises contributions that conjecture or otherwise comment on some form of connection between Bacon's legal background and some aspect of his scientific methodology, but do not explicitly and purposefully investigate such a hypothesis in any detail. The final strand (strand IV) involves a small set of contributions that explicitly hypothesize and investigate a connection between Bacon's legal background and some aspect of his scientific methodology.

In what follows, we provide an overview of the literature grouped in the above-identified four strands. In doing so, we focus on those aspects of the literature that are relevant to the three claims articulated above.¹ The final section of this appendix summarizes our findings.

Strand I: Contributions that either do not devote any attention to Bacon's legal background or, alternatively, mention Bacon's legal background but do not connect it to any aspect of his scientific methodology.

The scholarship on Bacon is voluminous. A large majority of works (original contributions or book reviews) on different aspects of Bacon's scholarly and other engagements never mention Bacon's background in law or legal work and, hence, seek no connection between Bacon's immersion in law and his scientific methodology. These contributions include Manzo (2006), Strazzoni (2012), Corneanu et al. (2012), Georgescu and Giurgea (2012), Lancaster (2012), Dzelzainis (2006), Park (2008), Vickers (1992), Vickers (2001), Manzo (2003), Muntersbjorn (2002), Studer (1998), Milner (1997), Rees (2002), Jalobeanu (2012), Anstey (2012), Langman (2012), Walton (2007), Kepple-Mamros (2007), Russell (1955), McCaskey (2009), Jones (2009), Manzo (2006), Solomon (2004), Anstey (2003), Jacob (2002), Wolfe (2002), Henry (2002), Harkness (2005), MacLean (1997), Achinstein (1997), Manzo (2000), Barnaby (2001), and van den Berg (1998).

In the introduction to what is perhaps the most comprehensive current overview of Bacon's contributions (Peltonen 1996c), Peltonen (1996a) only briefly mentions Bacon's legal opus and jurisprudential thought, and then only in the context of law reform. Neither Peltonen (1996a) nor

¹ For brevity we omit references to specific page numbers when providing direct quotations from the surveyed readings. Because we provide detailed bibliographical information on all surveyed readings, interested readers should be able to easily identify the exact position of any stated quotation within the pertinent reading.

any of the other chapters in Peltonen (1996c) explicitly link Bacon's legal thought to the core of Bacon's scientific method. Indeed, in Peltonen (1996c), the only reference to Kocher (1957) [classified in strand IV] is the following comment: "That certain statements of a general nature could be fruitfully applied to more than one case may well be a conviction deriving from his belief in the power of maxims in Jurisprudence" Kusakawa (1996). This is not followed up by any other statements about the origins of Bacon's views in Peltonen (1996c).

The *Stanford Encyclopedia of Philosophy* and the *Internet Encyclopedia of Philosophy* both concentrate on Bacon's non-legal writings, but provide a significant amount of detail on Bacon's legal career. Neither entry on Bacon, however, in any way connects his legal background with his work on scientific methodology. The same applies to Applebaum (2000), a further encyclopedia entry on Bacon.

Among the many themes and questions examined by Bacon scholars, one particular issue of enduring interest has been the genesis of Bacon's ideas, especially his ideas about scientific methodology. As the ensuing paragraphs show, the analysis of the origins of Bacon's ideas on scientific methods has devoted remarkably little attention to his legal background. For example, Rossi (1968) focuses on investigating the cultural environment influencing Bacon, exploring many such influences—classical culture, magico-alchemical inquiries, astrology and Copernican astronomy, atomistic theories of matter, classical mythology, religious conceptions of knowledge, existing philosophy, sixteenth century rhetorical writers, and pagan and evangelical moralities—but, importantly, not the law. Rossi (1968) concludes his arguments by "stressing the connections between Bacon's new logic and the tradition of Renaissance rhetoric" when analyzing "the historical and cultural environment in which Bacon's philosophy developed...".

Gaukroger (2001, 2006) is also interested in the cultural influences on Bacon. He does not ignore law, but rather emphasizes that Bacon treated natural philosophy and law in analogous ways, rather than viewing one as providing inspiration for the other. For Gaukroger, Bacon aimed to reform both law and natural philosophy as part of his overall project of creating and using a new method for the production of knowledge. In Gaukroger's reading (2001, 2006), for both of these reform projects and for Bacon's new method, it is renaissance humanism, English renaissance culture, and the rhetorical tradition, emphasizing psychology, that provide inspiration and models. "Since our interest is in the ways in which Bacon's concern with legal questions bears upon his program in natural philosophy, it is important we begin by asking what the connection between law and natural philosophy could be. To understand this connection we need to introduce a third ingredient: rhetoric, conceived as the general discipline of the rules of discovery and presentation driving classical humanism. We need to understand the relation between law, natural philosophy, and the general kinds of claim made about discovery and the organization of inquiry in the theories of rhetoric that make up the core of classical humanist learning. Without this, I suggest, law and natural philosophy simply do not have a relation beyond that of analogy—and Bacon clearly intends far more than that. What underlies his reform of natural philosophy is a distinctive stance within traditional humanism. The connection between natural philosophy and the law is mediated

by rhetoric, for rhetoric contains the art of discovery that underlies both law and natural philosophy...[Therefore in Bacon's aims the] *law itself, particularly legal procedure and the source of legal authority, is transformed*, [emphasis added] so that it coheres with the aims of the reformulated humanism and can act as an exemplification of the values of the humanist. In this way, it can be made to bear the weight of the wholly general claims that humanist theories of rhetoric made about discovery and presentation...[The law] was therefore the natural place to which to return, *if one was starting again from scratch, as was Bacon* [emphasis added]; and his general understanding of the aims and procedures of humanism led him to ask what forms of legal inquiry, argument, and organization meet these aims and procedures, to envisage what the legal system reformed along fundamental lines might look like and what practically might be done to remedy defects in the current practice of law" Gaukroger (2001).

Harkness (2007) characterizes Bacon as appropriating the experimental culture of the ordinary citizens of the City of London for his own ends. Nevertheless, her chosen foil for Bacon is Hugh Prat, a lawyer, whose profession Harkness (2007) does not link to Prat's avid collection of facts. Rees (2004) praises Bacon's contributions to scientific methodology, but sees no role for law as a potential contributing factor: "...*the Baconian form of eliminative induction seems to have been altogether original* [emphasis added]. There seems to be nothing of the kind in ancient, scholastic or humanist logic. There may be precedents for some of the apparently novel features of Bacon's thinking on this question, but if such there be I have yet to find them." Furthermore, "Bacon's was as sharp and as clean a break with certain versions of the past as it was possible to make. And the break involved not just a philosophy of knowledge but also a reinscription of human possibility."

Henry (2002) is explicitly interested in the genesis of Bacon's scientific method, but emphasizes its distinctly non-legal origin: "In the mysterious case of Francis Bacon, we will see that the story of how he came to do what he did takes us through unexpected and unfamiliar territory—through realms that now seem to have little or nothing to do with natural science, but that were once intimately connected with it. These are the realms of religion and magic." The role of law in the formulation of Bacon's scientific methodology is considered only briefly in Chapter 12: "It has been suggested that the interrogation of witches was seen by Bacon as a model for the interrogation of nature, and that the use of mechanical devices in experimental investigations was seen as a way of extracting nature's secrets by torture, comparable to the use of the rack or other machines of torture supposedly in use in the legal process." Yet Henry (2002) concludes with: "...it is important to bear in mind the magical and religious antecedents of Bacon's thought".

Perez-Ramos (1988) notes that his "inquiry is primarily an investigation into the key notions or 'ingredients' that, [according to him], make up Bacon's idea of science...". Law is awarded no place in Perez-Ramos's inquiry, even though he devotes attention to subjects such as astrology, astronomy, Copernican theory, corpuscularianism, craftsmanship, experimental tradition, mathematics, the technocratic view of science, etc. Minkov (2010) argues that his "aim is to show that an inquiry into what is good for man is the foundation and core of Bacon's thought".

Even though Minkov's (2010) treatise includes a chapter entitled "Bacon on justice and death", there are no references in the chapter to Bacon's law, and especially to the connection between Bacon's legal background and his scientific methodology.

Matthews' (2008) central thesis concerning the genesis of Bacon's ideas revolves around the influence of religion, not law: "Over the last ten to twenty years there has also been a trend toward understanding Bacon as a creature of his context, and this implies taking his theological statement seriously and interpreting them in the light of the religious fabric of Tudor and Stuart England." Harrison (2009) in a review of Matthews (2008) notes: "This is a welcome volume that makes a good case for the influence of theology on Francis Bacon's thought and sheds light on the nature of his religious convictions."

Solomon and Martin (2005), as the editors of a volume commemorating *The Advancement of Learning*, note that "five of our essayists take up Bacon's more or less successful efforts to forge a coherent and creative relationship with past intellectual, rhetorical, or religious traditions", but do not comment on Bacon's legal background. Instead, the edited volume refers to Bacon's indebtedness to, among other influences, the history of exploration, Neoplatonism, the ancient tradition of atomism, transcendental mysticism, Ockhamist nominalism, and transcendental traditions. Hogan and Schwartz (1983) comment on prior work by Wheeler (1983) [classified in strand IV] who "shows that in the field of law and jurisprudence, Bacon used his *new method* [emphasis added] to produce the 25 maxims, and he believed they possessed scientific validity. This method, as applied to law, we have described below under the making of a maxim." They, however, do not argue that Bacon's jurisprudence is a source for his scientific methodology.

Cohen (1982) combines the discussion of Bacon's common-law background with Bacon's scientific methodology but never explicitly suggests the former may have influenced the latter: "Francis Bacon, who made the first attempt at a systematic study of variative induction, laid great stress on its significance for legal and moral reasoning as well as for reasoning about the facts of nature. Wishing to produce a systematic digest of the common law, Bacon saw judicial decisions as the ultimate singular facts that could be taken to support a restatement of the law in general terms. Bacon held that as a common lawyer arrived at greater and greater generality in the formulation of his legal rules—as he moved higher and higher up what Bacon called 'the pyramid of axioms'—the lawyer would find his rules beginning to approximate to standard moral principles....So for Bacon all the basic patterns of inductive reasoning could be applied in a normative context just as well as in a factual one: variation of evidential instances, increase of certainty via increase of generality, avoidance of trivial increases in generality via the requirement that every increase should lead to new knowledge, and so on." Huxley (2004) and Cardwell (2002) discuss Bacon's legal writings but make no attempt to connect them to Bacon's scientific methodology.

McKnight (2007) likewise sees no role for law in the emergence of Bacon's scientific methodology. He argues that "Bacon's so-called scientific utopianism is grounded in his religious convictions that his age was one of Providential intervention and that he was God's agent for an

apocalyptic transformation of the human condition". Similarly, Sargent (2012) does not refer to Bacon's legal background when noting that "What did set Bacon apart was the way in which he produced a popular synthesis of the many examples of practical knowledge that flourished in his time and constructed a powerful argument for a transformation of the Aristotelian philosophical framework that dominated the universities."

Lewis (2012) focuses on Bacon's ingenuity, but sees no contributing role for law. In fact, his very discussion rejects such a possibility in noting that "...Bacon asserts that the more ingenious one is, the less likely one is to arrive at true knowledge of things: a strong ingenium will more often than not cause one to desert the light of nature for the dark caverns of the imagination.... Although exerting oneself ingeniously to maintain doubt is perfectly licit for a lawyer pleading a case or for a student involved in a university disputation, the natural philosopher should apply as much ingenuity to resolving doubt as he does to identifying it."

Martin (1993) in a book review notes that "John C. Briggs...argues for an intimate relationship 'between Bacon's famous reform of scientific method and his less well-known conceptions of rhetoric, nature and religion', and he proposes to display this relationship by discussing Bacon's debts to, and radical adaptations of, several 'normative Renaissance traditions'. These traditions, which Briggs gathers up and dubs the 'Timaeic' tradition, include the Wisdom Literature, the Pauline Epistles, old philosophies of organic nature, and the ideas of the Greek atomists. Informing all of them are Bacon's adaptations of ancient and Renaissance philosophies of rhetoric...". He makes no reference to Bacon's engagement in law.

In commenting on the origin of Bacon's scientific method, Pesic (2014) emphasizes Bacon's "use of Aristotelian philosophy and ancient myth as points of departure for what he called his 'new organon'" and does not mention any role for law. Turner (2013) examines "the political imaginary of Bacon's philosophy of nature as elaborated in the *Novum Organum* (1620)", but does not draw a connection between the latter and Bacon's legal background.

Bacon's legal background is similarly not referred to in Giglioni (2014), who notes that "In Bacon's system of knowledge, philosophy, as the domain of reason, starts from *historiae* and *fabulae*, once memory and the imagination have fulfilled their cognitive tasks". Commenting on the origin of Bacon's methodological approach, Pastorino (2011) suggests that "Bacon's ideas...can be tied to experiments for the determination of specific gravities born in a monetary context: Bacon's investigation was very likely a generalization of Jean Bodin's experiments". Neither Giglioni (2014) nor Pastorino (2011) mention law.

Vickers (1978) emphasizes Bacon's "intensely practical mind, not much inclined to abstract speculation", without suggesting that this attitude might have been derived from legal experience—even though Vickers later emphasizes how Bacon's personal success was shaped by his training in law, in particular "...the faculties which brought [Bacon] to eminence in that profession, intellectual penetration coupled with imagination and eloquence. Bacon's whole life-work was one of persuasion, whether as a lawyer or parliamentarian, counsellor to the monarch, or advocate of the new science. He was the master-rhetorician of his day in the sphere of public

life." Similarly, in a review of multiple new works on Bacon, Vickers (2004) mentions no role for law in the origins of Bacon's scientific methodology.

Peterfreund (2000) emphasizes the Calvinist, not legal, origins of Bacon's thought. In a book review of Jardine's work, Manzo (2001) mentions Jardine's "claims that Bacon the politician and Bacon the philosopher are interconnected", but never comments on Bacon the jurist. Snider (1991) comments, but never elaborates, on the following: "The equation of natural with civic law hinges on Bacon's dual authority, his capacity to function in the political and philosophical realms according to a unified code of impartiality and evenhandedness."

In an essay about Bacon's concept of objectivity, Zagorin (2001) notes that Bacon "was thoroughly acquainted with objectivity in the sense of impartiality as one of the requirements of truth and justice in both law and history, and sought to practice it himself in his activities as a judge, a writer on jurisprudence and a historian". However, Zagorin (2001) does not postulate a link between Bacon's legal background and his scientific methodology. In a review of Solomon (1998) [grouped into strand III below], Daston (1998) notes that "Solomon's reading of Bacon admirably attempts to bring together Bacon the pragmatic politician with Bacon the visionary natural philosopher, and to situate both in the tumultuous world of early modern commerce", not law.

Hale's (2013) goal is to "examine the place of the New Atlantis in Bacon's larger project and its place in the founding of modern political philosophy, briefly showing the ways Bacon's thought relates to Plato, Machiavelli and Hobbes". She does not discuss the potential influence of Bacon's legal background on his scientific methodology. The same is true of Price (2002). In a review of Sargent's work, Vickers (2001) makes no connection between Bacon's law and his scientific methodology, but notes that "Sargent rightly stresses the importance of Bacon's religious view". Peltonen (2001), Snider (1994), Ellis (2015), and Funari (2011) similarly never connect Bacon's law with his scientific methodology.

In a comparative survey of Bacon's natural and civil history, Manzo (2012) cites Kocher (1957) and Martin (1992) [grouped into strand IV] but notes that "Bacon's ideas about the origins of legal norms deserve a discussion in their own right, which lies outside the purpose of this article". In a further contribution that focuses on Bacon's legal thought, but does not draw a connection between Bacon's legal thought and his scientific methodology, Manzo (2014) examines "in what sense Bacon understood legal certainty". Indeed, her aim is to "...explore Bacon's views on certainty in his legal thought and practice, hoping that it may lead to a better understanding of the epistemological side of his legal thought and *prompt further studies* [emphasis added] to examine its possible connections to his treatment of certainty as it applies to the laws and facts of nature."

Wormald (1993) argues that Bacon wrote about policy using a similar methodology as when he wrote about natural science: history provided the set of facts from which theories of policy could be made. Indeed, Wormald contends that Bacon's scientific method was developed to examine the relationship between history and policy as much as to examine the relationship

between observations and scientific knowledge. Although for Wormald the history of the common-law is part of history in general, the use of the common-law is purely as history rather than any connection being drawn between the methodology of the common-law and natural science epistemology. Box (1994) in a review of Wormald (1993) comments on the author's "attempt to polish Bacon's tarnished scientific reputation by, in effect, substituting civil history for natural history as the basis of Baconian science. The former is paramount on the assumption that it contributes to parallel programmes in natural and civil science. ... however, the category of civil history is so expansive and the purpose of civil science so vague that far from enhancing Bacon's stature, this reinterpretation actually makes [Bacon's] scientific importance seem even more dubious."

Works grouped in strand I

- Achinstein, Sharon. 1997. "Origin and Authority in Seventeenth-Century England: Bacon, Milton, Butler by Alvin Snider." *Modern Philology*, 95:1, 113-116.
- Anstey, Peter. 2003. "The Oxford Francis Bacon, XIII: The Instauration Magna: Last Writings by Graham Rees." *Minerva*, 41, 89-92.
- Anstey, Peter. 2012. "Francis Bacon and the Classification of Natural History." *Early Science and Medicine*, 17:1/2, 11-31.
- Applebaum, Wilbur (ed.). 2000. *Encyclopedia of the Scientific Revolution from Copernicus to Newton*. New York, NY: Garland Publishing.
- Barnaby, Andrew. 2002. "A Thinker for All Seasons: Sir Francis Bacon and His Significance Today by David Burnet." *Isis*, 92:2, 395.
- Box, Ian. 1994. "Francis Bacon: History, Politics and Science, 1561–1626 by B.G.H. Wormald." *History of Political Thought*, 15:2, 294-296.
- Cardwell, Kenneth. 2002. "An Overlooked Tract by Francis Bacon." *Huntington Library Quarterly*, 65:3/4, 421-433.
- Cohen, L. Jonathan. 1982. "Intuition, Induction, and the Middle Way." *The Monist*, 65:3, The Philosophy of Wilfrid Sellars, 287-301.
- Corneanu, Sorana, Guido Giglioni and Dana Jalobeanu. 2012. "Introduction: The Place of Natural History in Francis Bacon's Philosophy." *Early Science and Medicine*, 17:1/2, 1-10.
- Daston, Lorraine. 1998. "Objectivity in the Making. Francis Bacon and the Politics of Inquiry by Julie Robin Solomon." *History and Philosophy of the Life Sciences*, 20:3, 366-367.
- Dzelzainis, Martin. 2006. "'The Feminine Part of Every Rebellion': Francis Bacon on Sedition and Libel, and the Beginning of Ideology." *Huntington Library Quarterly*, 69:1, 139-152.
- Ellis, Robert P. 2015. *Francis Bacon. The Double-Edged Life of the Philosopher and Statesman*. Jefferson, NC: McFarland and Company.
- Funari, Anthony J. 2011. *Francis Bacon and the Seventeenth-Century Intellectual Discourse*. New York, NY: Palgrave Macmillan.

- Gaukroger, Stephen. 2001 (cited as 2002 in some book reviews). *Francis Bacon and the Transformation of Early-Modern Philosophy*. Cambridge, UK: Cambridge University Press.
- Gaukroger, Stephen. 2006. *The Emergence of a Scientific Culture. Science and the Shaping of Modernity, 1210-1685*. Oxford, UK: Oxford University Press.
- Georgescu, Laura and Mădălina Giurgea. 2012. "Redefining the Role of Experiment in Bacon's Natural History: How Baconian Was Descartes Before Emerging from His Cocoon?" *Early Science and Medicine*, 17:1/2, 158-180.
- Gigliani, Guido. 2012. "Historia and Materia: The Philosophical Implications of Francis Bacon's Natural History." *Early Science and Medicine*, 17:1/2, 62-86.
- Hale, Kimberly Hurd. 2013. *Francis Bacon's New Atlantis in the Foundation of Modern Political Thought*. Lanham, MD: Lexington Books.
- Harkness, Deborah E. 2005. "The Instauration magna Part II: Novum organum and Associated Texts by Graham Rees and Maria Wakely (eds.)." *Renaissance Quarterly*, 58:2, 682-683.
- Harkness, Deborah E. 2007. *The Jewel House: Elizabethan London and the Scientific Revolution*. New Haven, CT: Yale University Press.
- Harrison, Peter. 2009. "Theology and Science in the Thought of Francis Bacon by Steven Matthews." *Isis*, 100:3, 660-661.
- Henry, John. 2002. "The 'Instauration Magna': Last Writings by Francis Bacon, by Graham Rees." *The British Journal for the History of Science*, 35:1, 108-110.
- Henry, John. 2002. *Knowledge Is Power: Francis Bacon and the Method of Science*. London, UK: Icon Books.
- Hogan, John C. and Mortimer D. Schwartz. 1983. "On Bacon's Rules and Maxims of the Common Law." *Law Library Journal*, 76, 48-77.
- Huxley, Andrew. 2004. "The Aphorismi and a Discourse of Laws: Bacon, Cavendish, and Hobbes 1615-1620." *The Historical Journal*, 47:2, 399-412.
- Jacob, James R. 2002. "Francis Bacon and the Transformation of Early-Modern Philosophy by Stephen Gaukroger." *The American Historical Review*, 107:5, 1631.
- Jalobeanu, Dana. 2012. "Francis Bacon's Natural History and the Senecan Natural Histories of Early Modern Europe." *Early Science and Medicine*, 17:1/2, 197-229.
- Jones, Matthew L. 2009. "Francis Bacon. The Instauration magna. Part 3: Historia Naturalis et Experimentalis: Historia Ventorum and Historia Vita & Mortis by Graham Rees (ed.)." *Renaissance Quarterly*, 62:2, 603-604.
- Kepple-Mamros, Deborah. 2007. "Francis Bacon and the Refiguring of Early Modern Thought by Julie Robin Solomon and Catherine Gimelli Martin." *The Sixteenth Century Journal*, 38:1, 150-151.
- Kusukawa, Sachiko. 1996. "Bacon's Classification of Knowledge." In: Peltonen, Markku (ed.), *The Cambridge Companion to Bacon*. Cambridge, UK: Cambridge University Press, 47-74.

- Lancaster, James A.T. 2012. "Natural Knowledge as a Propaedeutic to Self-Betterment: Francis Bacon and the Transformation of Natural History." *Early Science and Medicine*, 17:1/2, 181-196.
- Langman, Pete. 2012. "The Oxford Francis Bacon VIII: The Historie of the Raigne of King Henry the Seventh and Other Works of the 1620s by Michael Kiernan". *Renaissance Quarterly*, 65:4, 1326-1327.
- Lewis, Rhodri. 2014. "Francis Bacon and Ingenuity." *Renaissance Quarterly*, 67:1, 113-163.
- MacLean, Gerald. 1997. "Origin and Authority in Seventeenth-Century England: Bacon, Milton, Butler by Alvin Snider." *The Journal of English and Germanic Philology*, 96:1, 132-134.
- Manzo, Silvia. 2000. "Philosophical Studies, c. 1611-c. 1619 by Francis Bacon, by Graham Rees (ed.)." *The British Journal for the History of Science*, 33:2, 235-237.
- Manzo, Silvia. 2001. "The New Organon by Francis Bacon, Lisa Jardine and Michael Silverthorne." *The British Journal for the History of Science*, 34:1, 104-105.
- Manzo, Silvia. 2006. "Francis Bacon: Freedom, Authority and Science." *British Journal for the History of Philosophy*, 14:2, 245-273.
- Manzo, Silvia. 2006. "The Instauration Magna Part II: Novum Organum and Associated Texts by Francis Bacon, by Graham Rees and Maria Wakely." *The British Journal for the History of Science*, 39:2, 290-291.
- Manzo, Silvia. 2012. "Francis Bacon's Natural History and Civil History: A Comparative Survey." *Early Science and Medicine*, 17:1/2, 32-61.
- Manzo, Silvia. 2014. "Certainty, Laws and Facts in Francis Bacon's Jurisprudence." *Intellectual History Review*, 24:4, 457-478.
- Manzo, Silvia. 2003. "The Arguments on Void in the Seventeenth Century: The Case of Francis Bacon." *The British Journal for the History of Science*, 36:1, 43-61.
- Martin, Julian. 1993. "Francis Bacon and the Rhetoric of Nature by John C. Briggs." *The English Historical Review*, 108:427, 456-457.
- Matthews, Steven. 2008. *Theology and Science in the Thought of Francis Bacon*. Burlington, VT: Ashgate.
- McCaskey, John P. 2009. "Theology and Science in the Thought of Francis Bacon by Steven Matthews." *Technology and Culture*, 50:3, 685-686.
- McKnight, Stephen A. 2007. "Religion and Francis Bacon's Scientific Utopianism." *Zygon*, 42:2, 463-486.
- Milner, Benjamin. 1997. "Francis Bacon: The Theological Foundations of Valerius Terminus." *Journal of the History of Ideas*, 58:2, 245-264.
- Minkov, Svetozar Y. 2010. *Francis Bacon's 'Inquiry Touching Human Nature'. Virtue, Philosophy, and the Relief of Man's Estate*. Lanham, MD: Lexington Books.
- Muntersbjorn, Madeline M. 2003. "Francis Bacon's Philosophy of Science: Machina Intellectus and Forma Indita." *Philosophy of Science*, 70:5, Proceedings of the 2002 Biennial Meeting of

- The Philosophy of Science Association Part I: Contributed Papers, Edited by Sandra D. Mitchell, 1137-1148.
- Park, Katharine. 2008. "Response to Brian Vickers, 'Francis Bacon, Feminist Historiography, and the Dominion of Nature'". *Journal of the History of Ideas*, 69:1, 143-146.
- Pastorino, Cesare. 2011. "Weighing Experience: Experimental Histories and Francis Bacon's Quantitative Program." *Early Science and Medicine*, 16:6, 542-570.
- Peltonen, Markku (ed.). 1996c. *The Cambridge Companion to Bacon*. Cambridge, UK: Cambridge University Press.
- Peltonen, Markku. 1996a. "Introduction." In: Peltonen, Markku (ed.), *The Cambridge Companion to Bacon*. Cambridge, UK: Cambridge University Press, 1-24.
- Peltonen, Markku. 2001. "Francis Bacon, the Earl of Northampton, and the Jacobean Anti-Duelling Campaign." *The Historical Journal*, 44:1, 1-28.
- Perez-Ramos, Antonio. 1988. *Francis Bacon's Idea of Science and the Maker's Knowledge Tradition*. Oxford, UK: Clarendon Press.
- Pesic, Peter. 2014. "Francis Bacon, Violence, and the Motion of Liberty: The Aristotelian Background." *Journal of the History of Ideas*, 75:1, 69-90.
- Peterfreund, Stuart. 2000. "Imagination at a Distance: Bacon's Epistemological Double-Bind, Natural Theology, and the Way of Scientific Explanation in the Seventeenth and Eighteenth Centuries." *The Eighteenth Century*, 41:2, 110-140.
- Price, Bronwen (ed.). 2002. *Francis Bacon's New Atlantis. New Interdisciplinary Essays*. Manchester, UK: Manchester University Press.
- Rees, Graham. 2002. "Reflections on the Reputation of Francis Bacon's Philosophy." *Huntington Library Quarterly*, 65:3/4, 379-394.
- Rees, Graham. 2004. "On Francis Bacon's Originality." *Intellectual News*, 14:1, 69-74.
- Rossi Paolo. 1968. *Francis Bacon: From Magic to Science*. Chicago, IL: The University of Chicago Press.
- Russell, D. A. 1955. "Ernst Cassirer: The Platonic Renaissance in England by James P. Pettegrove." *Philosophy*, 30:114, 277-278.
- Sargent, Rose-Mary. 2012. "From Bacon to Banks: The Vision and the Realities of Pursuing Science for The Common Good." *Studies in History and Philosophy of Science*, 43, 82-90.
- Snider, Alvin. 1991. "Bacon, Legitimation, and the 'Origin' Of Restoration Science." *The Eighteenth Century*, 32:2, 119-138.
- Snider, Alvin. 1994. *Origin and Authority in Seventeenth-Century England: Bacon, Milton, Butler*. Toronto, CA: University of Toronto Press.
- Solomon, Julie Robin and Catherine Gimelli Martin (eds.) 2005. *Francis Bacon and the Refiguring of Early Modern Thought: Essays to Commemorate 'The Advancement of Learning' (1605–2005)*. Burlington, VT: Ashgate.

- Solomon, Julie Robin. 2004. "Francis Bacon's New Atlantis: New Interdisciplinary Essays by Bronwen Price." *Renaissance Quarterly*, 57:3, 1108-1109.
- Strazzeni, Andrea. 2012. "The Dutch Fates of Bacon's Philosophy: 'Libertas Philosophandi', Cartesian Logic and Newtonianism." *Annali della Scuola Normale Superiore di Pisa. Classe di Lettere e Filosofia, Serie 5*, 4:1, 251-281.
- Studer, Heidi D. 1998. "Francis Bacon on the Political Dangers of Scientific Progress." *Canadian Journal of Political Science*, 31:2, 219-234.
- The Internet Encyclopedia of Philosophy. Available at: <http://www.iep.utm.edu/bacon/>. Last accessed on February 8, 2018.
- The Stanford Encyclopedia of Philosophy. 2012. Francis Bacon. Available at: <https://plato.stanford.edu/entries/francis-bacon/>. Last accessed on February 8, 2018.
- Turner, Henry S. 2013. "Francis Bacon's Common Notion." *Journal for Early Modern Cultural Studies*, 13:3, 7-32.
- van den Berg, Sara. 1998. "Origin and Authority in Seventeenth-Century England: Bacon, Milton, Butler by Alvin Snider." *Renaissance Quarterly*, 51:1, 312-314.
- Vickers, Brian. 1978. *Francis Bacon*. London, UK: Longman (Writers & Their Work).
- Vickers, Brian. 1992. "Francis Bacon and the Progress of Knowledge." *Journal of the History of Ideas*, 53:3, 495-518.
- Vickers, Brian. 2001. "Selected Philosophical Works by Francis Bacon by Rose-Mary Sargent." *Isis*, 92:4, 783-784.
- Vickers, Brian. 2004. "The Oxford Francis Bacon. Vol. IV. The Advancement of Learning by Michael Kiernan; The Oxford Francis Bacon. Vol. XIII. The 'Instauratio Magna': Last Writings by Graham Rees." *Early Science and Medicine*, 9:2, 144-162.
- Walton, Michael. 2007. "The Religious Foundations of Francis Bacon's Thought by Stephen A. McKnight." *The Sixteenth Century Journal*, 38:2, 597-599.
- Wolfe, Jessica. 2002. "The Oxford Francis Bacon, XV: The Essayes or Counsels, Civill and Morall by Michael Kiernan." *The Sixteenth Century Journal*, 33:4, 1177-1178.
- Wormald, B. H. G. 1993. *Francis Bacon. History, Politics and Science, 1561-1626*. London, UK. Cambridge University Press.
- Zagorin, Perez. 2001. "Francis Bacon's Concept of Objectivity and the Idols of the Mind." *The British Journal for the History of Science*, 34:4, 379-393.

Strand II. Contributions that explicitly dismiss the possibility that Bacon's legal background may have shaped his scientific methodology.

Several prominent scholars of Bacon explicitly reject the possibility that Bacon's ideas about scientific methodology might have been influenced by his immersion in law. One highly acclaimed contribution in this strand of the literature is Zagorin (1998). Brian Vickers in the *Times Literary Supplement* describes Zagorin's (1998) book as "A concise but detailed analysis of [Bacon's] whole range of thought.... This penetrating account of Bacon's work can be

recommended as the best single-volume study available". In his review of Zagorin (1998), Peltonen (1999) notes: "All in all...Zagorin's book is amongst the best introductions to Bacon's philosophy.... In his balanced account of Bacon's natural philosophy, Zagorin gives short shrift to two particular claims: that Bacon's philosophy was indebted to Giordano Bruno's influence and that it was by and large based on a political ideology.... Bacon is said to have 'modeled his natural philosophy upon, commercial and technological practices, norms, and behaviors'.... This claim is repeated several times and its exposition takes up most of the book."

Although Zagorin (1998) discusses Bacon's legal career, he does not draw any connection between Bacon's legal background and his scientific methodology, including in a chapter entitled "The Genesis of Bacon's Project". Zagorin (1998) notes that "[Bacon's] intellectual formation drew on a great diversity of sources [including leading philosophic schools and thinkers of antiquity from the pre-Socratic's onward, ancient medical and scientific writers, the poets and mythology, the ureters and moralists, the historians and political writers of the ancient world, many noted modern philosophers and scientists, the occult sciences, astrology, alchemy, natural magic, European travel literature recent and contemporary foreign office, Protestantism, the Bible, as well as, interestingly, the legal and historical literature of his own country, and Roman law], many of which are obscure and others doubtless no longer recoverable."

Yet, according to Zagorin (1998), Bacon's law and his scientific methodology share no common link: "A common misconception among authors who have written about Bacon's work on law is that his legal philosophy was founded on his scientific method and the use of induction. This error is compounded in some of these authors by a second, *even bigger misconception, which supposes that Bacon's natural philosophy was actually the product of his legal ideas and experiences as a lawyer* [emphasis added]." Here, Zagorin (1998) takes issue with the work of Kocher, Wheeler, and Coquille ("[his] mistaken understanding of the relationship between Bacon's legal thought and his natural philosophy"), and Martin ("while [Martin's work] includes some interesting and useful matter, [it] also introduces exaggerations and misconceptions arising from the author's thesis that Bacon's natural philosophy stem from his experience and ideas as a lawyer") [grouped in strand IV]. He further takes issue with "other authors [who] have imagined that Bacon's work as an interrogator of suspects and criminal examinations was the source of his conception of Inquisition into nature, or that he adapted the procedures he prescribed in natural philosophy from the procedures of English law....These views are not only based largely on specious verbal analogies but spring from a superficial knowledge of Bacon's natural philosophy and its intellectual genealogy."

Zagorin's (1998) disapproving view of the conjecture that law may have had anything to do with Bacon's scientific methodology is perhaps best summarized with the following statement: "[Bacon's] concept of the true method of advancing the knowledge of nature originated not in his study or practice of law but in his critical reflections on dialectics, on the failings of syllogistic logic as an instrument of discovery, and on the limitations of the traditional kind of induction. His empiricism probably owed a considerable amount to his interest in natural magic and the

operations of the various crafts. He had no need to draw on his legal experience of examining suspects to form his idea of the interrogation of or Inquisition into nature."

In a review of Gaukroger (2002), Zagorin (2002) reiterates his own views by noting that "Gaukroger...attributes considerably more importance to rhetoric and law in the development of Bacon's natural philosophy than is justifiable." Expressing further doubt about the relevance of Bacon's legal background for his scientific methodology, Zagorin comments: "In general, it would be surprising if Bacon, who repeatedly insisted on the necessity of making a fresh start in the investigation of nature, should have found much help in pursuing this goal in the old and long-established disciplines of rhetoric and law".

Similarly, Vickers (2003) in his review of Gaukroger (2002) adamantly rejects the possibility of an influence of Bacon's law on his scientific methodology: "As for law, Gaukroger has been influenced by Julian Martin's claim that Bacon's thinking in science was formed by his legal training, but, as I pointed out..., Bacon regularly rejected any language-based approach to natural phenomena. This consideration disqualifies much of Gaukroger's discussion."

In a review of Martin (1992) [grouped in strand IV], Vickers (1994) characterizes as no more than a "superficial parallel" Martin's argument that "Bacon's plans for legal reform have the same goal (serving the imperial monarchy ad nauseam), and the same organizational structure as 'Solomon's House', the research institute described in the New Atlantis, both plans involving a bureaucratically organized hierarchy of committees". He further dismisses the possibility of a role of Bacon's legal background by arguing that "Martin quotes some passages where Bacon uses legal terminology in his scientific writings..., but fails to realize that Bacon's usages in law are literal, in science only metaphorical".

Finally, referring to De Morgan (1915) [grouped in strand III], Agassi (2013) also completely rejects the possibility of a connection from Bacon's legal background to his scientific method: "No Bacon text justifies De Morgan's characterization of his philosophy as conceived by a person with the mentality of a lawyer...". Marwil (1976) takes this even further by suggesting that Bacon's legal education must have produced a mind-set that would have been counter-productive for science.

Works grouped in strand II

Agassi, Joseph. 2013. *The Very Idea of Modern Science, Francis Bacon and Robert Boyle*. New York, NY: Springer.

Marwil, Jonathan. 1976. *The Trials of Counsel—Francis Bacon in 1621*. Detroit, MI: Wayne State University Press.

Peltonen, Markku. 1999. "Francis Bacon by Perez Zagorin; Objectivity in the Making: Francis Bacon and the Politics of Inquiry by Julie Robin Solomon." *Renaissance Quarterly*, 52:3, 926-928.

Vickers, Brian. 1994. "Francis Bacon, the State, and the Reform of Natural Philosophy by Julian Martin." *Renaissance Quarterly*, 47:3, 704-707.

Vickers, Brian. 2003. "Francis Bacon and the Transformation of Early-Modern Philosophy by Stephen Gaukroger." *Renaissance Quarterly*, 56:3, 856-859.

Zagorin, Perez. 1998. *Francis Bacon*. Princeton, NJ: Princeton University Press.

Zagorin, Perez. 2002. "Francis Bacon and the Transformation of Early-Modern Philosophy by Stephen Gaukroger." *Isis*, 93:3, 484-485.

Strand III. Contributions that conjecture or otherwise comment on some form of connection between Bacon's legal background and some aspect of his scientific methodology, but do not explicitly and purposefully investigate such a hypothesis in any detail, and do not therefore produce any persuasive evidence.

The connection between Bacon's scientific methodology and his legal background has wider currency as a hypothesis that has not been thoroughly investigated. As we demonstrate below, one subset of this strand of the literature suggests that causality may flow from Bacon's legal work to some aspect of his scientific methodology (as is the case in the contributions grouped in strand IV); another subset, however, views causality as flowing in the other direction, from Bacon's scientific methodology to his jurisprudence. Furthermore, much like the contributions that have explicitly investigated the influence of Bacon's immersion in law on his scientific methodology [strand IV], the literature in this strand exhibits significant heterogeneity with respect to which specific aspect of Bacon's scientific methodology is posited as connected to which aspect of Bacon's jurisprudence.

Holdsworth (1927) merely notes that "it is at least arguable" that Bacon's training in law "had some influence on his inductive system of experimental philosophy". Stone de Montpensier (1968) remarks that Bacon's logic of reasoning in *Maxims of the Law* resembles his scientific method. Sargent (1989) focuses on Robert Boyle (1627-1691), who was influenced by Bacon, and comments that the "experiential procedure of common law...influenced Bacon's thought". When discussing Bacon's emphasis on facts of nature, Desroches (2006) comments, but does not investigate the issue further, that it is "no great leap to suggest...that Bacon's conception of fact, construed in the context of his scientific programme, demands to be understood in terms similar to those governing its legal conception". None of these authors delves deeper into the empirical basis of their conjectures.

Coquillette (1992) focuses exclusively on Bacon's law and jurisprudence, but does not explore the possibility that Bacon's legal thought shaped his scientific methodology. If anything, Coquillette (1992) suggests that the latter may have shaped the former (rather than vice versa): "...my concluding thesis will be relatively simple. This thesis is that Bacon was the first truly analytical and critical jurist in the Anglo-American tradition. *He was also the first to dare to apply an empirical, inductive analysis to lawmaking* [emphasis added]. This new methodology, which he termed the 'Novum Organum' or 'new tool', had a direct and acknowledged effect on some of the most exciting legal thought in the next three centuries... No English jurist before Bacon looked at the law in this way."

Several scholars have written book reviews on Coquillette (1992). Given the absence of an emphasis in Coquillette (1992) on the potential link from Bacon's jurisprudence to his scientific methodology, it is not surprising that scholars commenting on Coquillette's work, such as Walker (1994), Cardwell (1995) and Harris (1993), do not even mention the possibility of such a link. Walker (1994), for example, comments that "Coquillette has provided a fine study which expands our understanding and appreciation of the Bacon legacy. Thus this book is necessary reading for those interested in the emergence of modern legal processes and in the neglected aspect of Bacon as a jurist". Harris (1993) notes that "Sir Francis Bacon, though otherwise he might have outshone them all, has largely had his legal works, like his mortal remains, buried in obscurity. The task undertaken by Daniel R. Coquillette has been to resurrect Bacon." Interestingly, Levack (1995) does note a connection between Bacon's law and his scientific methodology, but consistently with Coquillette's own emphasis, interprets the direction of causality as flowing from the latter to the former (rather than vice versa): "Bacon's jurisprudence, therefore, involved the application of his scientific and philosophical methods to the law." In this same vein, when Boyer (1994) comments on Coquillette (1992), he states that "Bacon applied to issues of law reform a methodology that reflected its author's scientific outlook". This is similar to Marwil's (1976) claim that Bacon's personality and intellect fueled his development of a common methodology that was applied to the method of investigation of both science and law.

In a more recent article, Coquillette (2013) further emphasizes the importance of Bacon's legal work: "Bacon's genius as the literal inventor of modern inductive social science, his extraordinary power as a writer, and his rise politically to be the second most powerful man in the England of his day, Vice Regent to James I, has historically overshadowed the fact that, first and foremost, he was a lawyer". Coquillette then hypothesizes that Bacon's experience in a non-common law court and his new scientific method led to his theory of law reform: "Bacon invented modern, scientific rulemaking [i.e., the making of rules in a legal context] by fusing his new theories of inductive, empirical research with the traditions of equitable [i.e., non-common-law] pleading...". Using an examination of two of Bacon's writings produced in the later stages of Bacon's life, Coquillette suggests that Bacon owes a "*great debt to Roman jurisprudence and Renaissance critical thinking*" [emphasis added].

Martin (1992) [grouped in strand IV] is one of the very few contributions that have, at least in part, examined the link between Bacon's law and his scientific methodology. Martin (1992) specifically argues that Bacon's natural philosophy should be understood as reflecting Bacon's political plans for the reform of the law and the state (as opposed to more narrowly his common-law background): "...this study insists that Bacon's legal and political career was crucial in the creation of his natural philosophy and that his natural philosophy cannot be separated from his political ambitions".

Martin's emphasis on the importance of Bacon's legal and political career (as opposed to his legal background and scholarship understood more narrowly) for his planned reform of natural philosophy (as opposed to his scientific methodology more specifically) has been noted by his

reviewers. Rothschild (1994) comments: "A summary judgment strongly suggests that Bacon's programs of reform proceeded without deviation from the legal and political experiences of a career in public service; that his vocation served as a channel of inquiry into the availability of expedients for better government and expansion of the kingdom...". Rees (1994) notes that "Francis Bacon was first and last a statesman in the Tudor Cromwellian mold who devoted all his energies to strengthening an imperial British state and its central institution, the monarchy. This, according to Julian Martin, is what unifies the various components of Bacon's public and intellectual life and, above all, his endeavors in the fields of legal reform and natural philosophy." Shapiro (1993) states that Martin's "...important study attempts to provide a contextual analysis of the origin and character of Francis Bacon's natural philosophy. Julian Martin argues that Bacon's natural philosophy should be understood as a subordinate part of a much larger reform program appropriate to a centralizing monarchy." Furthermore, she argues that by "investigating the political context of early modern natural philosophy", Martin (1992) "has drawn attention to the *still-neglected question of what the 'new philosophy' owed to the legal tradition* [emphasis added]".

Vickers (1994) [grouped in strand II], who also reviews Martin's work, dismisses Martin's argument about a connection between Bacon's law and his natural philosophy.

Interestingly, three further reviewers of Martin (1992) interpret Martin's work as drawing a more direct connection between Bacon's law and Bacon's scientific methodology than arguably professed by Martin himself. Croft (1995) notes that "Martin convincingly demonstrates how many of Bacon's procedures in natural philosophy were adapted from the law." Ahnert (2001) comments on Martin (1992) that "Bacon assumed the nature of the common law to be similar to that of the laws of nature. [Bacon] believed that much of the common law was hidden, that it was rational, and that men learned in the law could discover it. The same was true of the natural world; the principles of nature were hidden, yet they were capable of being discovered by the learned and licensed investigator." Hall (1993) notes that "It is hardly strange that [Bacon's] idea of the way to arrive at scientific truth was an adaptation from his ideal process 'for acquiring knowledge about the law'".

Recall that Gaukroger (2001, 2006) [grouped in strand I] examines the cultural influences on Bacon, emphasizing that Bacon viewed natural philosophy and law in analogous ways, rather than viewing one as providing a clear influence on the other. Several scholars have reviewed Gaukroger's work. Jacob (2002) does not at all mention the possibility of an influence of Bacon's law on his scientific methodology. Shapin (2002) credits Gaukroger for having "made a very great contribution to understanding the intentions driving Bacon's project". Interestingly, he then comments that: "Nevertheless, if we want to understand who the seventeenth-century English natural philosopher actually was, we have to leave Gaukroger's preferred world of close textual analysis and enter the world of social and cultural history". Although Shapin does not mention this point, it is certainly the fact that Bacon's social and cultural world was enormously influenced by the legal profession, the practice of the law, and the culture of the common-law.

Zagorin (2002) and Vickers (2003) [grouped in strand II] in their reviews of Gaukroger both reject the possibility of an influence of Bacon's law on his natural philosophy and scientific method.

Jardine (1974) argues that her "aim is to provide a consistent rather than a revolutionary reading of Bacon's works. By reconstructing the intellectual backcloth against which Bacon posed the particular methodological questions which engaged his attention, I believe we are led to appreciate the originality and ingenuity of his solutions...". Jardine (1974) is skeptical about Kocher's (1957) [grouped in strand IV] reasoning and, furthermore, attributes to Kocher an argument that is, in fact, the reverse of Kocher's original argument: "P. H. Kocher uses [a particular] analogy in support of the thesis that Bacon proposed an inductive method for use in jurisprudence." (Kocher argues that Bacon's law influenced his epistemology.)

In a book that is not specifically about Bacon, De Morgan (1915) conjectures, but never explores, the possibility of the importance of Bacon's legal background for his scientific methodology: "We think it possible that Harvey [who had noted that Bacon writes (natural) philosophy like a Lord Chancellor] might allude to the legal character of Bacon's notions: we can hardly conceive so acute a man, after seeing what manner of writer Bacon was, meaning only that he was a lawyer and had better stick to his business.... We do ourselves believe that Bacon's philosophy more resembles the action of mind of a common-law judge—not a Chancellor—than that of the physical inquirers who have been supposed to follow in his steps."

Solomon (1998) devotes considerable attention to Bacon's legal engagements, but never thoroughly investigates the possibility that Bacon's immersion in law may have influenced his scientific methodology. When commenting on the genesis of Bacon's scientific ideas, Solomon notes, for example, that "[Bacon's] scientific ideas were shaped by his own political and legal interests as a court official. Once James came to the throne, Bacon forged a scientific program that he hoped would gain intellectual acceptance and financial support from the reigning monarch." That is, it is "political and legal interests", not his legal background, that shaped Bacon's scientific program. She also asserts that "Bacon's formulation of a discourse of scientific objectivity is a complex, dialectical, often contradictory, and ambiguous exercise. This discourse mediates between the political and intellectual culture of the Jacobean court and the wider commercial culture that both shaped and was shaped by monarchy." However, when Solomon refers to work by Kocher, Wheeler, Simonds, Martin, and Shapiro [grouped in strand IV], who have hypothesized an influence of Bacon's legal, particularly common-law, background on his scientific methodology, she discounts arguments about the potential importance of Bacon's common-law background for Bacon's epistemology by noting that, during Bacon's era, "In truth...common-law procedures for the discovery of facts was still largely rudimentary....". If anything, Solomon appears to view Bacon's involvement in the non-common-law Court of Chancery, again coupled with his political ambitions, as exerting an influence on his science: "...the practice of common—and especially Chancery—law fueled Bacon's scientific particularism, but he also had broader

political reasons for utilizing the empirical particular as a legitimate of knowledge: namely, the desire to defend the prerogative of the crown...".

In Cassirer's (1953) book-length study of the contributions of the Cambridge School to modern philosophy, Bacon is awarded very limited space. Cassirer notes that "Bacon has become...the herald and precursor of the modern English spirit, of that spirit which, as early as the seventeenth century, entered into and diffused itself through all fields of intellectual culture—science as well as politics, philosophy as well as religion. Bacon himself understood the new philosophy which he represented, not so much as a work of genius as a 'birth of Time'." In a short passage where he comments on Bacon's natural philosophy, Cassirer states that "Bacon's induction is not a scientific, but a juridical process....Bacon sits as a judge over reality, questioning it as one examines the accused.... This procedure is not simply observational but strictly inquisitorial." Cassirer, however, never subjects his claims to any kind of careful scrutiny. Multiple authors have written a review of Cassirer's book. From the seven book reviews available on JSTOR, none in any way refers to the above-quoted passages in Cassirer's work; indeed, four out of seven reviewers do not even mention Bacon in their review.

In an Introduction to their edited volume, Daston and Stolleis (2008) emphasize the importance of natural law [an unwritten body of universal moral principles that are an inherent part of nature; to be distinguished from written positive law] as "an essential element of the conceptual vocabulary of modern science and philosophy" and, hence, view natural law as an important source of ideas in the development of both natural and social sciences. They note: "The impulse to systematization, with natural law supplying the first principles, was notably strong in both 17-century jurisprudence and natural philosophy. In the case of jurisprudence, this impulse often took the form of codification of laws, and it is suggestive that natural philosophers who were legally trained, such as Francis Bacon and Leibniz, were often involved in such attempts." An emphasis on codification would, of course, be reflective of civil-law jurisprudence rather than common-law ideas.

In the same edited volume, Stolleis (2008) notes the possibility of a connection between law and scientific methodology; however, according to him, causality flows from the latter to the former: "The Scientific Revolution from the mid-sixteenth century onwards—in mathematics, physics, astronomy and medicine, to name but a few disciplines—directly affected jurists as the constructors of the normative world. The emergence of 'natural sciences' shaped by 'laws', set forth in a 'Book of Nature', inevitably poses the question as to whether such laws might not also be found in the social order." Articulating an analogous point in the same edited volume, Steinle (2008) further comments: "One of the most influential programs for a 'new science' was presented in Francis Bacon's 1620 *Novum Organum*. Bacon here used the concept of laws of nature that was closely connected to his idea of 'form' and was thus not more sharply defined than the latter. Rather than stressing theological considerations, Bacon emphasized the analogy to the legal realm." Steinle also notes the possibility of an influence from Bacon's legal—specifically common-law—background and his scientific methodology: "Bacon—lawyer and politician, after all—dealt

with those questions and acted as a proponent of authoritative legislation. In transferring these legal concepts to natural philosophy he was careful to differentiate between different types of statements that play different roles and had to be established in different ways. [Customs] could only be recognized by empirical means and were valid even without being derived from our general principles. 'Laws', by contrast, were central parts of a larger structure of argumentation. It is striking to realize that Bacon, being one of the few to draw an explicit analogy between natural philosophy and matters of legislation, did exactly not refer to the tradition of natural law, but to the separate common-law tradition, so prominent in England." Maintaining focus on the importance of the natural law tradition, however, Steinle does not pursue any further investigation of this hypothesis.

Daston (1991) draws an analogy in Bacon between investigation through torture and experimentation: "When Bacon likened experiment to putting nature on the rack, it was a lawyerly analogy, for torture was the chief means of investigation for 'secret' crimes like heresy, theft by night, and adultery. Nature and the culprit must be forced to 'confess', for the deed seldom had witnesses." Daston, however, does not examine this issue in further detail. The possibility of a connection between torture as investigation and Bacon's experimentation is also a topic of interest for Merchant (2008). Focusing on the notion of a controlled experiment, Merchant (2008) argues that "Bacon was striving toward the idea of the contained, controlled experiment in which a natural object is forced by art or technology to yield its secrets", noting that "his concept of experiment emerged" from "the mechanical and practical arts". Merchant also draws a connection between Bacon's emphasis on experimentation and his juridical background as one of the factors that may have shaped Bacon's views on experimentation: "...Bacon's concept of the contained, controlled experiment arose out of three influences: the juridical tradition, the idea of nature in bonds (Prometheus), and the idea of extracting the secrets of nature." In particular, she comments that "Bacon used the term 'trial' to characterize an experiment. The interrogation of nature is analogous to a judicial trial, in which the subject on the witness stand is forced to answer questions in order to extract the truth ('the inquisition of truth').... Nature per se cannot speak but is privy to the facts and knowledge (secrets) to be extracted....By analogy, the scientist designs an experiment in which nature is 'put to the question' in a confined, controlled space where the correct answers can be extracted through inquisition." Much like Daston (1991), however, Merchant (2008) does not connect Bacon's legal background to his broader scientific method in any precise way, and focuses on the procedures for ascertaining facts rather than the epistemological process of drawing broader lessons from those facts. In a similar vein, Shapin (1993) suggests that Martin's (1992) work concerns the connection between courts pursuing facts and scientists investigating nature. "[Martin] deepen[s] our appreciation of the concrete courtroom practices which, [Martin] argues, provided Bacon with institutionalized repertoires whose perceived effectiveness and cultural legitimacy might be transferred to the practice of natural philosophy." These works, therefore, all emphasize the fact-finding aspect of Bacon's scientific method, rather than his inductive epistemology.

Park (1984) notes that Bacon "stood clearly within the mainstream of Renaissance logic and rhetoric, which rejected the technicalities of the scholastic tradition in order to emphasize the practical applications of these disciplines for effective communication. But whereas the humanist scholars upon whose ideas Bacon was drawing tended to emphasize the problems of communication in the classical arenas of politics and law, Bacon—both a politician and a lawyer—looked beyond to apply the same skills to science, a discipline previously seen as remote from the public domain." She, however, does not elaborate on the possible connection between Bacon's law and any specific aspect of his scientific methodology, and therefore does not add evidence to the conjecture.

Finally, Whitney (1989) is concerned with the following research question: "...to what degree does Bacon's appropriation of a rhetoric of political domination in his use of *instauratio* compromise his philanthropic and pragmatic science?". In addressing the question, he makes, but does not elaborate on, the following interesting comment in which he invokes Bacon's legal background: "The language of land ownership in medieval Latin, as a matter of fact, actually conflates *instauratio* and the verb *instruo*, instruct, furnish, or supply, from which *instrumentum* is derived. The Magna Carta, with which Bacon the lawyer was familiar, decrees that when an heir comes of age the steward must turn over to him the land '*totam Instauratam de carucis et omnibus aliis rebus*', 'fully furnished with valuables and all other things'....Because of the importance of instruments, says Bacon, we must "instruct" (*instruemus*) the mind with the *Organum*, the tool of method....: that is, *instauratio* it by instructing with instruments that probe instances." However, Whitney offers no further exploration of the connection between Bacon's law and Bacon's scientific methodology.

Works grouped in strand III

- Ahnert, Thomas. 2001. "The Varieties of Contexts in Early Stuart Intellectual History." *The Historical Journal*, 44:2, 565-577.
- Boyer, Allen D. 1994. "Light, Shadow, Science, and Law. Francis Bacon by Daniel R. Coquillette." *Michigan Law Review*, 92:6, 1994 Survey of Books Relating to the Law, 1622-1636.
- Cardwell, Kenneth. 1995. "Francis Bacon by Daniel R. Coquillette." *The Journal of Modern History*, 67:4, 919-920.
- Cassirer, Ernst. 1953. *The Platonic Renaissance in England*. Austin, TX: University of Texas Press.
- Croft, Pauline. 1995. "Francis Bacon, the State, and the Reform of Natural Philosophy by Julian Martin." *The English Historical Review*, 110:436, 471-472.
- Daston, Lorraine and Michael Stolleis. 2008. "Introduction: Nature, Law and Natural Law in Early Modern Europe." In: Daston, Lorraine and Michael Stolleis (eds.), *Natural Law and Laws of Nature in Early Modern Europe: Jurisprudence, Theology, Moral and Natural Philosophy*, Burlington, VT: Ashgate Publishing, pp. 1-28.

- Daston, Lorraine. 1991. "Baconian Facts, Academic Civility, and the Prehistory of Objectivity." *Annals of Scholarship*, 8, 337-363.
- De Morgan, Augustus. 1915. *A Budget of Paradoxes*, Second Edition. Edited by David Eugene Smith. Volume I. Chicago, IL: The Open Court Publishing.
- Desroches, Dennis. 2006. *Francis Bacon and the Limits of Scientific Knowledge*. New York, NY: Continuum International Publishing Group.
- Hall, A. Rupert. 1993. "Ministry of Science? Francis Bacon, the State, and the Reform of Natural Philosophy by Julian Martin." *Notes and Records of the Royal Society of London*, 47:2, 311.
- Harris, F. W. 1993. "Francis Bacon by Daniel R. Coquillette." *The Historian*, 56:1, 118-119.
- Holdsworth, William Searle 1927. "Bacon." *The Cambridge Law Journal*, 3:1, 10-12.
- Jacob, James R. 2002. "Francis Bacon and the Transformation of Early-Modern Philosophy by Stephen Gaukroger." *The American Historical Review*, 107:5, 1631-1631.
- Jardine, Lisa. 1974. *Francis Bacon: Discovery and the Art of Discourse*. London, UK: Cambridge University Press.
- Levack, Brian P. 1995. "Francis Bacon by Daniel R. Coquillette." *The American Journal of Legal History*, 39:1, 112-113.
- Marwil, Jonathan. 1976. *The Trials of Counsel—Francis Bacon in 1621*. Detroit, MI: Wayne State University Press.
- Merchant, Carolyn. 2008. "'The Violence of Impediments': Francis Bacon and the Origins of Experimentation." *Isis*, 99:4, 731-760.
- Park, Katharine. 1984. "Bacon's 'Enchanted Glass'". *Isis*, 75:2, 290-302.
- Rees, Graham. 1994. "Francis Bacon, the State, and the Reform of Natural Philosophy by Julian Martin." *Isis*, 85:2, 328-329.
- Rothschild, Harriet Dorothy. 1994. "Francis Bacon, the State, and the Reform of Natural Philosophy by Julian Martin." *The Sixteenth Century Journal*, 25:1, 195-196.
- Sargent, Rose-Mary. 1989. "Scientific Experiment and Legal Expertise: The Way of Experience in Seventeenth-Century England." *Studies in History and Philosophy of Science*, 20:1, 19-45.
- Shapin, Steven. "Francis Bacon, the State, and the Reform of Natural Philosophy by Julian Martin." *The British Journal for the History of Science*, 26:1, *Energy and Society*, 84-85.
- Shapin, Steven. 2002. "Francis Bacon and the Transformation of Early-Modern Philosophy by Stephen Gaukroger". *The British Journal for the History of Science*, 35:1, 107-108.
- Shapiro, Barbara. 1993. "Francis Bacon, the State, and the Reform of Natural Philosophy by Julian Martin." *The American Historical Review*, 98:4, 1246-1247.
- Solomon, Julie Robin. 1998. *Objectivity in the Making. Francis Bacon and the Politics of Inquiry*. Baltimore, MD: The Johns Hopkins University Press.
- Steinle, Friedrich. 2008. "From Principles to Regularities: Tracing 'Laws of Nature' in Early Modern France and England." In: Daston, Lorraine and Michael Stolleis (eds.), *Natural Law*

and Laws of Nature in Early Modern Europe: Jurisprudence, Theology, Moral and Natural Philosophy, Burlington, VT: Ashgate Publishing, pp. 215-232.

Stolleis, Michael. 2008. "The Legitimation of Law through God, Tradition, Will, Nature and Constitution." In: Daston, Lorraine and Michael Stolleis (eds.), *Natural Law and Laws of Nature in Early Modern Europe: Jurisprudence, Theology, Moral and Natural Philosophy*, Burlington, VT: Ashgate Publishing, pp. 45-56.

Stone de Montpensier, Roy L. 1968. "Bacon as a Lawyer and a Jurist." *Archives for Philosophy of Law and Social Philosophy*, 54:4, 449-483.

Walker, William T. 1994. "Francis Bacon by Daniel R. Coquillette." *The Sixteenth Century Journal*, 25:1, 247-248.

Whitney, Charles. 1989. "Francis Bacon's Instauration: Dominion of and over Humanity." *Journal of the History of Ideas*, 50:3, 371-390.

Strand IV. Contributions that explicitly postulate and investigate a connection between Bacon's legal background and some aspect of his scientific methodology while offering supporting evidence in favor of such connection.

Only a very small subset of the multitude of Bacon scholars has attempted to explicitly investigate a connection between Bacon's scientific methodology and his background in the law. This strand of scholarship on Bacon consists of contributions by Kocher (1957), Wheeler (1983), Simonds (1986), Cardwell (1990), Martin (1992: 164-171), Shapiro (2000: 107-112), and Serjeantson (2014: 701-704). However, much like in the case of contributions grouped in strand III above, even within this group of scholars there is broad disagreement on which aspects of Bacon's scientific method may have been most shaped by his legal ideas and which aspect of Bacon's legal background was most influential.

Shapiro (2000), for example, argues that Bacon's legal training may have influenced his scientific method primarily in the emphasis on the careful collection of facts by observation and experiment. She comments that "Bacon was ideally suited to appropriate legal-historical methods to the cause of natural philosophy". And further notes: "'Matters of fact', broadened by Bacon to include virtually all natural phenomena either observed or created experimentally, were to provide the basis for what he felt to be an entirely new natural philosophy....Only after the facts and experiments were properly verified and recorded, with the same or perhaps even greater certainty than facts in the courtroom, would the *New Organon*, itself derived at least in part from legal interrogatories, be implemented by sophisticated professionals." For Shapiro, Bacon's familiarity with both common and civil law procedures was crucial, and the procedures of the courtroom were central.

In contrast, Kocher (1957) and Wheeler (1983) suggest that Bacon's jurisprudence was central to his inductive reasoning and, thus, his broader epistemological framework (as opposed to Shapiro's focus on courtroom procedures and the collecting of facts). Wheeler (1983) argues that "...in his own investigations into the law, Bacon developed a hybrid research method that combined civil law and equity principles with those of the common law. That is, he combined a

method that rested upon hypothetico-deductive principles with one that was radically inductive....When Bacon turned to the problem of devising a new logic of inquiry that would be applicable to all empirical investigations in the natural as well as in the social sciences, he drew upon the methods that had proved effective for him in his civic law researches. He generalized the same 'natural history' research method for all science, social and natural alike. This was the empirico-deductive approach Bacon had already developed for the law and applied in the *Maxims [of the Law]*." Wheeler, therefore, seems to suggest that both the process of induction within common-law law-finding and the deductive principles within the civil-law tradition were important for Bacon's scientific epistemology. Moreover, whereas Shapiro focuses on the parallels between the legal and scientific determinations of facts, Wheeler focuses on the effect of the disparate common- and civil-law jurisprudence of developing the law itself.

Kocher (1957) generalized from Bacon's use of maxims (also referred to as aphorisms; short, pithy statements expressing a general truth or rule of conduct), "the generalizations or axioms of that middle order which Bacon throughout his philosophical writings describes as most fruitful for works". Kocher (1957) comments: "In natural science the utility of the middle axiom is to state a rule applicable to new physical situations. In jurisprudence the utility of the maxim is similarly to provide the premises upon which new cases can be decided, contradictions in existing cases erased, and analogies more safely followed out....But this is not the only significant resemblance between the legal maxim and the middle axiom of natural science. Both are derived by induction from accumulations of individual cases and then, once formulated, are applied back to determine particulars...Since the *Maxims of the Law* is...the earliest of all Bacon's known writings to champion the aphorism and certainly the earliest to display it in active use, we must reckon seriously with the possibility that he was much influenced towards it by his legal studies, and specifically by his study of the Civil Law." Thus, whereas Wheeler emphasizes the joining of the disparate civil- and common-law traditions within Bacon's analysis, Kocher emphasizes the similarity between the common-law process of finding the law and the civil-law epistemology of ascertaining scientific rules.

Martin (1992) mentions inductive epistemology and fact-seeking in the context of Bacon's legal theorizing but argues that Bacon's natural philosophy should be understood as reflecting Bacon's political plans for the reform of the law and the state rather than his common-law background per se: "...this study insists that Bacon's legal and political career was crucial in the creation of his natural philosophy and that his natural philosophy cannot be separated from his political ambitions". Furthermore, "...[Bacon's] reform of natural philosophy, no less than his proposed reform of law, was always governed by his political perspective...". When referring to Bacon's legal background, however, Martin very clearly points to Bacon's immersion in English common law (as opposed to continental civil law) as the particular legal source of influence on Bacon's thought. To understand Bacon, Martin argues it is "...important to remember that he was an experienced and learned Elizabethan common lawyer...". Martin repeats this point in commenting on Bacon's epistemology: "For Bacon, 'discovering' (i.e., uncovering) the truths of natural philosophy involved several stages, for each of which an exactly parallel feature existed

within the law as he practiced it..." Thus, in Martin's view, "...Bacon's procedures in natural philosophy were adapted by him from procedures in English law."

Finally, Simonds (1986), Cardwell (1990), and Serjeantson (2014) suggest that Bacon developed his ideas about the importance of fact-gathering and investigation exclusively based on his knowledge of continental civil and canon law. (That Bacon was well-read in and influenced by continental civil law is also noted by Wheeler (1983) and Kocher (1957); see above.) For example, Simonds (1986) comments that "...it was largely Bacon's civilian learning and professional experience that led him to an understanding of [the scientific] method". Cardwell (1990) argues that "...in administrative inquisition [as emphasized in the continental legal tradition] Bacon found a structure appropriate to his scientific enterprise, and in the inquisitorial procedure of preliminary legal examination Bacon saw language used in the way he thought the natural philosophers should use it in their commerce with Nature". Serjeantson notes that his research supports the view that "...Bacon's knowledge of the law might have helped shape his philosophy of science. Among recent scholars the rather different work of Harvey Wheeler and Julian Martin, in particular, come to mind. But this account has differed from the ones offered by them in emphasizing the significance of the civil law rather than the common law, reflecting the fact that...Bacon...drew his inspiration from the rule-governed civil law rather than the comparatively formless common law".

The precise set of Bacon's works considered by scholars grouped in this strand is often not made explicit. Kocher (1957) refers to a number of Bacon's methodological works, but among these focuses almost exclusively on the *Maxims of the Law*. In his short contribution, Simonds (1986) refers to, but hardly scrutinizes, aspects of the *Maxims of the Law*, *Reading on the Statute of Uses*, and an unnamed legal dictionary. Wheeler (1983) mentions, but never discusses in detail, "an informal survey" that the author undertook for purposes of his analysis. In drawing the analogy between Bacon's inquisitorial practice in court and his later examination of nature, Cardwell (1990) is explicit in making it clear that he draws on parts of *Novum Organum* and a select set of further works. When using Bacon's own works to draw parallels between Bacon's law and science, Martin (1992) draws primarily on Bacon's contributions about reform of the legal system and the science: "Bacon's reformed science of the law and his reformed natural philosophy have the same purpose, the same techniques, the same vocabulary and the same hierarchical organization" Martin (1992: 170). Shapiro (2000) briefly refers to Bacon's legal work in the context of the need to establish facts in the legal system, but references no specific legal works by Bacon when discussing Bacon's contributions to the development of ideas on the importance of ascertaining facts in natural history (Shapiro 2000). In conjecturing that "Bacon's general theory of the 'interpretation of nature' may perhaps also be regarded as having a significantly legal foundation", Serjeantson (2014) draws a parallel between Bacon's study of nature and the role of investigation in the legal process in the context of "a little-studied treatise" included in a volume published decades after Bacon's death.

Works grouped in strand IV

- Kocher, Paul H. 1957. "Francis Bacon on the Science of Jurisprudence." *Journal of the History of Ideas*, 18:1, 3-26.
- Wheeler, Harvey. 1983. "The Invention of Modern Empiricism: Juridical Foundations of Francis Bacon's Philosophy of Science." *Law Library Journal*, 76, 78-120.
- Martin, Julian. 1992. *Francis Bacon, the State, and the Reform of Natural Philosophy*. Cambridge, UK: Cambridge University Press.
- Shapiro, Barbara J. 2000. *A Culture of Fact: England, 1550-1720*. Ithaca, NY: Cornell University Press.
- Simonds, Roger T. 1986. "Bacon's Legal Learning: Its Influence on His Philosophical Ideas." In: MFarlane, D. (ed.), *Acta Conventus Neo-Latini Sanctandreami, Proceedings of the Fifth International Congress of Neo-Latin Studies*. Binghamton, NY: Center for Medieval and Early Renaissance Studies.
- Serjeantson, Richard. 2014. "Francis Bacon and the 'Interpretation of Nature' in the Late Renaissance." *Isis*, 105:4, 681-705.

Summary

In sum, four conclusions stand out on the basis of a survey of the literature that makes some form of connection between Bacon's legal background and some aspect of his scientific methodology. First, there is a significant number of authors who comment on such a connection, but the number of authors who actually produce any detailed evidence in support of the connection (those in strand IV) is very small compared to the number who make brief comments (those in strand III). Second, there is no agreement in the literature on the nature of causality: sometimes the changing methodologies of law and science are viewed as parallel products of some other set of intellectual ideas; sometimes Bacon's scientific method is viewed as stimulating a new approach to the law; sometimes Bacon's knowledge of civil law is viewed as an ingredient in the invention of a new scientific method; and only in a very small minority of cases is Bacon's knowledge of the common-law viewed as an ingredient in the invention of a new scientific method. Third, among those few Bacon scholars who view his law as providing some input into the development of his scientific method (those in strands III and IV), there is disagreement on which aspects of Bacon's scientific method are most affected by his legal ideas. A majority of such scholars focus on analogies between the process of ascertaining facts in specific legal cases and experimentation in nature. Fewer focus on the similarity between the epistemology of finding/creating the law (or laws) and the use of induction to find scientific rules. Fourth, among those few Bacon scholars who view his law as providing some input into the development of his scientific method, there is disagreement about whether the common-law or the civil-law was most influential.

Our paper strives to shed new light on the connection between Bacon's legal background and his scientific methodology by examining a large corpus of Bacon's works and using novel analytical methods.

Further works cited in this appendix

- Henry, John. 2002. *Knowledge Is Power: Francis Bacon and the Method of Science*. London, UK: Icon Books.
- Jardine, Lisa. 1974. *Francis Bacon, Discovery and the Art of Discourse*. London, UK: Cambridge University Press.
- Peltonen, Markku. 2004. "Bacon; Francis, Viscount St Alban (1561-1626)." *Oxford Dictionary of National Biography*. Oxford: Oxford University Press.
- Rees, Graham. 2004. "On Francis Bacon's Originality." *Intellectual News*, 14:1, 69-74.
- Rossi Paolo. 1968. *Francis Bacon: From Magic to Science*. Chicago, IL: The University of Chicago Press.
- Urbach, Peter. 1987. *Francis Bacon's Philosophy of Science: An Account and a Reappraisal*. Chicago, IL: Open Court.
- Zagorin, Perez. 1998. *Francis Bacon*. Princeton, NJ: Princeton University Press.

Appendix B: Robustness checks

Purpose and summary of findings

This appendix reports findings from a series of robustness checks, mentioned in Section 4.2 of the paper. We investigated if an emphasis in Bacon on either the utilitarian promise of science or the centralized organization of the scientific quest, which cannot be detected in STM models with 16 topics, can perhaps be detected in estimates of an STM with a much larger numbers of topics. Increasing the number of topics decreases standard measures of both model-fit and the average coherence of estimated topics, rendering such models clearly inferior to our chosen 16-topic STM. However, the estimation of models featuring a number of topics larger than 16 allows us to explore whether an emphasis on utilitarianism and centralized organization of science can perhaps be discovered at a greater level of topic granularity than suggested by standard criteria for the choice of the number of topics.

We estimated models with 32, 48, 64, and 100 topics, examining the topics within each. For each estimated model we followed the same process for examining the topical content as described earlier in this section. In particular, after closely inspecting the word lists for all estimated topics for a given model, we read the twenty documents that featured a given topic most prominently for all those estimated topics for which the highest probability and FREX words were even remotely suggestive of ideas that could be potentially linked to utilitarianism or organization of science.

The key insight obtained on the basis of this exercise is that, even when estimating STMs at much higher levels of granularity, we continue to see no emphasis in Bacon on either of the two ideas, the utilitarian promise of science or its centralized organization. For the 32-topic, 48-topic, and 64-topic STMs, respectively, we found no evidence whatsoever of an emphasis by Bacon on utilitarian ideas or centralized organization of science. We found virtually no indication of such ideas even in the 100-topic STM, the highest level of granularity that we explored.

Below, we detail the process that we followed when examining the content of topics estimated in the 100-topic model, the highest level of granularity that we explored. For example, the 100-topic STM contains a topic where Bacon discusses (what we might term today) social-welfare criteria. Yet there is no evidence of an emphasis on the utilitarian promise of science in that topic. In fact, in a document from *Novum Organum* that features this topic particularly prominently, Bacon articulates a distinctly non-utilitarian view: "Truth, therefore, and utility, are here perfectly identical, and the effects are of more value as pledges of truth than from the benefit they confer on men" (Bacon 2014, Section CXXIV). Similarly, in another topic where Bacon surveys the tasks required in generating and evaluating evidence, there is no discernible emphasis on the centralized organization of the scientific quest. Indeed, in a document featuring that particular topic Bacon comments: "...in the habits and regulations of schools, universities, and the like assemblies, destined for the abode of learned men and the improvement of learning, everything is found to be opposed to the progress of the sciences" (Bacon 2014, Section XC). Finally, neither

of these two topics from the 100-topic STM were in the top half of the ranking of topics based on their relative importance in the corpus (see Figure B2 and the discussion below).

Detailed analysis of 100-topic STM

Figure B1 illustrates that increasing the number of topics above 16 results in a very significant decrease in the standard measures of both model-fit and the average coherence of estimated topics, rendering such models clearly inferior to our chosen 16-topic STM. An implication of the reduction in coherence (internal consistency) of the estimated topics in STMs with a large number of topics is that it is in general more difficult to pin down the precise content of, and hence assign names to, the estimated topics.

Panel B1 lists the highest probability and FREX words for all 100 topics in the 100-topic STM. A close inspection of the word lists revealed that in the overwhelming majority of topics, there exists absolutely no trace whatsoever of ideas about either the utilitarian promise of science or the centralized organization of scientific quest. Indeed, we found no word list that readily suggested topics that corresponded to either of these ideas. We therefore decided to investigate further any topic whose word lists contained any hint whatsoever of these two ideas. We identified five such topics: 89, 18, 73, 63, and 84 (as highlighted in Panel B1). Figure B2 shows the relative importance of these topics in the corpus based on the expected topic proportion, indicating that, among these five topics, only topic 18 is ranked in the top half of all topics. For each of these five topics, we identified the top twenty documents in which a given topic is featured most prominently. We then carefully examined each of those documents in order to ascertain the core of each topic's content and in particular if we could detect any emphasis on the two sets of ideas. (The process for these five topics matched the process for labeling the 16-topic model described in Section 4 of the paper.)

Topic 89 is about (what might today be referred to as) social welfare criteria. The documents featuring this topic prominently include *The Beginning of the History of Great Britain*, *The History of the Reign of King Henry the Eighth*, a section from *The History of the Reign of King Henry the Seventh*, three sections from *Novum Organum*, an essay on nobility, and a series of private letters. In these documents, Bacon discusses judgments on how well countries are doing and how rulers are performing, as well as elaborates on the capacities that signify people as good rulers or servants of rulers.

In the first among the documents from *Novum Organum* that feature topic 89 prominently, Bacon discusses criteria in pursuing knowledge, as in: "Yet men are hurried on with the same senseless energy and useless combination in intellectual matters". In the second among the documents from *Novum Organum* that feature this topic prominently, Bacon comments on the ways through which mankind can establish dominion over nature: "For man, by the fall, lost at once his state of innocence, and his empire over creation, both of which can be partially recovered even in this life, the first by religion and faith, the second by the arts and sciences. For creation did not become entirely and utterly rebellious by the curse, but in consequence of the Divine decree, 'in the sweat of thy brow shalt thou eat bread', she is compelled by our labors (not assuredly by our

disputes or magical ceremonies), at length, to afford mankind in some degree his bread, that is to say, to supply man's daily wants." Thus, sciences represent one, but only a secondary, path for mankind to reconquer nature.

In the third document from *Novum Organum* that features this topic prominently, Bacon comments on the value of inventions—but never articulates a utilitarian view of science per se: "...we should notice the force, effect, and consequences of inventions, which are nowhere more conspicuous than in those three which were unknown to the ancients; namely, printing, gunpowder, and the compass. For these three have changed the appearance and state of the whole world: first in literature, then in warfare, and lastly in navigation; and innumerable changes have been thence derived, so that no empire, sect, or star, appears to have exercised a greater power and influence on human affairs than these mechanical discoveries....". In the same document, Bacon in fact argues that truth *is* utility¹: "Another objection will without doubt be made, namely, that we have not ourselves established a correct, or the best goal or aim of the sciences (the very defect we blame in others). For they will say that the contemplation of truth is more dignified and exalted than any utility or extent of effects; ...Let men learn (as we have said above) the difference that exists between the idols of the human mind and the ideas of the divine mind. The former are mere arbitrary abstractions; the latter the true marks of the Creator on his creatures, as they are imprinted on, and defined in matter, by true and exquisite touches. *Truth, therefore, and utility, are here perfectly identical* [emphasis added], and the effects are of more value as pledges of truth than from the benefit they confer on men." Even though this topic concerns social welfare criteria, it definitely does not provide a perspective that emphasizes the utilitarian promise of science.

Topic 18 is about positive individual qualities, either in people or in things. This topic is featured prominently in a number of Bacon's letters and in two essays, one on innovation and one on nature in men. In these, Bacon discusses people, processes, and objects in isolation, as opposed to within the context of society as a whole. This topic is also featured in a passage from the *New Atlantis* and a passage from the *Novum Organum*. In the former, Bacon lists items for scientific uses appearing in Bensalem, elaborating on what specific items or people do and/or are good for. In the latter, Bacon evaluates the qualities of the scientific process (e.g. "The advantage, by which these instances excel the more ordinary, regards specifically either theory or practice, or both"). Further documents featuring this topic prominently are a passage from *A Collection of Apothegms New and Old* where Bacon reviews stories that illuminate the personal qualities of people. In none of the documents featuring this topic prominently can we find comments indicative of the utilitarian aspects of science or the centralized organization of scientific quest.

¹ The OED entry characterizes 'utility' as "the fact, character, or quality of being useful or serviceable; fitness for some desirable purpose or valuable end; usefulness, serviceableness. In frequent use c1540–1650, and from c1755". The first time that 'utility' is defined as "the ability, capacity, or power of a person, action, or thing to satisfy the needs or gratify the desires of the majority, or of the human race as a whole" is dated to 1751. Another use of 'utility' in Bacon's time is "the quality of being advantageous or profitable, profit, advantage".

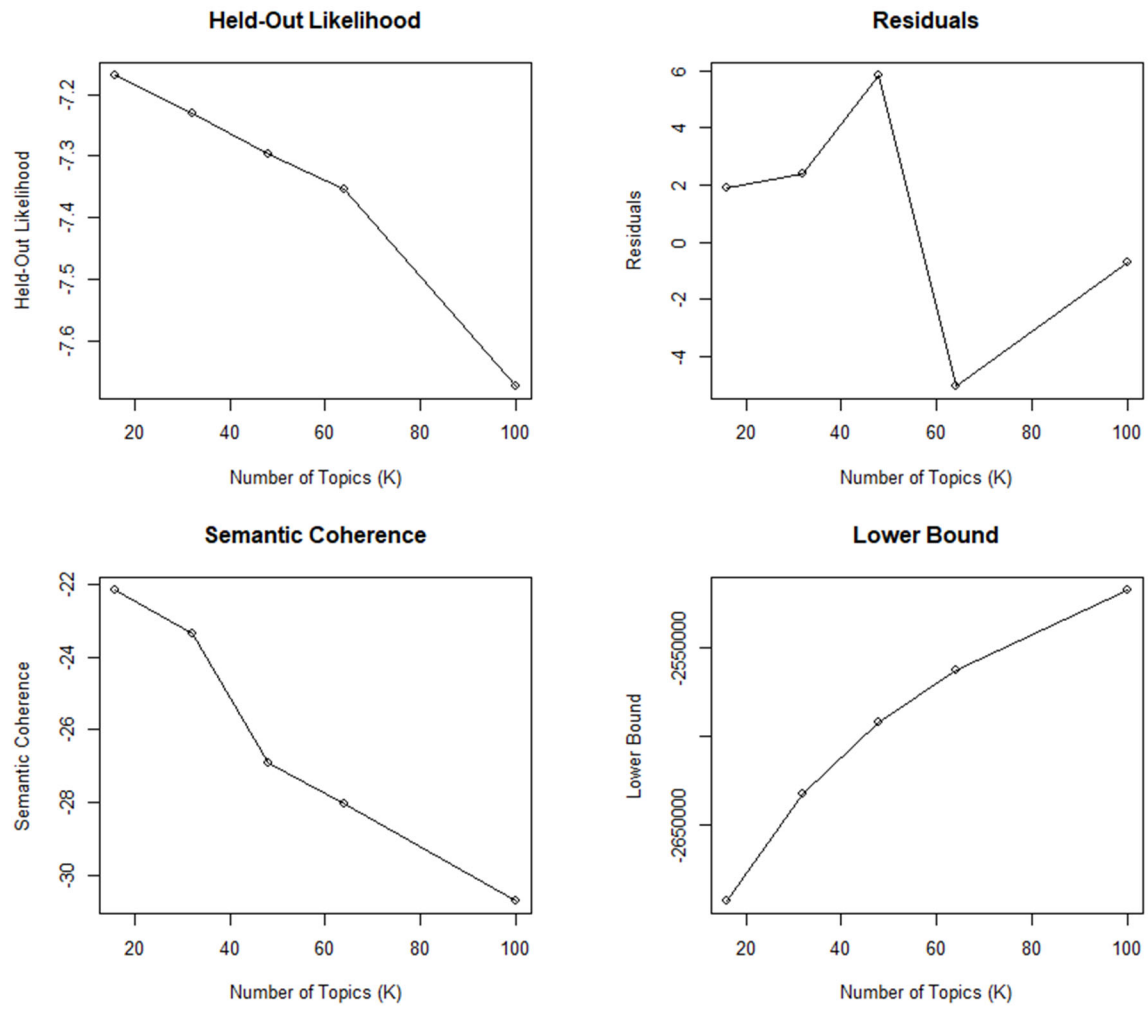
Topic 73 is about tasks in generating and evaluating evidence. It entails a delineation of the tasks involved in such processes, with Bacon emphasizing their onerous and challenging aspects. For example, in the document featuring this topic most prominently, *A Preparatory to the Natural and Experimental History*, Bacon notes that "...nor can it be compassed without vast labour and charges, as that which stands in need of many mens endeavours...For, as for the business itself of the intellect, possibly we shall be able to conquer that with our own strength; but the materials of the understanding are of so large an extent, that those must be gain'd and brought in from every place.... Besides we esteem it as a thing scarce worthy our enterprize, that we ourselves should spend time in such a business as is obtainable by almost all mens industries." Nowhere does Bacon suggest anything about centralization and organization. Indeed, in a passage from the part of *Novum Organum* that is ranked 20th among those featuring this topic prominently, Bacon actually remarks: "...in the habits and regulations of schools, universities, and the like assemblies, destined for the abode of learned men and the improvement of learning, *everything is found to be opposed to the progress of the sciences* [emphasis added]." Based on the same part of *Novum Organum*, one could argue that Bacon, if anything, advocated *decentralization* of the scientific quest: "If, therefore, there be any one who is more disposed and prepared for mechanical art, and ingenious in discovering effects, than in the mere management of experiment, we allow him to employ his industry in gathering many of the fruits of our history and tables in this way, and applying them to effects, receiving them as interest till he can obtain the principal." Even though this topic focuses on the processes of science, it definitely does not provide a perspective that emphasizes centralized organization.

Topic 63 could be best described by Bacon himself as "a small globe of the intellectual world", a phrase Bacon uses in one of passages from *The Advancement of Learning* that features this topic prominently. In that document, Bacon focuses on pointing out "...those errors and vanities which have intervened amongst the studies themselves of the learned, which is that which is principal and proper to the present argument; wherein my purpose is not to make a justification of the errors, but by a censure and separation of the errors to make a justification of that which is good and sound, and to deliver that from the aspersion of the other." This topic is also featured prominently in Bacon's essays, for example, on subjects such as studies, innovations, discourse, seeming wise, dispatches, atheism, superstition, cunning, beauty, and adversity. The common thread of these works is that Bacon offers classifications, and discusses the properties, of good and bad. This topic is not about organization of science and also not about the overall goals of scientific endeavor. Indeed, the closest Bacon comes to a discussion that resembles elements of utilitarianism and centralized organization is in *A Speech Touching the Recovering of Drowned Mineral Works*. In this work, ranked as low as 20th on the list of documents that feature this topic, Bacon addresses the parliament with the following proposition with which he hopes to draw "...his majesty into a serious consideration of the mineral treasures of his own territories, and the practical discoveries of them by way of [his] philosophical theory". Bacon views the "recovering all such drowned mineral work" as "the most probable means to relieve all the poor thereof without any other stock or benevolence, than that which divine bounty should confer on their own industries and honest

labours". Thus, Bacon argues, "...by this unchangeable way...have I proposed to erect the academical fabric of this island's Salomon's House, modelled in my New Atlantis. And I can hope...that my midnight studies to make our countries flourish and outvy European neighbours in mysterious and beneficent arts, have not so ingratefully affected the whole intellects, that you will delay or resist his majesty's desires, and my humble petition in this benevolent, yea, magnificent affair." Note, however, that Bacon's argument here is focused on the specific pursuit of mining and *not* on the scientific quest per se.

The theme of topic 84 is individuals interacting. Bacon emphasizes what happens when a small number of people (often only two) interact—in politics, in legal affairs, in government, in economic situations—and makes value judgments about those interactions. Documents featuring this topic prominently are the essay *A Fragment of the Colors of Good and Evil*, which features a general discussion of different types of arguments, whether they are good or bad, and whether they work or not; several *Maxims of the Law* (e.g. on when several persons' actions when viewed as a whole can be taken as lawful); a speech upon a noble's appointment to Lord Chief Justice of Ireland (where Bacon among others emphasizes that working together with others is important); and a number of other essays (e.g. on suitors, on discourse, on deformity, on superstition). None of the documents featuring this topic prominently involve a discussion of either the utilitarian promise of science or the centralized organization of scientific quest.

Figure B1



Panel B1

Topic 1 Top Words:

Highest Prob: sound, air, make, water, will, string, one, give, great, upon, voic, caus, bodi, tone, motion, nois, note, strike, may, percuss, hear, part, dram, wind, shall, weigh, two, man, grain, though

FREX: tone, string, percuss, dram, nois, sound, articul, concav, tripl, pipe, diapason, bell, loud, interior, grain, trunk, barrel, bullet, weigh, lute, overweigh, voic, strike, exterior, air, outsid, unison, bellow, music, saucer

Topic 2 Top Words:

Highest Prob: histori, learn, man, may, natur, great, will, time, shall, well, can, therefor, work, use, see, make, yet, part, like, state, book, memori, action, thing, mani, one, command, small, mind, much

FREX: histori, defici, immort, profici, stori, journal, learn, narrat, design, virgil, usag, brotherhood, magnific, commentari, monument, endow, writer, memori, personag, relianc, detur, ultra, illumin, univers, oblivion, memor, hippia, reader, extant, chronicl

Topic 3 Top Words:

Highest Prob: law, shall, feoff, yet, make, act, use, land, will, die, heir, therefor, say, statut, limit, enter, bind, purchas, condit, upon, servic, devis, seiz, first, part, take, dissent, rend, caus, hold

FREX: dissent, compuls, feoff, devis, purchas, duress, knight, pursuanc, fee, dagger, limit, feme, lesse, survivor, remot, fitzherbert, dyer, impuls, joint, descent, emerg, act, useless, enter, heir, rend, seiz, leas, pistol, condit

Topic 4 Top Words:

Highest Prob: law, war, nation, make, will, shall, say, may, man, yet, upon, natur, christian, speak, peopl, whether, part, though, govern, now, take, first, great, pollio, god, case, can, true, without, one

FREX: pollio, infidel, pirat, christian, nation, worship, propag, turk, idolatri, christendom, war, reproach, defac, signori, vindic, methink, mexico, enterpris, freeman, heresi, idol, societi, tempor, extirp, ottoman, obligatori, gentil, barbarian, holi, peru

Topic 5 Top Words:

Highest Prob: lordship, majesti, upon, may, will, honour, shall, great, make, now, lord, good, humbl, time, know, matter, yet, can, rather, war, take, unto, one, like, come, therefor, much, think, self, thing

FREX: lordship, humbl, peril, william, treasur, honour, includ, presum, agendum, merit, ormond, harvest, popular, aspect, accept, irish, soev, solicator, burghley, brograv, shelf, fran, cecil, earl, subsidi, singular, reconquest, tie, reduct, vouchsaf

Topic 6 Top Words:

Highest Prob: majesti, may, shall, good, self, will, think, toward, servic, time, move, poor, thing, princ, ever, heart, gracious, miseri, leav, great, now, god, king, give, way, though, hand, one, often, far

FREX: miseri, murrey, gracious, prize, relief, nineteen, majesti, thrice, piti, poor, sovereign, prosper, pieti, grace, move, comfort, pull, fault, often, merci, almighti, advers, sentenc, fountain, gentleman, beseech, humbl, heart, improvid, offenc

Topic 7 Top Words:

Highest Prob: caus, water, bodi, make, will, spirit, see, part, upon, may, great, tooth, come, thing, man, can, also, like, shall, put, motion, turn, stone, one, sweat, find, use, therefor, take, time

FREX: tooth, sweat, tickl, expel, marrow, shell, coal, beak, skin, moistur, nail, skull, compress, leaf, worm, horn, laugh, bone, lassitud, cantharid, basen, quar, drunken, pale, pensil, leg, groan, char, coral, visual

Topic 8 Top Words:

Highest Prob: spirit, man, bodi, part, old, young, thing, oil, heat, also, live, one, will, long, self, motion, wine, forth, water, air, substanc, see, much, blood, canon, flame, now, can, yet, three

FREX: commix, vitriol, vital, oil, refriger, dram, canon, explic, cell, almond, detent, spirit, perspir, milk, petroleum, gross, intener, young, suffoc, mouldi, pluck, vivif, eel, milki, old, wine, leg, ventricl, hair, connatur

Topic 9 Top Words:

Highest Prob: man, good, natur, mind, like, great, shall, make, will, use, give, thou, virtu, much, upon, come, kind, excess, affect, littl, show, light, take, can, let, one, habit, toward, therefor, part

FREX: chariti, doctor, excess, angel, facil, shine, mke, ungraci, portraitur, imprint, compliment, italian, strait, habit, thou, invest, malign, puls, timber, hit, collater, opportun, behaviour, boy, pattern, dog, draught, bewar, articl, gain

Topic 10 Top Words:

Highest Prob: king, upon, great, make, will, time, shall, man, peopl, princ, come, take, part, also, perkin, well, one, year, may, england, much, can, yet, earl, person, give, unto, say, two, put

FREX: perkin, castill, ferdinando, fillip, chamberlain, katherin, rebel, empson, ken, duke, aragon, treati, earl, stanley, warwick, exet, suffolk, cornwal, scottish, cornishmen, arthur, clifford, arch, dudley, flander, napl, bray, castl, duchess, fatherlaw

Topic 11 Top Words:

Highest Prob: learn, say, make, man, speech, alexand, will, use, great, princ, king, upon, excel, time, one, thing, virtu, name, give, yet, shall, unto, caesar, see, can, come, note, may, speak, word

FREX: trajan, alexand, antoninus, callisthen, antipat, homer, falinus, learn, diogen, xenophon, commodus, parmenio, adorn, caesar, predecessor, vener, succeed, vox, eloqu, silenus, pleasu, speech, nerva, emperor, dictat, cassandra, cashier, metellus, darius, quirir

Topic 12 Top Words:

Highest Prob: year, man, live, hundr, age, life, nourish, one, great, eighti, long, also, old, time, nineti, woman, may, mani, well, upon, twenti, four, creatur, seven, yet, five, will, thirti, three, less

FREX: nineti, eighti, hundr, seventi, fifti, thirti, live, nourish, year, rhetorician, fourscore, eight, marcus, age, fulfil, simeon, graft, woman, affabl, xenophan, sixti, twenti, auster, calm, aaron, betwixt, flood, veneri, elder, weep

Topic 13 Top Words:

Highest Prob: grant, land, name, true, yet, one, thing, pass, unto, addit, patent, word, fals, refer, shall, day, tenur, demonstr, whereof, upon, although, good, parish, certainti, part, law, therefor, rule, first, counti

FREX: falsiti, indentur, varianc, denomin, dale, parish, tenur, annex, addit, patent, specificat, rubi, burst, grant, date, certainti, appel, gentlewoman, specifi, demonstr, counti, meum, manor, dunstan, indentura, box, precinct, fals, refer, promontori

Topic 14 Top Words:

Highest Prob: law, shall, will, time, now, can, one, may, make, natur, born, man, first, reason, custom, point, mind, see, work, case, say, occas, without, therefor, either, write, self, put, like, take

FREX: born, ant, unwis, post, union, noos, restrict, madam, yoke, custom, expect, succeed, spectat, droit, baptism, latin, privileg, legitim, occas, payment, articul, expir, pair, wherea, hostil, summari, daughter, zeal, compil, acquir

Topic 15 Top Words:

Highest Prob: bodi, water, will, part, make, draw, see, air, upon, nourish, great, cold, also, like, therefor, may, natur, spirit, heat, littl, time, put, caus, first, shall, take, glass, well, flame, much

FREX: amber, purger, version, urin, rub, clay, indur, ice, gut, attract, rhubarb, pebbl, dens, pellet, tangibl, stomach, electr, nourish, minc, yolk, cream, mesenteri, wool, purg, infus, cow, foment, staunch, cold, windi

Topic 16 Top Words:

Highest Prob: say, will, one, answer, man, upon, great, come, lord, king, sir, take, make, shall, ask, queen, give, tell, may, see, can, like, know, much, time, think, hous, mean, use, friend

FREX: nichola, pompey, vespasian, madam, cardin, diogen, yes, raleigh, ask, lacedaemonian, archbishop, crassus, sir, answer, pyrrhus, walter, captain, pillow, uva, inn, ladi, pillori, boot, peasant, pope, queen, aristippus, rabelai, rescript, whitehead

Topic 17 Top Words:

Highest Prob: tree, will, upon, plant, fruit, make, earth, may, put, water, root, grow, caus, forth, ground, come, herb, also, seed, great, like, leav, flower, set, see, kind, one, therefor, bear, much

FREX: sap, dung, moss, herb, bough, oak, cucumb, stalk, tree, graft, mushroom, lettuc, fig, plant, sprout, colewort, mistleto, plum, radish, vine, prickl, escul, baiz, pear, chalk, seed, tion, gilli, holli, peach

Topic 18 Top Words:

Highest Prob: new, good, make, can, man, year, letter, experi, god, give, inventor, practic, shall, great, gift, self, mind, mean, call, love, think, may, sinc, hous, preced, first, use, also, lordship, long

FREX: inventor, innov, aspir, recommend, gift, unknown, ceremoni, june, pray, fellow, statu, sorri, music, davi, axletre, engin, sake, experi, astronomi, repos, gravil, ducat, new, practic, preced, gunpowd, visit, letter, wing, conceal

Topic 19 Top Words:

Highest Prob: heat, natur, bodi, cold, fire, hot, air, thing, will, make, instanc, flame, water, burn, warm, degre, also, yet, glass, let, first, may, one, appear, motion, self, must, like, tabl, upon

FREX: warm, ignit, heat, hot, perpendicular, negat, ray, expans, exclus, burn, howev, cold, reject, flame, liquid, sparkl, weather, dung, tube, instanc, tenuiti, subjoin, attrit, decreas, fire, potenti, anim, apron, glass, friction

Topic 20 Top Words:

Highest Prob: god, man, thou, thi, shall, work, time, holi, will, earth, spirit, lord, day, word, creatur, unto, make, natur, thing, good, yet, one, law, may, can, christ, great, world, first, etern

FREX: thi, etern, ghost, thou, creation, psalm, christ, holi, mediat, jesus, uniti, righteous, translat, bide, redempt, sing, carol, godhead, reveal, everlast, wick, prais, pour, god, regener, creat, along, miracl, soul, brittl

Topic 21 Top Words:

Highest Prob: man, shall, will, king, may, upon, think, say, undertak, good, parliament, thing, make, hous, lie, can, truth, mind, like, suspicion, light, much, know, well, find, opinion, yet, natur, must, self

FREX: suspicion, undertak, pack, fort, card, silent, parliament, committe, rumour, protest, truth, messag, gididi, woo, suspect, fede, brambl, diffid, smother, shrink, dress, hous, buzz, falsehood, dust, poplar, betray, price, coin, stout

Topic 22 Top Words:

Highest Prob: land, make, shall, use, estat, man, heir, life, statut, entail, can, will, upon, tenant, leas, good, may, seiz, convey, give, call, feloni, fine, three, son, forfeit, debt, time, year, parti

FREX: entail, viii, forfeit, leas, tail, liveri, debt, feesimpl, convey, revers, recoveri, tenant, land, chattel, wardship, escheat, heir, bargain, feloni, remaind, attaind, estat, seiz, cestui, sale, soccag, outlawri, owner, fine

Topic 23 Top Words:

Highest Prob: land, heir, shall, call, servic, man, king, tenant, inherit, upon, knight, hold, make, son, lord, day, court, tenur, one, judg, may, can, first, die, seiz, take, give, person, enter, everi

FREX: tenur, inherit, knight, escheat, soccag, heir, prius, attaind, nisi, ancestor, tenor, tenant, land, juri, uncl, manor, ken, assiz, capit, verdict, plough, freehold, sue, writ, sister, sheriff, harvest, descent, escuag, acr

Topic 24 Top Words:

Highest Prob: lord, overburi, will, impoison, poison, shall, somerset, first, upon, man, may, murder, must, make, can, secret, king, give, great, time, act, three, proof, tower, part, say, natur, ladi, mean, self

FREX: overburi, somerset, impoison, empoison, poison, tower, murder, weston, displac, ladi, hatr, proof, abet, lieuten, peer, keeper, trap, prison, malic, lord, secret, evid, gradus, friendship, steward, packet, jargon, defenc, intox, divert

Topic 25 Top Words:

Highest Prob: court, law, man, shall, say, upon, may, honour, case, judg, will, make, caus, person, duel, majesti, great, time, take, challeng, lord, justic, like, offenc, punish, give, general, think, much, though

FREX: duel, challeng, combat, court, punish, fight, quarrel, decre, advoc, attorney, censur, martial, priest, contum, misdemeanour, offenc, fortitud, depos, combin, judg, murder, lion, capit, certif, disgrac, proclam, surrey, clerk, insidi, homicid

Topic 26 Top Words:

Highest Prob: law, case, will, may, time, rule, shall, man, author, good, work, use, reason, yet, make, judgement, cours, majesti, book, great, new, one, now, matter, better, first, doubt, mani, set, either

FREX: student, lawyer, vacant, resp, innov, incertainti, civilian, languag, penal, text, recompil, obsolet, exposit, yearbook, quotat, rule, vouch, abridg, repetit, debat, law, book, regist, decis, unprofit, author, finch, compos, institut, commonlaw

Topic 27 Top Words:

Highest Prob: say, will, man, one, come, shall, upon, answer, take, great, king, like, now, wise, sir, reveng, pass, make, time, friend, father, give, hear, never, wrong, mani, better, day, use, gentleman

FREX: aristippus, seaman, themistocle, owl, antigonus, reveng, pater, falinus, cato, florenc, udg, vindict, pericl, maker, forgiv, harbng, spartan, fool, alciabiad, wager, grand, horn, mad, coward, popham, truce, fabius, shave, pace, wrong

Topic 28 Top Words:

Highest Prob: use, statut, feoff, law, upon, case, shall, make, will, say, take, time, trust, remedi, consider, commonlaw, good, may, give, reason, therefor, one, conscienc, cesti, land, possess, right, matter, find, noth

FREX: cesti, feoff, statut, commonlaw, subpoena, notic, trust, conscienc, chanceri, mortmain, covin, regina, tenanc, richard, collus, henri, cap, relief, praecip, creditor, remedi, consider, use, herbert, possess, quaer, exposit, provisor, recontinu, case

Topic 29 Top Words:

Highest Prob: majesti, shall, make, will, king, lord, must, great, may, justic, upon, god, good, judg, one, think, take, much, self, speak, busi, fear, coke, know, first, tabl, opinion, law, say, honour

FREX: coke, matthew, patent, owen, tabl, compani, religion, amiss, peacham, penalti, recus, essay, fear, subscrib, sergeant, addit, exchequ, acquaint, majesti, judg, scale, justic, crook, bench, pieti, lest, flatter, warrant, paper, revenu

Topic 30 Top Words:

Highest Prob: king, shall, law, man, inquir, therefor, take, offenc, god, three, concern, first, will, make, person, peopl, present, time, unto, life, say, within, upon, treason, hous, may, second, part, church, feloni

FREX: verg, recus, supremaci, inquir, offenc, capit, unlaw, jesuit, oath, perjuri, mile, safeti, weapon, witchcraft, seminari, feloni, malici, stab, monitor, wil, treason, impun, fraud, carpet, offend, robberi, yard, disguis, profan, aswel

Topic 31 Top Words:

Highest Prob: natur, will, man, scienc, experi, one, philosophi, great, yet, may, can, hope, discoveri, shall, even, mind, new, observ, particular, thing, matter, upon, age, therefor, rather, make, first, time, caus, understand

FREX: instinct, unanim, discoveri, investig, system, mankind, axiom, philosophi, scienc, mode, theori, intermedi, meantim, induct, mechan, epoch, pueril, arrang, hesit, result, everyth, whatev, deduc, hitherto, afford, instaur, research, vagu, howev, notion

Topic 32 Top Words:

Highest Prob: will, metal, make, silver, iron, brass, ounce, gold, incorpor, glass, may, use, lead, bodi, stone, whether, inquir, weight, copper, first, colour, like, tin, sever, well, fire, mixtur, compound, half, melt

FREX: ounce, brass, tin, copper, metal, silver, calcin, incorpor, addita, quicksilv, iron, stuff, tough, melt, fixat, calaminar, gold, malleabl, cheap, vitrifi, luster, flint, compound, plate, item, glass, volatil, vitrif, electrum, steel

Topic 33 Top Words:

Highest Prob: instanc, bodi, motion, natur, water, will, heat, air, place, may, also, power, part, can, observ, spirit, must, one, great, like, substanc, differ, shall, let, effect, flame, first, appear, take, therefor

FREX: magnet, similar, instanc, expans, rapid, class, migrat, expand, conspicu, exist, contact, howev, tendenc, investig, sphere, anim, particl, deviat, homogen, format, concret, classif, liquid, predomin, imped, clandestin, compress, veloc, ebb, speci

Topic 34 Top Words:

Highest Prob: man, good, natur, great, part, duti, can, much, make, one, say, life, will, virtu, mind, thing, upon, write, knowledg, may, place, well, concern, felic, yet, see, whereof, opinion, first, give

FREX: needless, felic, duti, societi, passiv, socrat, sophist, activ, doctrin, conserv, resum, eam, perturb, exemplar, faculti, fruition, exalt, cabinet, divis, decid, vita, contempr, profess, fifteen, censur, honesti, everyth, cultur, presuppous, itch

Topic 35 Top Words:

Highest Prob: sound, will, make, bodi, air, see, one, echo, hear, may, much, shall, like, man, great, light, speak, pass, upon, visibl, string, voic, well, come, time, better, therefor, motion, side, stand

FREX: echo, visibl, audibl, medium, sound, pipe, string, bell, lute, speci, vial, repercuss, delat, reflect, sight, distanc, voic, concav, pupil, harp, line, cranni, purl, music, nois, grate, unison, local, yawn, wall

Topic 36 Top Words:

Highest Prob: man, say, make, natur, fortun, may, can, will, good, mind, time, see, upon, thing, knowledg, great, one, much, part, like, shall, yet, virtu, first, use, well, wisdom, govern, wherein, anoth

FREX: eam, lover, precept, sapien, fortun, livi, cato, decenc, moral, cicero, magnus, oneself, caution, pursuit, machiavelli, behaviour, animi, chanc, sinew, transgress, porta, virtus, knowledg, eleg, anyth, quomodo, handmaid, haec, defici, sulla

Topic 37 Top Words:

Highest Prob: law, time, upon, king, may, make, good, well, give, say, great, statut, majesti, first, work, will, part, thing, like, yet, speak, god, long, custom, caesar, theme, now, man, subject, mani

FREX: theme, lawgiv, compil, pembrok, commission, sulla, poster, lycurgus, scribe, graft, recompile, saxon, repeal, bid, mishap, callisthen, caesar, justinian, golden, edict, nil, alexand, discounten, prais, ordin, digest, decemvir, edgar, danish, solon

Topic 38 Top Words:

Highest Prob: king, spain, great, upon, majesti, will, shall, letter, matter, time, make, good, mean, man, take, first, say, servic, last, unto, like, one, also, may, can, antonio, know, find, manuel, receiv

FREX: antonio, manuel, spain, intellig, count, portug, invas, calai, emanuel, advertis, mendoza, evas, secretari, whither, confer, sum, apprehend, confess, realm, intercept, detest, franc, credenc, traitor, expostulatori, letter, cun, hostil, antwerp, reveal

Topic 39 Top Words:

Highest Prob: motion, bodi, thing, water, will, heat, part, may, one, natur, yet, togeth, air, must, great, can, come, place, first, desir, let, like, name, self, sea, well, upon, make, call, spirit

FREX: congreg, ebb, vacuiti, coition, motion, predomin, connexion, flow, load, magnet, gun, assimil, heterogen, dimens, homogen, excit, rotat, abhor, centaur, curb, numb, pole, lesser, shore, penetr, compress, bullet, atlant, florida, decisori

Topic 40 Top Words:

Highest Prob: king, upon, time, make, shall, great, will, part, may, britain, take, person, come, duke, lord, man, yet, peopl, french, also, law, one, first, parliament, good, think, peac, unto, war, much

FREX: duke, plantagenet, britain, french, lincoln, lovel, york, richard, maximilian, sanctuari, ambassador, succour, orlean, earl, briton, treati, battl, clarenc, coron, urswick, simon, flander, stafford, margaret, dowag, burgundi, rebel, councillor, charl, fight

Topic 41 Top Words:

Highest Prob: great, may, upon, war, peopl, state, will, plantat, make, man, thing, estat, like, let, roman, time, arm, can, yet, mani, common, world, natur, therefor, plant, subject, shall, countri, say, kingdom

FREX: plantat, jus, fiddl, martial, courag, expens, armi, effemin, victual, roman, ordnanc, popul, battl, timor, habilit, nobleman, sparta, peasant, empir, militia, war, warlik, veteran, stem, spread, lazi, persian, turk, penuri, decay

Topic 42 Top Words:

Highest Prob: great, one, natur, state, time, faction, make, union, man, bodi, kingdom, see, mani, yet, first, take, govern, common, upon, will, king, may, justic, motion, well, princ, particular, hold, like, much

FREX: faction, sedit, discontent, union, cassius, communiti, judah, unit, conjunct, sabin, sovereignti, candidaci, israel, opus, vote, subdivid, tacitus, earthquak, leagu, sign, convert, audaci, somewher, stock, epimetheus, mobil, leo, troy, aragon, unperfect

Topic 43 Top Words:

Highest Prob: king, make, upon, war, time, will, great, unto, franc, shall, peac, may, lord, thing, think, know, person, maximilian, can, good, now, england, yet, come, part, french, one, duke, well, give

FREX: maximilian, perkin, flander, bruge, york, duchess, ambassador, duke, charl, french, franc, ferdinando, richard, sluic, tirrel, john, britain, ladi, margaret, prior, frion, ravenstein, simnel, lambert, dismiss, tower, ambassag, napl, burgundi, confeder

Topic 44 Top Words:

Highest Prob: thing, man, natur, may, say, will, shall, unto, seem, also, jupit, time, god, see, mani, yet, much, prometheus, well, take, one, invent, fabl, great, like, neither, first, make, good, everi

FREX: prometheus, jupit, typhon, atalanta, parabl, page, bacchus, miss, moreov, pan, allegori, giant, gorg, scylla, icarus, arthur, fabl, torch, apollo, thunderbolt, mercuri, muse, chariot, serpent, sphinx, ball, wrest, mysteri, transcend, insurrect

Topic 45 Top Words:

Highest Prob: counsel, king, man, great, thing, upon, danger, princ, will, one, first, like, counsellor, make, come, time, good, matter, person, use, second, author, common, take, may, mani, henri, sometim, let, father

FREX: counsellor, counsel, henri, solyman, danger, ripe, secreci, destruct, nero, neighbour, meti, nodd, sentinel, outrun, charl, memento, celer, toss, trade, skil, jealousy, palla, cabinet, affair, fatal, committe, potent, depress, vespasian, consort

Topic 46 Top Words:

Highest Prob: church, shall, may, god, upon, bishop, time, man, thing, will, great, one, yet, good, well, matter, word, minist, say, give, make, caus, therefor, first, think, can, reason, majesti, see, law

FREX: preacher, church, pastor, liturgi, bishop, preach, jurisdic, baptism, minist, excommun, plural, prayer, ministri, primit, mainten, spiritu, benefic, ecclesiast, tith, nonlatin, reform, ecclesia, tempor, holi, dean, edif, impropri, grave, accus, extol

Topic 47 Top Words:

Highest Prob: knowledge, use, man, method, great, make, may, speech, will, therefor, reason, one, word, thing, part, good, shall, write, see, anoth, say, rhetor, matter, scienc, well, much, place, memori, tradit, can

FREX: method, rhetor, cipher, tradit, logic, eloqu, knowledg, defici, hieroglyph, aphor, deliveri, cogit, grammar, stammer, enfold, illustr, inquiri, gestur, transit, charact, emblem, everyth, memori, speech, danc, jest, tongu, malum, similitud, aristotl

Topic 48 Top Words:

Highest Prob: man, anger, will, natur, time, first, let, fame, well, therefor, thing, dissimul, great, make, upon, must, mani, can, three, may, open, secret, habit, take, say, mind, set, good, second, much

FREX: anger, dissimul, fame, simul, angri, folk, secreci, tiberius, vitellius, habit, contempt, asleep, mucianus, dissembl, froward, augustus, close, pick, appeas, injuri, refrain, disadvantage, wari, secret, legion, intermiss, historian, hide, spoil, whosoev

Topic 49 Top Words:

Highest Prob: thing, man, natur, say, may, make, see, one, will, shall, world, come, take, god, place, great, yet, child, like, two, first, mani, famili, pan, kind, time, also, order, work, part

FREX: bensalem, pan, perseus, herald, saturn, orpheus, pentheus, feast, thebe, famili, palla, giant, coelum, actaeon, shield, sister, harmoni, grape, goat, mantl, hunt, marriag, parent, enamel, endymion, jew, wanton, ivi, pace, luna

Topic 50 Top Words:

Highest Prob: war, upon, spain, great, will, man, come, make, time, part, state, shall, yet, spaniard, say, take, forc, fear, just, may, sea, year, ship, king, now, speak, english, land, armi, england

FREX: spaniard, palatin, navi, spain, spanish, valour, germani, parma, invas, defens, fight, war, armi, english, ship, drake, fleet, offens, thousand, bohemia, fort, retreat, lacedaemonian, syria, defeat, enterpris, duke, brave, milan, venic

Topic 51 Top Words:

Highest Prob: king, will, shall, man, law, may, upon, give, can, subject, princ, one, lord, great, time, make, pope, say, matter, justic, god, parliament, judg, take, like, yet, offenc, charg, opinion, peopl

FREX: pope, slander, benevol, sediti, depos, administ, cathol, major, prerog, subordin, allegi, irrit, doctrin, tempor, proscib, contagion, sentenc, conspiraci, clemenc, excommun, aggrav, heresi, discret, offenc, papist, venom, rascal, channel, pontif, thn

Topic 52 Top Words:

Highest Prob: wind, air, blow, will, sail, motion, thing, great, one, part, sea, south, north, east, make, rain, may, place, water, sun, west, cloud, way, much, rise, come, also, likewis, name, begin

FREX: wind, sail, mast, south, east, north, blow, rain, nurseri, presag, cloud, west, gale, prognost, engend, moon, storm, mizon, monit, weather, stormi, allay, wave, whirl, vapour, top, whirlwind, optat, calm, impuls

Topic 53 Top Words:

Highest Prob: will, majesti, shall, may, great, like, work, man, upon, good, plantat, kingdom, make, mean, undertak, therefor, part, place, person, three, thing, mani, first, can, one, natur, wherein, peopl, estat, charg

FREX: plantat, hospit, undertak, ireland, project, sutton, beggar, town, discard, relief, harp, commod, provis, revenu, kingdom, desol, portion, build, endow, benefic, foundat, enterpris, consequ, reader, pervert, knighthood, want, habit, mass, charg

Topic 54 Top Words:

Highest Prob: natur, understand, man, philosophi, will, experi, bodi, must, thing, first, method, can, mind, axiom, human, scienc, great, upon, particular, sens, idol, system, instanc, therefor, notion, matter, howev, yet, caus, investig

FREX: idol, system, investig, abstract, theori, axiom, latent, dogma, similar, exist, howev, method, notion, primari, genuin, anticip, theoret, prematur, deduc, sceptic, tendenc, process, transform, logic, sourc, philosophi, speci, format, greek, specif

Topic 55 Top Words:

Highest Prob: may, bodi, thing, take, spirit, will, much, use, upon, part, also, life, wine, good, touch, make, oper, littl, like, water, air, therefor, long, heat, juic, meat, oil, espec, let, drink

FREX: saffron, intener, bath, claret, grain, ale, broth, juic, anoint, aliment, meat, unction, stomach, decoct, wine, steep, powder, fricat, shirt, exclus, drink, baysalt, spoon, liver, oil, fat, boil, myrrh, skin, infus

Topic 56 Top Words:

Highest Prob: natur, will, shall, speaker, master, law, kingdom, say, may, peopl, time, upon, great, can, see, state, self, yet, first, therefor, man, make, now, never, king, much, answer, take, part, one

FREX: speaker, master, nobil, provinc, surcharg, revolt, alien, scottish, commixtur, inconveni, famili, kingdom, canton, benefit, goth, parmenio, sureti, normandi, object, jus, union, privileg, pastur, swiss, solon, burgundi, pisa, nation, whosoev, swisser

Topic 57 Top Words:

Highest Prob: shall, majesti, scotland, england, may, will, law, whether, question, sever, make, one, point, britain, nation, part, parliament, time, kingdom, crown, name, yet, subject, first, alter, great, therefor, opinion, king, take

FREX: scotland, britain, england, nation, intern, articl, scot, admiralti, style, union, question, crown, merchant, nobil, divid, receipt, parliament, erect, whether, impost, royal, march, wale, dialect, languag, financ, scottish, merchandis, seal, english

Topic 58 Top Words:

Highest Prob: shall, grant, upon, take, law, life, die, make, now, condit, yet, seiz, tenant, disseise, common, remit, case, without, heir, rend, right, therefor, may, feoff, king, land, use, reason, remaind, can

FREX: disseise, remit, remitt, legal, lesse, impropri, remaind, atturn, incumb, grant, support, graunte, advowson, feme, neighbor, franketen, tenant, discontinu, cops, dower, notam, center, leas, rend, deer, claim, vie, companion, seiz, hay

Topic 59 Top Words:

Highest Prob: shall, come, great, say, may, land, will, one, man, upon, let, make, know, time, part, good, see, ship, place, side, take, day, give, littl, think, yet, stranger, also, countri, travel

FREX: boat, travel, galleri, pillar, front, ship, room, ark, navig, atlanti, diari, island, palac, america, voyag, sick, inund, china, stori, stranger, stair, turban, europ, aboard, window, cloister, scroll, fair, citi, chamber

Topic 60 Top Words:

Highest Prob: shall, word, error, take, upon, rend, rule, plead, therefor, bring, give, case, heir, acr, law, land, matter, plea, ambigu, good, reserv, will, grant, issu, may, reason, yet, writ, intend, make

FREX: ambigu, plead, acr, aver, plea, formedon, shill, rend, donor, warranti, attaind, error, demurr, warren, manor, ass, frank, entail, fealti, dale, reserv, writ, replic, bar, plaintiff, implic, moiети, graunte, discontinu, alleg

Topic 61 Top Words:

Highest Prob: spirit, life, long, thing, also, man, may, bodi, much, good, will, live, diet, use, shall, certain, take, like, great, opiat, old, yet, rather, age, touch, make, condens, heat, nitr, sleep

FREX: opiat, nitr, opium, condens, prolong, cool, statur, shorten, diet, flight, nitrous, venetian, subordin, spirit, grey, eager, sleep, liver, hair, cornarus, insight, abstin, spice, betoken, distil, obstin, treacl, juic, leg, lignum

Topic 62 Top Words:

Highest Prob: man, will, thing, say, make, busi, know, one, speech, good, may, come, time, take, anoth, wise, seem, dispatch, cun, let, speak, like, matter, much, studi, upon, point, question, mani, can

FREX: dispatch, cun, ware, surpris, trick, secretari, afraid, studi, troublesom, negat, speech, eyebrow, abil, forehead, amus, dart, busi, shift, fetch, wait, satir, declin, distil, discours, beatric, tale, iter, jesuit, ornament, wise

Topic 63 Top Words:

Highest Prob: man, knowledg, learn, time, matter, god, natur, first, one, make, see, great, upon, work, say, truth, philosophi, error, unto, use, two, anoth, scienc, author, part, may, shall, divin, will, much

FREX: knowledg, schoolman, antiqu, illustr, philosophi, learn, augment, contempl, nil, alterc, imag, aristotl, scienc, error, period, truth, degener, travail, alchemi, novelti, web, navig, curios, impostur, confut, relic, plato, badg, profound, angel

Topic 64 Top Words:

Highest Prob: use, statut, feoff, law, word, shall, estat, seiz, case, upon, may, person, possess, make, first, execut, heir, cesti, can, time, therefor, right, three, save, land, will, titl, king, take, life

FREX: cesti, feoff, statut, seiz, proviso, remaind, preamb, possess, commonlaw, conting, feesimpl, tail, use, save, execut, convey, regress, estat, infant, joint, fee, titl, purview, limit, feme, exclud, heir, vest, bargain, enrol

Topic 65 Top Words:

Highest Prob: squir, upon, shall, make, god, hand, one, man, time, yet, come, may, will, good, part, take, find, majesti, life, well, queen, think, now, confess, england, poison, earl, great, say, num

FREX: squir, num, saul, stabl, vow, jesuit, conspir, suborn, persuas, confessor, voyag, fugit, poison, earl, bladder, suspicion, slander, david, saddl, wick, heathenish, retract, confess, priest, belik, papist, hell, uttermost, richard, ride

Topic 66 Top Words:

Highest Prob: good, will, self, may, think, make, can, shall, much, letter, man, god, see, give, though, yet, true, know, part, friend, find, sinc, time, write, hand, therefor, one, great, upon, best

FREX: vacat, assault, attorney, friend, cross, wealth, repent, tide, unjust, access, advantag, hazard, cost, amend, pray, merci, beseech, befal, prophesi, mourn, mediocr, patronag, block, rip, puff, wound, sleight, opportun, sinc, leisur

Topic 67 Top Words:

Highest Prob: shall, man, law, edward, necess, one, life, yet, upon, case, excus, kill, action, anoth, can, maxim, therefor, will, statut, wast, punish, commit, malic, accessari, act, feloni, come, rather, join, tenant

FREX: accessari, excus, rob, unpunish, trespass, malic, wast, justifi, maxim, necess, kill, steal, standf, edward, punish, penal, default, assail, fitzherbert, damag, crime, obedi, mad, salus, merchandis, feme, aunt, feloni, murder, felon

Topic 68 Top Words:

Highest Prob: man, natur, part, knowledg, upon, mind, use, may, make, bodi, thing, shall, invent, one, will, great, can, yet, therefor, much, philosophi, imagin, like, two, particular, true, say, speak, find, first

FREX: defici, invent, anatomi, inquiri, medicin, calendar, variabl, imagin, induct, knowledg, magic, metaphys, proposit, prescript, mathemat, vicissitud, philosophi, elench, physician, artifici, predict, principl, neptun, delug, rhetor, earthquak, faculti, astronomi, abash, aristotl

Topic 69 Top Words:

Highest Prob: man, virtu, person, make, great, will, good, upon, bold, honour, one, follow, busi, may, prais, like, can, natur, much, part, certain, yet, see, first, common, say, time, beauti, mani, better

FREX: bold, mahomet, prais, deform, beauti, blister, personag, hill, officii, virtu, flatter, painter, glorious, lucki, ishmael, scorn, secundus, decent, ostent, mountebank, factious, absurd, espial, virtuous, titus, vespasianus, superior, vaunt, counten, pretti

Topic 70 Top Words:

Highest Prob: will, shall, upon, may, court, king, great, majesti, justic, make, caus, lord, man, say, first, thing, take, chanceri, give, time, true, find, know, charg, much, offenc, now, one, god, case

FREX: chanceri, weston, injunct, chancellor, impoison, poison, court, juri, decre, offenc, posi, tanquam, pottag, justic, sergeant, praemunir, agrav, client, overburi, commonlaw, lawyer, charg, pronounc, seal, bill, guilti, impeach, commission, verdict, gibb

Topic 71 Top Words:

Highest Prob: man, learn, make, great, say, may, time, can, mind, knowledg, natur, thing, will, give, one, friend, love, upon, true, well, shall, yet, person, god, much, state, fortun, mani, good, see

FREX: friendship, learn, solitud, cato, marcus, pedant, friend, poverti, nec, anxieti, lumen, knowledg, dionysius, tam, quintus, irresolut, sulla, minor, atheism, applic, swell, lover, virtuous, caesar, theatrum, tinkl, discredit, patron, dream, leisur

Topic 72 Top Words:

Highest Prob: king, law, natur, england, shall, say, case, subject, one, may, person, can, will, upon, time, first, reason, statut, therefor, make, kingdom, act, man, word, yet, two, parliament, bear, crown, come

FREX: allegi, conquest, gascoign, alien, england, submiss, normandi, descent, conquer, lieg, walter, infer, fol, homag, obeis, englishmen, scottishmen, born, signori, plead, foe, derogatori, anjou, privileg, crown, scotland, abridg, birth, subject, duchi

Topic 73 Top Words:

Highest Prob: thing, histori, natur, may, will, man, experi, shall, concern, inquisit, let, make, also, part, much, use, work, inquir, whether, must, upon, either, order, certain, great, four, three, time, fold, see

FREX: fold, histori, experiment, inquisit, med, breez, organon, alphabet, potenti, tropic, meteor, instaur, wherefor, interpret, prodigi, threefold, contribut, subjoin, west, semi, delta, cardin, inquir, volum, artificii, perspicu, celesti, experi, composur, east

Topic 74 Top Words:

Highest Prob: envi, man, upon, great, good, fortun, will, thing, person, time, busi, self, much, princ, less, may, public, use, ambiti, yet, natur, therefor, ever, state, think, shall, make, can, servant, note

FREX: envi, ambiti, envious, wri, briberi, eunuch, pull, banish, lover, con, crocodil, consol, public, screen, centr, epistl, fortun, alban, ambit, lame, vile, fascin, minist, witchcraft, infect, talon, evil, wheat, calam, discontent

Topic 75 Top Words:

Highest Prob: bodi, spirit, thing, part, repar, life, long, death, air, canon, therefor, may, way, repair, explic, will, last, man, inquisit, natur, aliment, forth, hard, can, without, come, much, time, also, make

FREX: repar, explic, canon, aliment, repair, malaciss, inanim, oili, wateri, consumpt, consubstanti, inquisit, dew, organ, renov, perspir, etern, durat, diet, prolong, porch, extern, arteri, membran, death, inhibit, detain, suppl, flame, pefrac

Topic 76 Top Words:

Highest Prob: man, say, church, god, will, thing, shall, law, religion, part, good, great, upon, one, time, make, may, know, true, matter, can, controversi, person, well, much, see, non, yet, seek, first

FREX: controversi, preach, uniti, church, atheism, heresi, profan, atheist, superstit, religion, worship, zeal, dominus, idolatri, carnal, bishop, scriptur, apostl, partial, exhort, infer, preacher, posit, blasphemii, deiti, doctrin, deform, holi, gentil, christ

Topic 77 Top Words:

Highest Prob: lordship, place, may, shall, will, majesti, good, humbl, man, think, pleas, servic, hope, lord, know, time, self, solicator, much, chancellor, can, letter, king, therefor, well, father, salisbury, work, like, attorney

FREX: solicator, salisbury, lordship, humbl, chancellor, attorney, fer, sergeant, finish, thank, hope, pleas, deserv, place, resolv, argument, servic, gracious, signif, egerton, father, further, planter, duti, favour, bill, letter, governor, kinsman, sure

Topic 78 Top Words:

Highest Prob: king, man, feloni, treason, constabl, may, shall, justic, offic, peac, case, person, upon, make, realm, proceed, power, court, call, good, petti, punish, chap, land, take, law, commit, one, author, everi

FREX: constabl, chap, feloni, treason, leet, abjur, petti, mispris, shire, praemunir, currant, jurisdict, realm, punish, peer, sanctuari, proclam, oyer, affray, imprison, session, offic, forfeitur, coin, peac, forfeit, enabl, jailor, accessari, termin

Topic 79 Top Words:

Highest Prob: natur, man, part, caus, philosophi, divin, god, may, knowledg, histori, thing, therefor, upon, use, true, one, make, metaphys, will, physic, reason, accord, handl, scienc, matter, word, three, much, defici, whereof

FREX: metaphys, defici, poesi, theolog, philosophi, physic, divin, summari, effici, final, inquiri, prophecii, exposit, ark, histori, basi, concept, scriptur, fabl, parabol, notion, satisfactori, inspir, handl, reced, terra, allus, contempl, feign, principl

Topic 80 Top Words:

Highest Prob: good, man, king, court, shall, justic, may, peac, take, will, debt, executor, everi, make, counti, law, parti, call, pay, judg, properti, one, upon, sheriff, administr, bind, land, constabl, legaci, give

FREX: executor, legaci, debt, indict, gaol, counti, administr, constabl, guilti, circuit, eyr, sheriff, pay, market, outlaw, properti, stray, session, intest, owner, juri, accus, assiz, recogniz, thief, steal, chattel, dioces, grand, executorship

Topic 81 Top Words:

Highest Prob: law, make, will, shall, repeal, non, former, claus, clausula, revoc, new, man, act, year, yet, good, stand, sheriff, statut, king, parliament, void, first, author, reason, corpor, can, present, without, take

FREX: repeal, clausula, revoc, claus, detractor, sheriff, oculus, revok, corpor, cap, non, damag, minor, corpus, menac, summon, trespass, testat, repugn, layout, void, depriv, apart, past, patent, aver, garment, aliv, restrain, dispens

Topic 82 Top Words:

Highest Prob: majesti, good, may, will, time, king, know, letter, shall, upon, lord, though, make, great, toward, commend, servic, profit, say, mean, self, sir, occas, can, brother, use, love, mind, hope, one

FREX: mutual, salut, compani, entranc, forese, commend, brother, interim, durham, faul, friendship, vivac, matthew, lake, profit, villier, sir, georg, disadvantag, deceas, project, letter, sow, reap, occas, husbandri, majesti, humbl, requit, recommend

Topic 83 Top Words:

Highest Prob: man, will, custom, exercis, use, upon, natur, exampl, thing, help, bodi, well, one, much, great, affect, forc, take, may, mind, see, mean, though, yet, first, power, action, work, perfect, true

FREX: extempor, tullii, shoe, custom, exercis, faber, halter, intellectu, engag, scourg, penanc, altar, rhetor, feat, similitud, pliant, whoever, transform, faculti, sophist, logic, learner, victori, suffoc, reform, breath, hermogen, voluntari, corrobor, mend

Topic 84 Top Words:

Highest Prob: good, quoth, will, man, thing, make, colour, one, take, may, seem, say, well, see, evil, back, non, therefor, mani, great, kind, part, yet, come, self, place, without, away, natur, shall

FREX: gradus, malum, reprehens, reprehend, quoth, autem, melior, qui, spur, blossom, colour, mayor, incept, citizen, evil, plural, minus, luck, start, realiti, absit, men, nam, mala, distant, burden, felic, comprehens, hereof, deceiv

Topic 85 Top Words:

Highest Prob: will, bodi, spirit, water, caus, see, part, make, heat, may, great, air, also, upon, therefor, putrefact, natur, time, good, come, littl, put, cold, like, much, forth, first, man, dri, creatur

FREX: putrefact, bottl, matur, beer, concoct, moistur, acceler, appl, congeal, liquor, portend, smell, candl, liquefi, shine, fragil, putrifi, clarif, moon, summer, wax, visual, percept, sugar, cotton, emiss, lee, putrefi, basen, vivif

Topic 86 Top Words:

Highest Prob: majesti, king, upon, great, time, man, make, state, spain, good, england, shall, say, may, one, will, never, unto, yet, mani, realm, part, much, year, war, like, honour, peopl, also, princ

FREX: libel, spain, cathol, sundri, untruth, lowcountri, realm, christendom, guis, invas, avouch, duke, nobil, franc, burleigh, treati, confederaci, invad, germani, faction, amiti, macedon, assay, ambassador, england, drift, successor, persecut, mari, turk

Topic 87 Top Words:

Highest Prob: long, year, life, bodi, live, age, creatur, dri, tree, will, spirit, bird, touch, thing, old, also, much, short, forth, part, man, one, young, last, air, water, make, may, bear, great

FREX: desicc, liver, durabl, tallow, wrinkl, dri, goos, bird, eagl, growth, creatur, swan, moistur, rust, arefact, womb, flesh, threescor, short, ambient, wither, raven, pertain, length, dove, nut, harden, wax, parchment, tree

Topic 88 Top Words:

Highest Prob: majesti, lord, will, may, king, time, upon, opinion, say, shall, think, well, chancellor, make, letter, day, give, busi, part, much, god, though, can, send, case, come, now, true, self, judg

FREX: chancellor, peacham, paper, majesti, advertis, indict, shrewsburi, pray, tyron, coke, bench, absent, yesterday, lord, feb, murray, projector, rhythm, forbear, sorri, cough, domini, garrison, april, privycouncil, presumpt, send, humbl, devout, mistrust

Topic 89 Top Words:

Highest Prob: man, may, one, natur, can, will, king, great, histori, matter, say, light, without, make, use, time, think, scienc, ancient, now, mind, caus, effect, thing, invent, yet, world, upon, general, discoveri

FREX: studious, mankind, system, discoveri, dignifi, uncertainti, exist, anxious, alik, steadi, everyth, correct, goal, valuabl, invent, talon, empir, interpret, histori, margaret, event, frequent, commonplac, scienc, useless, exert, probabl, adapt, enabl, benefit

Topic 90 Top Words:

Highest Prob: flower, tree, garden, may, alley, upon, sweet, like, part, come, side, set, astring, green, ground, rise, hedg, fine, read, white, fruit, fair, blossom, will, main, littl, leav, arch, foot, well

FREX: rosemary, heath, nard, pink, alley, hedg, astring, flux, mirabolan, asparagus, cypress, berberri, blossom, strawberri, laudanum, alo, bay, garden, gillyflow, quinc, musk, violet, carpent, arch, flower, myrtl, junip, daffodil, tulippa, pomegran

Topic 91 Top Words:

Highest Prob: also, make, divers, great, thing, man, will, natur, come, one, bodi, upon, likewis, mani, pleasur, use, kind, mean, like, see, earth, spirit, colour, place, proserpina, sever, light, without, well, set

FREX: proserpina, siren, cere, sphinx, velvet, chariot, entic, blue, song, anti, attir, salomon, scene, ulyss, silk, hell, page, pluto, plume, worm, enigma, torch, coagul, artifici, narcissus, wing, pool, marin, divers, imit

Topic 92 Top Words:

Highest Prob: lord, will, time, say, queen, shall, self, good, can, know, lordship, think, well, majesti, make, essex, take, upon, may, matter, man, part, tell, come, yet, ever, one, true, mani, mind

FREX: essex, northampton, queen, madam, lord, cion, ber, remem, con, dam, ireland, mat, rememb, tell, othersid, test, forsak, bee, rack, lordship, ous, ire, dissuad, satisfi, councillor, ration, member, incens, divert, sex

Topic 93 Top Words:

Highest Prob: shall, man, will, yet, may, time, state, thing, make, upon, take, reign, one, can, princ, religion, happi, peopl, queen, first, cours, king, life, long, without, age, place, see, well, much

FREX: con, albeit, irish, popish, felic, rebel, reign, penalti, toler, woe, happi, aswel, establish, religion, ireland, prin, queen, hap, prais, calentura, barbar, sex, poperi, henryth, blemish, munster, licenti, ous, scan, tune

Topic 94 Top Words:

Highest Prob: majesti, law, great, take, abus, may, time, unto, subject, king, yet, make, use, one, upon, good, excel, name, will, mani, royal, come, say, high, peac, natur, can, self, govern, reign

FREX: abus, royal, toga, majesti, vouchsaf, grievanc, provis, sacr, amend, price, justinian, reign, horac, germanicus, dread, enorm, progenitor, petit, british, ego, manifold, channel, mighti, purveyor, oppress, crave, eas, choir, vexat, pound

Topic 95 Top Words:

Highest Prob: will, may, king, shall, man, usuri, let, upon, can, make, much, take, must, good, matter, state, great, thing, person, give, trade, either, part, law, one, money, first, time, honour, place

FREX: usuri, trade, rate, borrow, usur, coloni, merchandis, merchant, lend, choic, commod, money, discommod, interpos, licenc, board, regul, employ, cost, vaniti, courtier, petit, suitor, interest, nativ, beseech, favourit, council, churchman, eas

Topic 96 Top Words:

Highest Prob: suit, make, man, law, will, act, contract, deed, may, interest, elizabeth, good, edward, time, can, grant, yet, attorney, mean, shall, use, perfect, year, blood, feoff, land, first, new, erudit, name

FREX: erudit, interest, suit, revok, demis, attorney, countermand, contract, liveri, deed, enrol, coven, elizabeth, atturn, surrend, bargain, suitor, edward, exchang, duress, consumm, ibi, sale, dissolv, challeng, oblig, transmut, nephew, charter, desert

Topic 97 Top Words:

Highest Prob: man, death, thing, may, can, natur, upon, shall, say, will, matter, yet, unto, die, think, make, begin, god, come, see, one, desir, well, also, self, like, even, power, hold, know

FREX: nemesi, mourn, proteus, labyrinth, page, cupid, daedalus, combat, achel, nox, aurora, hercul, bull, goddess, mechan, juno, atom, miss, jupit, death, obsequy, fabl, diomed, flock, lament, satieti, guest, miser, commiser, vicissitud

Topic 98 Top Words:

Highest Prob: man, upon, imagin, will, spirit, may, shall, thing, make, bodi, one, work, like, use, take, also, part, great, think, natur, experi, say, time, anoth, much, come, can, therefor, must, good

FREX: ointment, imagin, bead, wart, witch, plagu, magic, transmiss, emiss, perfum, card, juggler, belief, weapon, immateri, cramp, sympathi, wolf, ingredi, agu, anoint, hedgehog, jaundic, toad, brain, wear, smell, unburi, infect, dog

Topic 99 Top Words:

Highest Prob: man, great, rich, come, place, time, good, shall, think, say, may, thou, yet, will, best, upon, though, mean, certain, wife, make, can, one, thi, child, servant, well, propheci, use, much

FREX: propheci, rich, thyself, galba, dream, rough, thi, predict, thou, despis, wife, enrich, inquisitor, vespasian, hemp, chastiti, fleet, lad, philip, facil, briberi, unmarri, singl, pluto, accomplish, beforehand, ultima, chariti, childless, wors

Topic 100 Top Words:

Highest Prob: bodi, rather, health, one, find, man, diet, natur, best, will, exercis, thou, physic, sleep, mind, chang, therefor, good, shall, may, come, thing, use, sick, fit, littl, like, last, age, full

FREX: health, diet, physic, defi, sleep, patient, sick, eat, joy, exercis, thou, excess, novelti, safe, precept, physician, chang, cure, diseas, despis, studi, surfeit, knotti, illustri, mirth, combin, exhilar, cel, splendid, masteri

Figure B2

