

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" Kusukawa (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."

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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

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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.

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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.
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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

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