# Confessionalization and Natural Philosophy

Andreas Blank

## Introduction

This chapter addresses prominent considerations both for and against the *confessionalization thesis*—the view that theological contents specific to the Catholic, Lutheran, and Reformed creeds had an influence on the theoretical contents of early modern natural philosophy. This thesis intersects with the larger question regarding the interrelations between science and religion, a question which has shaped many debates in the past decades. The question regarding this thesis’s truth is both narrower and wider than the question concerning the influence of religion on the emergence of modern science. It is narrower because it does not go into the wider issue of whether the Reformation brought about changes in general cultural attitudes toward work ethics, social organization, and profitable education that, in a very indirect way, turned out to be supportive of the development of experimental methods, the mathematization of natural laws, and the search for technological innovation.[[1]](#footnote-1) It also leaves aside the role that institutional changes connected with the Reformation and the Counterreformation—such as educational reforms and new patterns of network formation—had for the emergence of the sciences.[[2]](#footnote-2) Furthermore, the religious views of some of the most important early modern natural philosophers—e.g., the radical reinterpretation of the doctrine of the Trinity in Henry More, the anti-Trinitarian theology of Isaac Newton, and the acceptance of a conception of an immaterial, divine space in both thinkers—can hardly be understood as outcomes of the homogenizing pressures of confessionalization.[[3]](#footnote-3) But the question concerning the influence of confessionalization on natural philosophy is also wider than that regarding the influence of religion on science, since early modern natural philosophy comprised many themes that are not regarded as parts of what came to be called “natural science.” In sum, there is an imprecise overlap of “confessionalization” and “religion,” on the one hand, and of “natural philosophy” and “science,” on the other.

It will thus be useful to begin with some conceptual clarifications. Confessionalization (*Konfessionsbildung*) is a concept developed by historians such as Ernst Walter Zeeden and Wolfgang Reinhard.[[4]](#footnote-4) It is meant to describe a political program pursued by the authorities of the emerging early modern states and the newly founded churches in the Protestant world, as well as the response of the authorities of the Catholic Church and the Catholic territories to this development. This political program involved a variety of elements: One element was the negotiation of agreements or compromises about matters of theological doctrine—a process that, on the side of the Protestants, resulted in a large number of texts that defined what believers were supposed to confess. On the Catholic side, this development was countered by a gradual consolidation of dogma, most prominently during the Council of Trent (1545-1564). Another element of confessionalization went beyond the specifically religious realm and included detailed regulations of social customs and personal habits.[[5]](#footnote-5) A third element, in both Protestant and Catholic contexts, consisted in building up institutions for the close surveillance of religious beliefs and practices in the parishes.[[6]](#footnote-6)

How successful was the political program? If one examines the negotiation protocols and draft versions of texts defining confessional tenets, it becomes clear that the finally accepted versions often papered over deep and unresolved theological disagreements. If one looks into the extant visitation reports, it becomes clear that heterodox beliefs and even remnants of paganism remained pervasive in popular culture. If one considers the ever-increasing penalties inflicted on the ever-same transgressions of the customs and habits regulations, it becomes clear that the population in the sixteenth and early seventeenth centuries was recalcitrant to a degree hardly imaginable in later centuries. Is it plausible, then, to assume that early modern natural philosophers simply succumbed to the homogenizing pressures of confessionalization?

An answer to this question depends partly on how the disciplinary identity of early modern natural philosophy could be described. What seems uncontroversial is that, due to the persistence of Aristotelian and Neoplatonic modes of thought, natural philosophy in the sixteenth and seventeenth centuries covered the scope of the Aristotelian works devoted to natural particulars—*Physics*, *On the Heavens*, *Meteorology*, *On Generation and Corruption*, *History of Animals*, *On the Parts of Animals*, *On the Generation of Animals*, *On the Soul*, and *Parva Naturalia*—as well as themes prominent in Plato’s *Timaeus* and its Renaissance readings. Natural philosophy therefore included logic, metaphysics, methodology, cosmology and philosophical psychology. What is controversial, however, is the question of the relation between early modern natural philosophy and theology. This question has led to a spirited controversy between Andrew Cunningham and Edward Grant. Cunningham observes that there are numerous programmatic passages in the early modern works that describe the point of doing natural philosophy as gaining insight into divine providence.[[7]](#footnote-7) Grant has objected that, for the most part, these programmatic statements have left no traces whatsoever in early modern treatments of the details of natural things, which is why he concludes that these treatments are not at all about God.[[8]](#footnote-8) Luckily, the controversy need not be resolved here, since it raises questions that go far beyond the scope of the present chapter. Evidently, however, the question of the influence of confessionalization on natural philosophy is relevant to this controversy, and, as far as this goes, both positions seem to involve exaggerations.

Some leading historians of science have used aspects of confessionalization to explain specifics of early modern natural philosophy, and it has even been suggested that there was something that could be described as *the* confessionalization of early modern physics.[[9]](#footnote-9) Such claims have triggered weighty criticisms. In what follows, I will sketchily present four case studies that indicate some senses in which the confessionalization thesis seems to be well-founded, as well as some senses in which existing criticisms seem to be persuasive. In addition, I will present some further source materials that point to the conclusion that one ought to be cautious about making too general claims concerning the pervasive role of confessionalization in early modern natural philosophy. Since some of the generalizations found in the literature are mainly (but not only) based on sources from the English-speaking world, I will counterbalance such approaches by considering mainly (but not only) sources from other parts of Europe.

## Confessionalization and Cosmology

The decision of the Catholic Church to commit itself to geocentric cosmology explains why Catholic natural philosophers regarded it as a duty to defend central aspects of Ptolemaic cosmology. Protestant astronomers were more open to explore alternatives. Initially, the truth of Copernican astronomy (even if not its usefulness in making predictions) was contested by Philipp Melanchthon, but through the work of Georg Joachim Rheticus, heliocentric planetary motions soon began to be regarded as a genuine possibility.[[10]](#footnote-10) As Grant has brought to light, the Jesuit defense of the immobility and centrality of the earth involved a number of innovative considerations, too. For instance, Giovanni Baptista Riccioli abandoned the medieval view that the center of the universe is the most ignoble place. Riccioli argued instead that the center of the universe must be the place of the earth because the earth is the place of living beings—that is, the most perfect beings in the created world. Moreover, simplicity considerations played a role—superior celestial bodies are better adapted for circular motion than the earth due to the heaviness of the elements of earth and water.[[11]](#footnote-11) Perhaps the most innovative suggestion can be found in Jesuit accounts of the nova of 1572 as a cluster of denser ethereal parts that look like a new star.[[12]](#footnote-12) According to such accounts, what takes place in the celestial realm is accidental change, but not substantial change. The Jesuits also developed responses to Tycho Brahe’s arguments against hard spheres. They accepted Tycho’s observations that show that the orbits of Mars and the sun intersect and that the movement of the comet of 1577 took place in the celestial region beyond the moon. Robert Bellarmine and Christopher Clavius suggested that these observations point to the conclusion that heavenly bodies move through a fluid medium,[[13]](#footnote-13) while Roderigo de Arriaga suggested that the relevant medium could be of a nature that lies somewhere in the range between a liquid and a gas.[[14]](#footnote-14)

Protestant astronomers were not doctrinally compelled to find such remedies for a geocentric cosmology. Beyond this lack of theological commitment, some historians have argued that there was a specifically Lutheran astronomy whose general characteristics derive from the view that natural events refer to moral and spiritual truths, so the normal course of nature is revelatory in that it expresses the order in the mind of God.[[15]](#footnote-15) In more technical terms, the distinction between general providence, understood as divine support of the normal course of nature, and special providence, understood as divine intervention in the normal course of nature, became prominent in Lutheran cosmology. For instance, Melanchthon attributes phenomena such as comets to special providence, as signs of the will of God and as warnings against immoral ways of living.[[16]](#footnote-16) Similarly, the Lutheran theologian Jacob Andreae interpreted the nova of 1572 as an instance of special providence,[[17]](#footnote-17) and the astronomer Joachim Camerarius the Elder regarded such singular heavenly phenomena as announcements of disasters.[[18]](#footnote-18) The belief in singular divine signs in nature was the theoretical foundation for the defense of astrological beliefs. For instance, the astronomer Caspar Peucer advocated divination from meteorological and astronomical signs—an idea that is also present in the thought of Johannes Kepler.[[19]](#footnote-19)

Is there anything specifically Lutheran about these providential and astrological views? Gábor Almási has suggested that the idea that astronomy leads to knowledge of divine providence is a commonplace in prefaces to and commentaries on Johannes Sacrobosco’s textbook *On the Sphere*—even those from the Catholic world.[[20]](#footnote-20) Some of these Catholic sources also claim that astronomical signs could be used for prognostic purposes. However, it may be objected that the three most influential Catholic thinkers mentioned by Almási—Jacques Lefèvre d’Étaples, Alessandro Piccolomini, and Christopher Clavius—take an unambiguously critical stance toward astrological prognostications. Lefèvre d’Étaples emphasizes the speculative nature and the Gentile origins of these practices.[[21]](#footnote-21) Clavius refers to a series of authoritative refutations of astrology, most prominently the one developed by Gianfrancesco Pico della Mirandola.[[22]](#footnote-22) Piccolomini argues that the inconstancy and perpetual flux of events on the elemental level preclude any regularity of the efficient causation of heavenly bodies on terrestrial objects.[[23]](#footnote-23)

Moreover, as far as I can determine, any reference to the concept of *special* providence is absent from the writings of Lefèvre d’Etaples, Piccolomini, and Clavius alike. To be sure, a reference to providence can be found in Lefèvre d’Étaples, but what he has in mind is the immutable regularity and uniformity of the motions of heavenly bodies that cause changes on earth:

This motion is uniform in itself and in lower thing it carries all forms with it through its efficient causation, just as God is unique and simple in himself and in creatures, which depend on him according to the different degrees of things, manifold and of many forms.[[24]](#footnote-24)

Similarly, Piccolomini adduces theological considerations when he discusses the shape of the outermost celestial sphere. As he argues, it must be spherical because only a shape that does not have any beginning or end could express the perfection of its creator.[[25]](#footnote-25) However, Piccolomini does not consider providence in connection with any singular natural events. Nor does one find a reference to special providence in Clavius’s discussion of the nova of 1572.[[26]](#footnote-26)

The criticism of astrological prognostication and the absence of reference to special providence thus constitute two significant differences between leading Catholic astronomers and the Lutheran theologians and astronomers. Thus, even if the idea that the regular motion of heavenly bodies is an expression of providence was common to both traditions, and even if astrological views are not entirely absent from the Catholic tradition, cosmology may be an area where the confessionalization thesis has strong plausibility.

## Confessionalization and the Physics of the Eucharist

Another promising connection between specifically confessional theological doctrines and natural philosophy can be found in the widely diverging doctrines of the Eucharist. However, the connection is less clear-cut for Lutherans than it is for Catholics and Calvinists.

The Catholic doctrine of transubstantiation, according to which the substance of bread turns into the substance of the body of Christ, while the sensible accidents remain the same, evidently raises a question concerning how accidents can possess the required degree of independence from substances.[[27]](#footnote-27) A good example for a discussion of this question is found in the physics of the Jesuit Honoré Fabri. Fabri claims that corporeal qualities can miraculously become accidents that can exist outside a subject, and in the Eucharist are corporeal qualities.[[28]](#footnote-28) He conjectures that the body of Christ is penetrated by these accidents, which are themselves impenetrable and extended.[[29]](#footnote-29) Of course, one may wonder whether penetration is not a reciprocal relation: if accidents penetrate a substance, then the substance penetrates the accidents; also, if there are several accidents that penetrate the same substance, these accidents also seem to penetrate each other. Fabri seems to have been aware of the second problem since he suggests that the accidents are only impenetrable by accidents that are not relevant for what is going on in the Eucharist.[[30]](#footnote-30) But he does not say what distinguishes the irrelevant accidents from other accidents. In any case, from these considerations he draws the conclusion that the body of Christ in the Eucharist has internal quantity, but not impenetrability.[[31]](#footnote-31) A possible solution for the difficulties arising from the hypothesis of the independence of accidents from substances can be found in René Descartes’s defense of transubstantiation. According to Descartes, the accidents that remain seemingly the same are nothing but secondary qualities, such that the new substance must only have primary qualities capable of producing the same sensory impression as the primary qualities of the previous substance.[[32]](#footnote-32)

A strong connection between theological doctrine and natural philosophy can also be found in the case of the Calvinist doctrine of the Eucharist. According to Jean Calvin, what takes place in the Eucharist is a “showing” (*exhibitio*) of the body of Christ “because its truth is inseparable from the sign.”[[33]](#footnote-33) But in Calvin’s view, this does not involve presence of the body of Christ in an invisible form because this is contrary to the nature of bodies. As he argues, if the body of Christ were ubiquitous by its nature, then its birth and existence in space and time would be due to some dispensation from its natural state. In this case, the local and temporal existence of the body of Christ “would be a *phantasma*.”[[34]](#footnote-34) For Calvinist natural philosophers, it was therefore essential to argue for locality as an essential property of bodies. Perhaps the most sophisticated version of this argument can be found in Clemens Timpler.[[35]](#footnote-35) Timpler distinguishes the Aristotelian conception of place as defined by the surfaces of surrounding bodies from quantity as an essential property of created substances. He maintains that quantity as an essential property can be ascribed both to corporeal and incorporeal substances, independently of whether they are surrounded by anything.[[36]](#footnote-36)

The connection between the theology of the Eucharist and natural philosophy is less clear among Lutherans. Lutherans used the outer-sphere problem (i.e., what is the place of the heavens?) to defend the view that being in a place is not essential for bodies,[[37]](#footnote-37) but this argumentative move contributes little to analyzing how more than one body can be at the same place at the same time. Something more specific is needed, and Luther suggests the body of Christ is present in the bread “definitively.”[[38]](#footnote-38) As Luther explicates his argument, according to the scholastic theory of being in a place “definitively,” a being can occupy, without undergoing any change, a smaller or larger body, such as when demons are thought to be capable of residing in a nutshell as well as in a whole house. Luther transfers this theory from spiritual to corporeal entities and conjectures that the body of Christ can be present in the closed door of the grave and in the eucharistic bread. He understands this way of being in a place as an alternative to the concept of “circumscriptive” presence (presence in a place that is defined by the boundaries of surrounding bodies), as well as an alternative to the concept of “repletive” presence (the presence as a whole in every part of a creature, which Luther ascribes to God).[[39]](#footnote-39)

As Giovanni Gellara has brought to light, the conception of definitive presence of Christ’s body was indeed adopted by some Lutheran philosophers, such as Christoph Scheibler.[[40]](#footnote-40) However, other theologians with Lutheran leanings found Luther’s theory of definitive presence unsatisfactory. For instance, Philipp Melanchthon held that after the resurrection, the body of Christ has a single location in the heavens, and it is present insofar as it increases the perfection of the Church and vivifies the minds of believers.[[41]](#footnote-41) Johannes Brenz, the reformer of Württemberg, takes an intermediary position. As he argues, due to the union of the powers of Christ and the person of the Father, the humanity of Christ is wherever God is. Since Brenz accepts the view that God is present in every creature, he also maintains that the body of Christ is present in all creatures, even though in a non-sensible way. What is special about the Eucharist, in Brenz’s view, is that Christ has given only to bread and wine the function of signifying his sacrifice. In this sense, only bread and wine can show (*exihibere*) the body of Christ, although the body of Christ is present in all creatures.[[42]](#footnote-42)

These doctrinal differences between Luther and Lutherans are highly relevant for the treatment of the Eucharist in one of the most sophisticated Lutheran natural philosophers, Tübingen-based Jacob Schegk.[[43]](#footnote-43) Schegk offers an answer to the question of how God can be omnipresent without being multiplied and limited according to particular places and particular objects by adopting the Platonic view that all creatures are prefigured in the divine ideas and that concrete beings are images of what exists in the divine mind. This is why he accepts the view that God exists in every point of the world as a whole, but he qualifies this claim by adopting the scholastic theory of eminent containment according to which the effect is contained in the eminent cause in a more perfect way. Consequently, he holds that divine operations are present in creatures in a way that is not distinct from the presence of divine essence in creatures.[[44]](#footnote-44) Moreover, in order to explicate the sense in which God can be present as a whole to the whole world and as a whole to each of the parts of the world, Schegk applies the relation between different sensible species to explicate the relation between different divine potencies: As different sensible species can be present in the same medium, different divine potencies can be present in the same place.[[45]](#footnote-45) But this mode of divine omnipresence is compatible with the view that the body of Christ, “insofar as it is considered absolutely and with respect to its nature … is absent, and furthermore can exist only in a single place through natural actuality.”[[46]](#footnote-46) Consequently, the body of Christ cannot be co-extensive with other bodies. Schegk concludes that, in the Eucharist, there is no natural or local presence of Christ; rather, the Eucharist should be understood as a visible sign of invisible grace, particularly of the efficient role of Christ in salvation.[[47]](#footnote-47) Schegk thus uses various elements of natural philosophy to explain the concept of divine ubiquity; but he rejects Luther’s concept of the “definitive” presence of the body of Christ in the Eucharist. Schegk’s work illustrates how the divergences between Luther and Lutheran theologians opened up a space in which Lutheran natural philosophers were able to explore a variety of positions concerning the physics of the Eucharist and likewise loosened the connection between confessional commitments and natural philosophy.

## Confessionalization and Natural History

The two preceding sections have presented two areas where the confessionalization thesis has considerable plausibility, although it may require some qualifications concerning overlaps between Catholic and Protestant texts and concerning the internal divergences between Protestant theologians. By contrast, in this and the following section, I present two fields that offer some counter-evidence. In the present section, I challenge the view that the disappearance of moral meanings from early modern natural history could be explained by some features of the hermeneutics of the reformers. In the following section, I explore how natural philosophy was used to counter the dynamics of confessionalization from an ecumenical point of view.

Peter Harrison provides extensive evidence for the disappearance of symbolic meanings from early works on natural history. The majority of his sources derive from the English tradition, but he also invokes the botanic work of the Zurich-based naturalist Conrad Gesner.[[48]](#footnote-48) Harrison explains the disappearance of symbolic meanings of plants and animals through what he calls “the collapse of allegorical interpretation of texts.” As he puts it, the “literalist mentality of the reformers … gave a determinate meaning to the text of the scripture, and at the same time precluded the possibility of assigning meanings to natural objects.”[[49]](#footnote-49) However, Barbara Johnston has pointed out that moral meanings are present in Gesner’s zoological writings, as well as in the *Theatre of Insects*, a work published in London in 1634.[[50]](#footnote-50) The latter work is built around unfinished notes by Gesner; one of his collaborators, the English preacher and physician Thomas Penny, added further material, and Penny’s friend Thomas Moffett, a physician to English aristocracy, completed the text. Still, Johnston sees this, as well as Gesner’s work on the history of animals, as intermediary steps in a development that led to a view of nature devoid of moral meaning. As it turns out, contrary to what Harrison claims, the moral interpretations of animals found in Gesner and Moffett are in *conformity* with the hermeneutic practices of the reformers. This is why the disappearance of symbolic interpretations of animals cannot be explained by how the reformers interpreted biblical texts.

There is a substantial body of work in the history of theology that documents the intricacies of the hermeneutic practices of the reformers, even though this body of research seems to have been largely neglected by historians of science. In particular, it has been made clear that Luther was aware of the fact that the biblical texts are full of metaphors, allegories, and other rhetorical figures.[[51]](#footnote-51) Similarly, Johannes Oecolampad, the reformer of Basel, holds that biblical allegories combine a historical-literal sense with a prophetic sense that refers to the coming of Christ, as well as a moral sense that guides toward the virtues of charity and mercy, both in the biblical past and in the present.[[52]](#footnote-52) Likewise, Huldrych Zwingli, the reformer of Zurich, thought that biblical metaphors and allegories can lead, through exploiting similarities between different topics, to insight into moral and prophetic truths.[[53]](#footnote-53) What the reformers certainly were opposed to was the *arbitrary* interpretation of anything in the bible as a metaphor or an allegory; but where there is textual evidence that something was intended as a metaphor or an allegory, then they agreed that a textually and contextually informed decoding of the metaphorical or allegorical sense was called for.

Such a hermeneutic attitude is particularly relevant for the interpretation of the prophets, whose texts can hardly be reduced to a literal-historical sense. There, one finds a wealth of natural particulars—plants, animals, body parts, aspects of agricultural life—that are used in symbolic senses, and while the reformers disagreed about many of the details, they agreed that these passages require metaphorical and allegorical readings. To give just one illustration: the interpretation of a passage from Isaiah 1:3, where the disobedience of the Jewish people is contrasted with the observation that the ox and the ass recognize the one who gives them food and shelter. Luther is clear that the ox and the ass here are used as moral exemplars of gratitude[[54]](#footnote-54)—which is only one instance of Luther’s use of animals as moral exemplars.[[55]](#footnote-55) Oecolampad compares the case of the gratitude of the ox and the ass with other animal virtues, such as the supposed mildness (*mansuetudo*) of lions toward their benefactors.[[56]](#footnote-56) Calvin, too, assigns moral meanings to animals—in fact, often negative meanings.[[57]](#footnote-57) Regarding the passage at hand, Calvin observes that brutes can learn and recognize those who feed them, which is what we can learn “in the school not of humans but of beasts.” In particular, he holds that one can learn one’s duty (*officium*) from them, since “often beasts follow the order of nature better and carry more humanity [*humanitas*] with them than humans themselves.”[[58]](#footnote-58) As he explains, no animal feeds on its own kind and hence must be able to recognize its similarity in the other; brutes employ care in raising their offspring, while human parents often forget nature and humanity and abandon their children. Also, brutes take as much food and drink as is sufficient for upholding life and forces, while humans consume superfluous goods. And brutes generally, in contrast to humans, do not transgress the laws of nature. Hence, Calvin takes the allegory of the ox and the ass to relate to the “order of nature.”[[59]](#footnote-59)

If one compares these interpretations with the treatment of the moral signification of animals in Gesner, it becomes clear that Gesner’s view is fully consistent with the hermeneutics of the reformers. Gesner cites approvingly from Theodore of Gaza’s preface to the translation of Aristotle’s *Historia Animalium*: The habits of animals provide “exemplars of all duties [*officia*] and offer an image of virtues with the highest authority of nature.”[[60]](#footnote-60) Not only do brutes abstain from killing members of the same species, they also use food and sleep according to what their well-being demands. Ants and bees provide models of industriousness, while bees are models of justice because they collect only what they need without hurting any plant. This is also why animals can be used symbolically:

To this can be added the usefulness that arises from these animals for the art of speaking. For the comparison and assimilations that the Greeks call parables, which excellently ornament speech and keep the attention of the audience, can be developed with variety, copiousness and aptitude from thence ….[[61]](#footnote-61)

Altogether, the general view is that animals can be used symbolically *because* they exemplify natural goodness; and this is exactly what corresponds to the interpretation of the ox and the ass that one finds in the Isaiah commentaries of Luther, Oecolampad, and Calvin. In light of these textual observations, one could conclude that the hermeneutics of the reformers does explain something about the development of early modern natural history; however, what it explains is the *persistence* of the assignment of moral meanings to animals rather than the *disappearance* of such meanings from natural history.

## Confessionalization and Ecumenical Natural Philosophy

Ecumenism was an early modern movement that explicitly sought to counter confessionalization, and its use of natural philosophy, most prominently in the work of the English Catholic natural philosopher Sir Kenelm Digby, is another obstacle to all-too-general confessionalization claims. This insight is easily obscured by the ambiguity of the concept of ecumenism. In one sense, ecumenism can be understood as an ecclesiological concept centered on the idea of the reunion of churches. As Stefania Tutino has pointed out, though, ecclesiology did not play significant role in Digby’s politics.[[62]](#footnote-62) In another sense, ecumenism can be understood as centered on the concept of a “common theology.” According to John Henry, Digby’s *Two Treatises* contribute to an ecumenical program by providing an answer to the question of whether the human soul is naturally immortal—a question that divides Catholic dogma from the theology of the Church of England. Catholic dogma holds that human beings—composed of body and soul—are naturally immortal, while theologians of the Church of England tend to ascribe the immortality of both human bodies and human souls to a supernatural Divine intervention.[[63]](#footnote-63)

This “common theology” approach may be investigated further in two directions. First, it may be interesting to note that a similar ecumenical approach to the use of natural philosophy for the purposes of defending the doctrine of the immortality of humans can be found, with explicit reference to Digby, in the early writings of the Lutheran Gottfried Wilhelm Leibniz.[[64]](#footnote-64) Second, it may be instructive to ask why Digby and Leibniz took such a strategy to be convincing for members of different confessions. As I would like to suggest, Digby and the early Leibniz share the view that common notions could be used as criteria for the evaluation of natural philosophical hypotheses that are acceptable to members of different confessions. For instance, Digby suggests that we should prefer ordinary concepts: “we should acquiesce and be content with that naturall and plaine notion, which springeth immediately and primarily from the thing it selfe: which when we do not, the more we seeme to excel in subtility, the further we goe from reality and truth.”[[65]](#footnote-65) In his view, “[i]t is the indisciplined multitude that must furnish learned men with naturall apprehensions and notions to exercise theire wittes about.”[[66]](#footnote-66) Because they confer content to theoretical concepts, common notions also function as criteria for adequate theory formation—as Digby points out, they function as the “norm of discourse” (*norma loquendi*).[[67]](#footnote-67)

Digby applies this strategy from the very beginning of the *Two Treatises*, when he points out that when thinking about body, “the first thing which occurreth to our sense in the perusal of it, is its *Quantity*, bulke, or magnitude: and this seemeth by all mankind, to be conceived …inseparable from a body.”[[68]](#footnote-68) In other words, categorial concepts such as “quantity” do not belong to the technical vocabulary of specialists, but are rather part of ordinary language. Likewise, Digby holds that the common notion of quantity is nothing but the extension of a thing, “expressed by a determinate number of lesser extensions of the same nature,” such that “the whole by comprehending those partes, is a meere capacity to be divided into them” and concludes that quantity is nothing but divisibility.[[69]](#footnote-69) Moreover, Digby argues that the distinction between substance and quantity is also present in our “familiar discourse,” when we, e.g., say that Socrates was bigger as a man than as a boy, or that boiling milk runs over the pot it is in.[[70]](#footnote-70) Finally, Digby argues that quantity may be changed while substance remains unchanged. The cases of boiling milk or boiling water provide him with striking examples of a change of quantity in an unchanged substance.[[71]](#footnote-71)

Similarly, central aspects of Leibniz’s early views on the nature of matter are founded on an analysis of our everyday conception of material objects. Leibniz analyzes matter in terms of epistemically primitive concepts by searching for criteria by which we distinguish between bodies and non-bodies. According to his view, this criterion is resistance (*antitypia*) together with extension. As he argues, “whatever humans only sense to be extended or what they only see … they do not immediately call a body, for they think that sometimes it is only a mere image and *phantasma*. But what they not only see but touch, that is, in what they find *antitypia*, this is what they call body, while what lacks *antitypia*, they deny that it is a body. In two things both experts and laymen locate the nature of body, in extension and *antitypia* taken together ….”[[72]](#footnote-72) Leibniz’s approach to the nature of material objects includes an analysis of our immediately accessible thought about body and space. As he argues, space and body aredistinct because

we perceive that we think of space as the same when bodies change, and what we perceive ourselves to be thinking or not thinking we perceive truly. The perception of thought is immediate to the thought itself in the same subject, and so there is no cause of error. Therefore, it is true that we think of space remaining the same when bodies change and that we can think of space without a body which is in it. Now two things are diverse if one can be thought of without the other.[[73]](#footnote-73)

As in Digby, one finds here an argumentative move from commonly shared ideas to the nature of space and body.

The crucial point of the analysis of matter—both in Digby and in the early Leibniz—is to argue that matter, due to its inherent passivity, cannot provide an adequate explanation for the active aspects of human thought. Thought, therefore, must be the property of an immaterial and hence immortal human soul. In fact, Digby describes the question of the immortality of the soul as the “main and great question” of his work.[[74]](#footnote-74) At the same time, he understands an account of the actions of inanimate and living bodies as the “main hinge, upon which hangeth and moveth” this question.[[75]](#footnote-75) In particular, he characterizes the goal of the first part of the *Two Treatises* as an account of the actions that bodies are capable of, thereby also indicating what actions bodies are not capable of. The task of the second part of the *Two Treatises* is to show that the actions that are specific to rational souls cannot be reduced to the principles governing the bodily world.[[76]](#footnote-76) Digby claims that what he says about human souls expresses the “common notion of spiritual things.”[[77]](#footnote-77) To give just one example for such an argument based on common notions, Digby observes that the mind can be characterized as “a comparing power; for all his particular knowledges, are nothing else but respects or comparisons between particular thinges ….”[[78]](#footnote-78) Since matter, as characterized in the first part of the *Two Treatises* does not have the power of comparison, minds must be immaterial.

The early Leibniz thought that Digby’s arguments could be integrated into his own project of promoting ecumenism through philosophical arguments for the immateriality and immortality of the human soul. In the *Outline of the Catholic Demonstrations* (1668-69[?]), Leibniz mentions, in his plan for the sixth chapter, the proof(s) developed in Digby’s *Two Treatises*.[[79]](#footnote-79) Leibniz emphasizes the importance of directing the attention to something that is already known, even though in an unreflective way. Accordingly, he develops a line of argument for the difference between the structure of *conatus* in the mind and of *conatus* in bodies based on an analysis of the structure of thought. As Leibniz observes, “thought is nothing but the sense of comparison,” and he makes clear that thought therefore involves two active aspects: (1) “*To think* is being the reason of change, or to change itself”; and (2) “*To think* is indefinable, in the same way as *to sense,* or rather *to act* are indefinable. And nevertheless, once one undergoes them, they are reflected in themselves ….”[[80]](#footnote-80) The first active aspect of thought thus is due to the fact that every thought gives rise to further thoughts; the second active aspect is due to the fact that every thought is accompanied by reflexive awareness. Moreover, Leibniz regards the capacity of retaining and comparing its own states as a further active capacity that defines the nature of the mind.[[81]](#footnote-81) Contrasting the description of the structure of thought with the common notion of matter indicates that the mind must be an immaterial and indestructible entity.

The usage of common notions explains why Digby and Leibniz converge on a similar strategy of using natural philosophy for the purpose of identifying areas of belief that can be shared by members of different confessions. Natural philosophy thus provides rational grounds for a common theology and thereby fulfils the ecumenical function of countering the dynamics of confessionalization.

## Conclusion

This chapter has offered a few observations that give an impression of how heterogeneous the relevant source materials concerning the relation between confessionalization and early natural philosophy are—too heterogeneous, probably, to invite any very general conclusions. What these observations indicate is that the relation between confessionalization and natural philosophy is different in different thematic areas. Natural philosophy indeed may be used to defend theological claims central to the program of confessionalization, such as the philosophical analysis of transubstantiation (or its impossibility) or the philosophical analysis of geocentric astronomy. But then it also may turn out that some theological claims prominent in one confession are by no means absent from works in different religious traditions, as seems to be the case with a providential reading of heavenly phenomena and astrological prognostications. And it may turn out that theological disagreements between theologians belonging to the same confession, as in the case of the disagreements between Lutherans concerning the nature of the Eucharist, opened up the theoretical space for philosophical conceptions that did not coincide with the position taken by Luther, as can be seen in the writings of Schegk. What is more, while the disappearance of symbolic meanings from natural history is certainly a characteristic feature of the emerging scientific approach to plant and animal physiology, explaining this development through Protestant hermeneutics may be inconclusive for the simple reason that Protestant hermeneutics did not eliminate the assignment of symbolic meanings to natural particulars. Finally, natural philosophy was also used as a tool for an ecumenical program that resisted confessionalization, as can be seen in the writings of Digby and the early Leibniz.

Can something be learned from this heterogeneity concerning the disciplinary identity of early modern natural philosophy? I do not want to contest Grant’s argument that it does not make much sense to assume that early modern natural philosophers always were thinking about the relation between God and the natural world, when such a conjecture does not make any difference to the interpretation of a particular text. Nevertheless one should not dismiss the programmatic statements to the effect that the entire aim of doing natural philosophy is to gain a better understanding of God—even if such statements might indeed be nothing more than a response to an intellectual climate that, especially in Protestant regions, was by no means favorable to philosophical reflection. In spite of the diverging role of specifically confessional influences, all of the philosophical issues discussed here in some way or other do concern the relation between God and nature. Obviously, this is the case with the question of divine providence as an object of astronomy; it is the case with the question of divine presence in the Eucharist; it is the case with the question of animal virtues as an expression of a divinely created natural order; and it is the case in the question of the natural immortality of human souls. In this sense, there is in fact substantial textual evidence that even details of natural philosophy were driven by theological concerns. Still, as I have argued, not all aspects of early modern natural philosophy were motivated by theological concerns (as in the case of the disappearance of symbolic meanings from many works on natural history), and some theological concerns that influenced natural philosophy should not be described in terms of the specific mechanisms of confessionalization (as in the case of the ecumenical strategies found in Digby and Leibniz). Even the limited number of case studies considered here thus points to the conclusion that there may not have been anything that could be described as *the* confessionalization of early modern natural philosophy.

## References

Alexandrescu, Vlad 2007. "Descartes and Pascal on the Eucharist," *Perspectives on Science* 15: 434-449.

Almási, Gábor 2014. "Rethinking Sixteenth-Century ‘Lutheran Astronomy’," *Intellectual History Review* 24: 5-20.

Austin, William H. 1970. "Isaac Newton on Science and Religion," *Journal of the History of Ideas* 31: 521-542.

Backus, Irena 2016. *Leibniz: Protestant Theologian*. Oxford: Oxford University Press.

Barker, Peter, and Goldstein, Bernard R. 2016. "Theological Foundations of Kepler's Astronomy," *Osiris* 16: 88-113.

Bellucci, Dino 1998. *Science de la nature et Réformation. La physique au service de la Réforme dans l’enseignement de Philippe Mélanchthon*. Rome: Edizioni Vivere.

Blank, Andreas 2005. *Leibniz: Metaphilosophy and Metaphysics, 1666-1686*. Munich % I Philosophia.

--- 2007. "Composite Substance, Common Notions, and Kenelm Digby’s Theory of Animal Generation," *Science in Context* 20: 1–20.

Boner, Patrick J. 2013. *Kepler’s Cosmological Synthesis. Astrology, Mechanism and the Soul*. Leiden: Brill.

Brenz, Johannes 1590. *Opera*. Vol. 8. Tübingen: Gruppenbach.

Calvin, Jean 1551. *Commentarii in Isaiam Prophetam*. Geneva: Crispinus.

--- 1553. *Institutiones Christianae Religionis*. Geneva: Stephanus.

Clavius, Christoph 1585. *In sphaeram Ioannis de Sacro Bosco commentarius*. 3 ed. Roma: Basa.

Clough, David 2009. "The Anxiety of the Human Animal: Martin Luther on Non-human Animals and Human Animality," in Celia Deane-Drummond and David Clough (eds.), *Creaturely Theology: On God, Humans and other Animals.*, London: SCM Press, pp. 41-60.

Cohen, I. B., Duffin, K. E. , and Strickland, Stuart (eds.) 1990. *Puritanism and the Rise of Modern Science. The Merton Thesis*. New Brunswick, NJ: Rutgers University Press.

Coudert, Allison 1975. "A Cambridge Platonist’s Cabbalist Nightmare," *Journal of the History of Ideas* 36: 633-652.

Cunningham, Andrew 2000. "The Identity of Natural Philosophy. A Response to Edward Grant," *Early Science and Medicine* 5: 259-278.

Digby, Kenelm 1644. *Two Treatises. In the one of which the Nature of Bodies, in the other, the Nature of Mans Soule is looked into, in Way of Discovery, of the Immortality of Reasonable Souls*. Paris: Blaizot.

Fabri, Honoré 1669. *Physica, id est, Scientia rerum corporearum*. Lyon: Anisson.

Field, J. V. 1984. "A Lutheran Astrologer: Johannes Kepler," *Archive for the History of Exact Sciences* 31: 189-272.

Force, James E., and Popkin, Richard H. (eds.) 2013. *Newton and Religion: Context, Nature, and Influence*. Dordrecht: Springer.

Frank, Günter 2003. *Die Vernunft des Gottesgedankens Religionsphilosophische Studien zur frühen Neuzeit*. Stuttgart: Frommann-Holzboog.

Gellera, Giovanni 2013. "Calvinist Metaphysics and the Eucharist in the Early Seventeenth Century," *British Journal for the History of Philosophy* 21: 1091-1110.

Gesner, Conrad 1551. *Historiae animalium lib. I De quadrupedibus viviparis*. Zurich: Froschauer.

Goldenbaum, Ursula 1998. "Leibniz as a Lutheran," in Allison P. Coudert, Richard H. Popkin, and Gordon M. Weiner (eds.), *Leibniz, Mysticism and Religion*, Dordrecht: Kluwer, pp. 169-192.

Grant, Edward 2003. "The Partial Transformation of Medieval Cosmology by Jesuits in the Sixteenth and Seventeenth Centuries," in Feingold Mordechai (ed.), *Jesuit Science and the Republic of Letters*, Cambridge, MA: MIT Press, pp. 127-156.

--- 2007. *A History of Natural Philosophy. From the Ancient World to the Nineteenth Century*. Cambridge: Cambridge University Press.

Haga, Joar 2012. *Was There a Lutheran Metaphysics? The Interpretation of Communicatio Idiomatum in Early Modern Lutheranism*. Göttingen: Vandenhoek & Ruprecht.

Harrison, Peter 1998. *The Bible, Protestantism, and the Rise of Natural Science*. Cambridge: Cambridge University Press.

Hellyer, Marcus 2005. *Catholic Physics. Jesuit Natural Philosophy in Early Modern Germany*. Notre Dame, IN: University of Notre Dame Press.

Henry, John 1982. "Atomism and Eschatology: Catholicism and Natural Philosophy in the Interregnum," *British Journal for the History of Science* 15: 211–239.

Huff, Peter A. 1999. "Calvin and the Beasts: Animals in John Calvin’s Theological Discourse," *Journal of the Evangelical Theological Society* 42: 67-75.

Iliffe, Rob 2017. *Priest of Nature: The Religious Worlds of Isaac Newton*. Oxford: Oxford University Press.

Johnston, Pamela 2011. "A Theatre of Insects, or How Nature Lost Her Morality," *AA Files* 63: 37-45.

Kusukawa, Sachiko 1995. *The Transformation of Natural Philosophy: The Case of Philip Melanchthon*. Cambridge: Cambridge University Press.

Lanzinner, Maximilian 2003. "Johannes Kepler: A Man Without Confession in the Age of Confessionalization?," *Central European History* 36: 531-545.

Lattis, James M. 1994. *Between Copernicus and Galileo: Christoph Clavius and the Collapse of Ptolemaic Cosmology*. Chicago: University of Chicago Press.

Lefèvre d’Etaples, Jacques 1517. *Introductorium astronomicum*. Paris: Stephanus.

Leibniz, G. W. 1923. *Sämtliche Schriften und Briefe*. Berlin: Akademie Verlag.

--- 1969. *Philosophical Papers and Letters*. Edited by E. Loemker Leroy. Dordrecht: Kluwer.

Leijenhorst, Cees 2001. "Place, Space and Matter in Calvinist Physics," *Monist* 84: 520-541.

Leijenhorst, Cees, and Lüthy, Christoph 2001. "The Erosion of Aristotelianism: Protestant Eucharistic Theology and Natural Philosophy in Germany and the Dutch Republic " in Cees Leijenhorst, Christoph Lüthy, and Johannes M. M. H. Thijssen (eds.), *The Dynamics of Aristotelian Natural Philosophy*, Leiden: Brill, pp. 375-411.

Luther, Martin 1534. *Vom Abendmahl Christi Bekentnis*. Wittenberg: Luft.

--- 1860. *Exegetica Opera Latina*. Edited by H. Schmidt. Erlangen and Frankfurt: Heyder & Zimmer.

Lüthy, Christoph 2005. "The Confessionalization of Physics: Heresies, Facts and the Travails of the Republic of Letters," in John Brooke and Ian Maclean (eds.), *Heterodoxy in Early Modern Science and Religion*, Oxford: Oxford University Press, pp. 81-114.

Markley, Robert 1989. "Isaac Newton’s Theological Writings: Problems and Prospects," *Restoration* 13: 35-48.

Martens, Rhonda 2000. *Kepler’s Philosophy and the New Astronomy*. Princeton: Princeton University Press.

Melanchthon, Philipp 1559. *Enarratio epistolae Pauli ad Colossenses*. Wittenberg: Iohannes Crato.

Merton, Robert K. 1936. "Puritanism, Pietism, and Science," *Sociological Review* 28: 1-30.

Methuen, Charlotte 1998. *Kepler’s Tübingen. Stimulus to a Theological Mathematics*. Aldershot: Ashgate.

--- 1999. "Special Providence and Sixteenth-Century Astronomical Observation: Some Preliminary Observations," *Early Science and Medicine* 4: 648-674.

Miller, David Marshall 2008. "‘*O male factum*’: Rectilinearity and Kepler’s Discovery of the Ellipse," *Journal for the History of Astronomy* 39: 43-63.

Mulligan, Lotte 1980. "Puritanism and English Science: A Critique of Webster," *Isis* 71: 456-69.

Oecolampad, Johannes 1525. *In Iesaiam prophetam Hypomnematon*. Basel: Cratander.

Piccolomini, Alessandro 1568. *De sphaera*. Basel: Perna.

Reinhard, Wolfgang 1983. "Zwang zur Konfesionalisierung? Prolegomena zu einer Theorie des konfessionellen Zeitalters," *Zeitschrift für historische Forschung* 10: 257-277.

Ringleben, Joachim 1997. "Luther zur Metapher," *Zeitschrift für Theologie und Kirche* 94: 336-369.

Schegk, Jacob 1566. *Responsio … ad libellum Anonymi interpretis*. Tübingen: Morhard.

Schilling, Heinz 1994. *Kirchenzucht und Sozialdisziplinierung im frühneuzeitlichen Europa*. Berlin: Duncker & Humblot.

Snobelen, Stephen D. 1999. "Isaac Newton, Heretic: The Strategies of a Nicodemite," *British Journal for the History of Science* 32: 381-419.

Timpler, Clemens 1607. *Metaphysicae systema methodicum*. Frankfurt: Neben.

Tutino, Stefania 2016. *Thomas White and the Blackloists*. London: Routledge.

Vermij, Rienk 2010. "A Science of Signs. Aristotelian Meteorology in Reformation Germany," *Early Science and Medicine* 15: 648-674.

Webster, Charles 1975. *The Great Instauration: Science, Medicine and Reform, 1626-1666*. London: Duckworth.

Westman, Robert S. 1975. "The Melanchthon Circle, Rheticus, and the Wittenberg Interpretation of the Copernican Theory," *Isis* 66: 164-193.

--- 2011. *The Copernican Question. Prognostication, Skepticism and Celestial Order*. Berkeley: University of California Press.

Zeeden, Ernst Walter 1965. *Die Entstehung der Konfessionen: Grundlagen und Formen der Konfessionsbildung*. Munich: Oldenbourg.

--- 1985. *Konfessionsbildung. Studien zur Reformation, Gegenreformation und katholischen Reform*. Stuttgart: Klett-Cotta.

Zeeden, Ernst Walter, and Molitor, Hansgeorg (eds.) 1977. *Die Visitation im Dienst der kirchlichen Reform*. Münster: Aschendorff.

Zwingli, Huldrych 1959. *Sämtliche Werke*. Vol. 14. Zurich: Verlag Berichthaus.

1. (Merton 1936; Webster 1975) For critical discussion, see (Mulligan 1980; Cohen, et al. 1990). [↑](#footnote-ref-1)
2. See Detlefsen in this volume. [↑](#footnote-ref-2)
3. (Austin 1970; Coudert 1975; Markley 1989; Snobelen 1999; Force and Popkin 2013; Iliffe 2017) [↑](#footnote-ref-3)
4. (Zeeden 1965; Reinhard 1983; Zeeden 1985) [↑](#footnote-ref-4)
5. (Schilling 1994) [↑](#footnote-ref-5)
6. (Zeeden and Molitor 1977) [↑](#footnote-ref-6)
7. (Cunningham 2000) [↑](#footnote-ref-7)
8. (Grant 2007, 251, 301-302) [↑](#footnote-ref-8)
9. (Lüthy 2005) [↑](#footnote-ref-9)
10. (Westman 1975) [↑](#footnote-ref-10)
11. (Grant 2003, 129-131) [↑](#footnote-ref-11)
12. (Grant 2003, 136-137) [↑](#footnote-ref-12)
13. (Lattis 1994) [↑](#footnote-ref-13)
14. (Grant 2003, 141) [↑](#footnote-ref-14)
15. (Westman 2011) [↑](#footnote-ref-15)
16. (Methuen 1999, 106). On Melanchthon’s natural philosophy, see (Kusukawa 1995; Bellucci 1998). [↑](#footnote-ref-16)
17. (Methuen 1998, 125-128) [↑](#footnote-ref-17)
18. (Vermij 2010) [↑](#footnote-ref-18)
19. (Field 1984; Martens 2000; Lanzinner 2003; Miller 2008; Boner 2013; Barker and Goldstein 2016) [↑](#footnote-ref-19)
20. (Almási 2014) [↑](#footnote-ref-20)
21. (Lefèvre d’Etaples 1517, 1v) [↑](#footnote-ref-21)
22. (Clavius 1585, 5-6) [↑](#footnote-ref-22)
23. (Piccolomini 1568, 148-149) [↑](#footnote-ref-23)
24. (Lefèvre d’Etaples 1517, 13r) Unless otherwise noted, translations are my own. [↑](#footnote-ref-24)
25. (Piccolomini 1568, 13) [↑](#footnote-ref-25)
26. (Clavius 1585, 192-194) [↑](#footnote-ref-26)
27. (Hellyer 2005, 90-113) [↑](#footnote-ref-27)
28. (Fabri 1669, 8, 18) [↑](#footnote-ref-28)
29. (Fabri 1669, 9) [↑](#footnote-ref-29)
30. (Fabri 1669, 19) [↑](#footnote-ref-30)
31. (Fabri 1669, 15) [↑](#footnote-ref-31)
32. (Alexandrescu 2007) [↑](#footnote-ref-32)
33. (Calvin 1553, 182r) [↑](#footnote-ref-33)
34. (Calvin 1553, 182v) [↑](#footnote-ref-34)
35. (Leijenhorst 2001, 530-532) [↑](#footnote-ref-35)
36. (Timpler 1607, 120-126) [↑](#footnote-ref-36)
37. (Leijenhorst and Lüthy 2001) [↑](#footnote-ref-37)
38. (Luther 1534, sig. k1r) [↑](#footnote-ref-38)
39. (Luther 1534, sig. k1v-k2r) [↑](#footnote-ref-39)
40. (Gellera 2013, 1104-05) [↑](#footnote-ref-40)
41. (Melanchthon 1559, sig. H3r-H4v) [↑](#footnote-ref-41)
42. (Brenz 1590, 510-512) [↑](#footnote-ref-42)
43. (Frank 2003, 93-100; Haga 2012, 145-154) [↑](#footnote-ref-43)
44. (Schegk 1566, 44-48) [↑](#footnote-ref-44)
45. (Schegk 1566, 60-61) [↑](#footnote-ref-45)
46. (Schegk 1566, 50) [↑](#footnote-ref-46)
47. (Schegk 1566, 50) [↑](#footnote-ref-47)
48. (Harrison 1998, 78-79) [↑](#footnote-ref-48)
49. (Harrison 1998, 4) [↑](#footnote-ref-49)
50. (Johnston 2011) [↑](#footnote-ref-50)
51. (Ringleben 1997) [↑](#footnote-ref-51)
52. (Oecolampad 1525, 5v) [↑](#footnote-ref-52)
53. (Zwingli 1959, 148-149) [↑](#footnote-ref-53)
54. (Luther 1860, 18) [↑](#footnote-ref-54)
55. (Clough 2009, 56) [↑](#footnote-ref-55)
56. (Oecolampad 1525, 7v-8r) [↑](#footnote-ref-56)
57. (Huff 1999) [↑](#footnote-ref-57)
58. (Calvin 1551, 9) [↑](#footnote-ref-58)
59. (Calvin 1551, 10) [↑](#footnote-ref-59)
60. (Gesner 1551, sig. c4r) [↑](#footnote-ref-60)
61. (Gesner 1551, sig. c4r) [↑](#footnote-ref-61)
62. (Tutino 2016, §3.2) [↑](#footnote-ref-62)
63. (Henry 1982, 223–227) [↑](#footnote-ref-63)
64. On Leibniz’s relation to Lutheranism, see (Goldenbaum 1998; Backus 2016). [↑](#footnote-ref-64)
65. (Digby 1644, 4-5) [↑](#footnote-ref-65)
66. (Digby 1644, 8) [↑](#footnote-ref-66)
67. (Digby 1644, 8) [↑](#footnote-ref-67)
68. (Digby 1644, 1) [↑](#footnote-ref-68)
69. (Digby 1644, 9) [↑](#footnote-ref-69)
70. (Digby 1644, 25) [↑](#footnote-ref-70)
71. (Digby 1644, 25) See (Blank 2007). [↑](#footnote-ref-71)
72. (Leibniz 1923, 6-2:443) [↑](#footnote-ref-72)
73. (Leibniz 1923, 6-2:304-305; Leibniz 1969, 143) [↑](#footnote-ref-73)
74. (Digby 1644, 342) [↑](#footnote-ref-74)
75. (Digby 1644, 342) [↑](#footnote-ref-75)
76. See (Digby 1644, 341-342). [↑](#footnote-ref-76)
77. (Digby 1644, 444) [↑](#footnote-ref-77)
78. (Digby 1644, 360) [↑](#footnote-ref-78)
79. (Leibniz 1923, 6-1:494-495) [↑](#footnote-ref-79)
80. (Leibniz 1923, 6-2:282-283) [↑](#footnote-ref-80)
81. (Leibniz 1923, 6-2:285; Blank 2005, §3.3) [↑](#footnote-ref-81)