
Introduction: Logic and Methodology in the Early Modern Period

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Introduction

Being mainly concerned with the origins and development of formal logic, current “histories of logic” often devote scarce, if any, space to logic in the early modern period. In standard narratives, emphasis is put, on one side, on Aristotle’s *Organon* and on the Stoics’ logic of propositions, and on the other side, on the development of mathematical logic from Boole and Frege on (Scholz 1931; Bochenski 1956; Kneale 1962; Blanché 1970). The picture often emerging from such reconstructions represents early modern philosophers—net of their criticisms of Aristotelian syllogism—as largely estranged from the discipline. It is true that, the medieval period’s concern with semantic and inference issues has been accounted for (Prantl 1855–1870; Ashworth 1988; Biard 1989, 1997; Gabbay and Woods 2008). But it is as if there were a “mise en sommeil de la logique” in the seventeenth century (Blanché 1970, p. 174). Our purpose, in this special issue, is to take a stand against this view.

In addition to providing an incomplete image of the development of logic in general, such depiction of early modern logic also limits our understanding of the new forms of rationality which emerged during the period and especially their connection with the rise of modern science. Light is generally shed on a supposed “shift of emphasis from problems connected with purely formal logic

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towards the epistemological and psychological aspects of human cognition” (Nuchelmans 1998, p.104). But resort to epistemology and psychology as disciplinary categories supposedly qualified to account for the general features of early modern logic is only illuminating at first sight. This gesture does indeed reveal the wideness in scope of such logic: in this era, logic’s purpose is to teach how to accurately arrange and order mental materials in order to reason without error. It involves both theories of ideas and of the operations of the intellect, and descriptions of the knowledge acquisition process. In other words, in the early modern period, presentations of the steps for the building of a reasoning, of forms of reasoning and of their uses are commonly closely intertwined with remarks about the acquisition of ideas and about the grooming of the cognitive faculties. This is a complex intertwinment. However, the elucidation of its philosophical import is not made fully possible by a mere reference to epistemology and psychology of knowledge. It is true that these terms properly indicate the kind of issues frequently addressed within the field of seventeenth century logic (Hatfield 1997; Michael 1997). Still, as such, they do not sufficiently clarify the philosophical agenda they are used to account for. It is not just that they are anachronistic. It is not just that their convenient advocacy is commonly part of an exemption strategy from thorough investigation into the institutional, scientific and cultural reasons for the many reshapings of the systems of knowledge that early modern logic stems from. Most of all, it is that, within the framework of the traditional narratives of the history of early modern logic, epistemology and psychology, on the one hand, formal logic, on the other hand, are commonly treated as mutually exclusive terms. It is as if the seventeenth-century treatment of logic in non exclusively formal terms were tantamount to a rejection of this essential component of logic (MacFarlane 2000), or at least, to an indifference towards it.

We suggest that such narratives do not accurately describe the shape taken by this discipline in this historical period: they are not focused on the task of emphasizing the concrete philosophical import of what they call the “epistemological turn” in logic. Rather, they state bluntly that “these developments were on the whole not good for logic; certainly they were not good for formal logic” (Michael 1997, p.2). In this respect, they constitute stepping stones for an methodologically poorly-oriented archeology of modern logic: while they aim at identifying when and why logic and psychology began to be set apart from one another, they consider any attempt to deal with them altogether as an error. In so doing, they make use of criteria which are foreign to seventeenth century actor categories. They even go as far as accusing early moderns of articulating illusory norms for reasoning, as if these authors’ interest in actual patterns of thought prevented them from distinguishing actual human reasoning from its implicit norms. They charge them with psychologism. As Hatfield puts it, “the indictment of ‘psychologism’ relies on an assimilation

of early modern theories of cognition to recent conceptions of mind, psychology, epistemology, and their relations. It thereby misreads the substantive positions of the early modern authors” (Hatfield 1997, p. 31). Our objective, in this issue, is to contribute to correcting these misreadings.

To be sure, although many early modern philosophers elaborate on logic as a propaedeutic to, or a part of their philosophical systems, the contribution of this discipline to the building of philosophical modernity remains an outstanding issue. In a nutshell, in such traditional interpretations of the genesis and the development of early modern philosophy, as those provided by d’Alembert in his *Discours Préliminaire de l’Encyclopédie* (1751) or by Hegel in his *Vorlesungen über die Geschichte der Philosophie*, the frequent stress put on the figures of Bacon, Descartes, Locke or Kant, is accompanied by an insistence on the respective merits of *Novum Organum*, *Discours de la méthode*, *Méditations Métaphysiques*, *An Essay Concerning Human Understanding* and the *Kritik der Reinen Vernunft*. But the entrenchment of these major books in the field of logic is generally disregarded, while it is acknowledged by their authors and by their contemporary readers, either directly or indirectly (see Rossi 1957; Jardine 1974; Buickerood 1985; Gaukroger 1989; Serjeantson 2006; Ariew 2006, 2014; Serjeantson 2008; Savini 2011; Cassan 2015a; Petrescu 2018; Schuurman 2001, 2003; Pécharman 2016b; Sgarbi 2013, 2016; Lu-Adler 2018). As a result, the significance of the role taken by logic towards philosophical modernity is still commonly downplayed, while being crucial to its building. This will be our contention here.

In doing so, we will draw on current research in the history of logic in the early modern period. First, the importance of logic as a discipline widely taught in schools, colleges and universities of early modern Europe has been documented from the pioneering bibliographical works of Risse on (Risse 1965, 1970). On this basis, a social and cultural history of logic developed (Serjeantson 2013; Brumberg-Chaumont forthcoming). It became possible to explore significant continuities and changes in the teaching of logic. Studies were indeed undertaken in the context of an assessment of the historical category of early modern period as such. The consideration of the respective specificity of the sixteenth, seventeenth, and eighteenth centuries as far as logic is concerned revealed that some of the major changes in this discipline occur, first, after Ramus, and second, after Descartes. These studies were conducted at the level of the nation. Attention was paid to the influence religion has on pedagogy and to the uses of logic made by theologians, in particular while accounting for the Eucharist. (England: Howell, 1961; Thomas, 1964; Trentman, 1976; Giard 1985. France: Ong 1958; Bruyère 1984. Finland: Lounela 1978. Iberic Peninsula: Ceñal 1972; Muñoz Delgado 1964, 1972). Even in technical and traditional histories of logic, representative logic textbooks, such as Joachim Jungius’ *Logica Hamburgensis* (Jungius 1957, 1977) or Antoine Arnauld and

Pierre Nicole's *Logique ou l'art de penser* (Arnauld and Nicole 1662), which were bestsellers, have also been singled out (Kneale 1962, pp. 313–14, 315–20).

Second, the seventeenth century's voicing of criticism concerning the historical state of logic is no longer seen as an absurd attempt at invalidating this discipline as such; at getting rid of it. It is indeed well known that authors from Montaigne to Kant, belonging to very different philosophical traditions, shared an interest in harshly criticizing scholastic logic as verbose and sterile. But by now, it is also clear that these kind of statements have precise historical determinations such that they neither literally lead to a blacklisting of Aristotle and syllogistic logic, nor to attempts at doing without logic. Such a caricature view was expressed by, for instance, Husserl, when dwelling on the practical character of logic in his *Logical Investigations* (1900). It was grounded on his assumption that the early moderns lacked a sound philosophical understanding of the purpose of logic, which, in his eyes, kept them from coherently constructing a system of logic (Husserl 1970, pp. 28–33).

Progress in the history of ideas showed the falsity of this kind of presupposition, by revealing the complexity of post-medieval logic. On the one hand, the shape taken by this discipline during the period was addressed by an assessment of its specific purpose. The scientific reasons accounting for the need of a renewal in the field of logic during the period were contextually reconstructed. These reconstructions made visible a paradigm shift: in the seventeenth century, logic was not taken, anymore, mainly as an art of communication, but tended to be redefined in terms of a set of tools designed in the service of scientific discovery (Howell 1961; Gilbert 1960; Vasoli 1968; Jardine 1974; Roux 2011). From this point on, claims about Aristotle's logic as potentially harmful for the guidance of the mind and for discovery began to make sense as part of a general strategy for supporting the revolution in the art of thinking early modern authors saw themselves as involved in (Corneanu and Vermeir forthcoming). In addition to this, studies developed of figures of Renaissance anti-Aristotelian logic, such as Ramus (Ong 1958; Bruyère 1984). The temptation to mythologize them as brave opponents to scholasticism, abstractly reduced to a unified and well established tradition, was overcome (Grafton and Jardine 1986; Meerhoff 2001, 2005). The dissemination and penetration of Ramist logic across Europe was closely examined (Feingold 2001) and the scope of its legacy assessed (Demonet 1992; Anstey 2015; Couzinet 2015).

But this does not mean, on the other hand, that it became possible to draw a clear line between old and new. On the contrary, scholarly underscoring of the multi-layer legacy of Aristotelian and non-Aristotelian traditions in Renaissance and seventeenth century logic revealed the constant crossing of the theoretical divide between scholastics and moderns in this context (Minio-Paluello 1972; Schmitt 1983; Pécharman 2016a). Not only did all these authors frequently share basic terminology; they also responded to each

other. For instance, on the one hand, the early modern turning of the teaching of logic into an object of derision constituted the counterpoint of the search for a new logic, which could serve as a scientific method. On the other hand, the denunciation of the logic of the schools as a logic unable to cope with a scientific use provided a matrix for reforms of logic teaching. Hence, in the end, it appeared that the early modern paradigm shift concerning the function attributed to logic did not preclude a continuity with regard to the past from the standpoint of the conceptual apparatus. Besides, it was established that during the seventeenth century; didactic questions about the traditional learning of logic and searches for method of scientific discovery developed together.

Hence, at that time, the shape adopted by the current narratives about the reasons for the frequent attribution of a lack of productivity to the elaborated investigations of late medieval scholastic logic. First, we are not given anymore to read a simplistic binary story, confronting Modernity defensors with Ancient, Medieval, and Renaissance anchored in past opponents (Ashworth 1974; Jardine 1988; Nuchelmans 1980, 1983, 1998; Peixoto 2020; Vasoli 1974). Second, these narratives do without the long lasting claim that in the early modern period, logic did not attract the attention of the best minds, with the exception of Leibniz (Rossi 1960; Kneale 1962, p. 320). Third, they do not equate a presentation of early modern logic with a study of Leibniz's logic, notwithstanding the fact that this whole issue has not been fully dealt with so far (Couturat 1901; Russell 1900; Leibniz 1998; Pelletier 2013). In the end, they already convincingly show that deep transformations occurred in a period once thought to have made little contribution to logic.

The articles published in this volume are accordingly intended as contributions to a broader reassessment of the importance of early modern logic—one which frames these doctrines as particular answers to long debated questions concerning science, method, and the education of minds.

Why is such reassessment necessity? First, we know that during this period learned men and philosophers used the canons of logicians in order to debate about the respective merits of ancient and modern philosophy (Piaia 2011). To be sure, assessments of early moderns' remarks about logic played a prominent role in the appreciation of philosophical modernity. In England, for instance, the classical scholar, linguist and historian, William Wotton took sides against Sir William Temple's "history of learning," meant to show that the moderns' pretention to novelty and superiority was misguided, by defending their legacy in the field of logic. Against Jonathan Swift's patron, in his *Reflections upon Ancient and Modern learning* (1694) he opposed this view:

Whether the Moderns have been deficient in this noble Part of *Logick*, may be seen by those who will compare *Des Cartes's Discourse of method*, Mr *Lock's Essay of Humane Understanding*, and *Tschirnhaus's Medicina Mentis*

with what we have of the Ancients concerning the *Art of Thinking*: Where, though it may be pretended that their Thoughts and Discoveries are not entirely new in themselves, yet to us, at least, they are so, since they are not immediately owing to ancient Assistances, but to their own Strength of Thought and Force of genius. And since this Art is, indeed, the Foundation of all Knowledge, I ought to take notice, that my Lord Bacon and Des Cartes were the two Great men, who both found Fault with the *Logick* of the Schools, as insufficient of itself for the great Design of *Logick*, which is the Advancement of real Learning; and got Authority enough to persuade the World, in a very great degree, that other Methods must be taken, besides making Syllogisms. (Wotton 1694, p. 154–56)

The writing technique adopted is pretty efficient. Wotton singles out “great” names (Bacon, Descartes, Locke, Tschirnhaus) and credits them for having something valuable to say about logic. The objective he pursues is explicit: to use these authors’ understanding of logic as a device, so as to legitimate their building of new philosophical doctrines. So, in the early modern period, a connection was made between early modern theories about the use of reason and the philosophical outcome actually achieved by this use.

It has already been established, furthermore, that there is a relation between the early moderns’ assessment of traditional logic and a major change: the reshaping of natural philosophy. This commonplace in the historiography of the early modern period can be traced back, at least, to Cassirer’s *Das Erkenntnisproblem in der Philosophie und Wissenschaft der neueren Zeit* (Cassirer 2004, p.325). Indeed, on the one hand, the mechanisation of nature, a prominent feature of the seventeenth century Scientific Revolution, is based neither on the system of topics, which, from Aristotle on, had provided the ontological and conceptual framework for scientific researches, nor on the procedures for inventing arguments which, according to authors like Ramus, set the pattern for science. On the other hand, modified versions of the topics do become organizing principles of the experimental approach to the study of nature articulated throughout the period, especially in England, from Bacon to Boyle and Locke (See Charrak 2005; Anstey and Hunter 2008a, 2008b). So in the early modern period, the making of new methodologies in connection to the building of new explanatory programs of nature, is based, in a large part, on a reappraisal of some of the logical tools at hand and this reappraisal, far from amounting to a mere rejection of these tools, consists, rather, in a process of reformulation. These changes in the field of natural philosophy, by leading to a redefinition of scientific invention, contributed to a reshaping of logic.

Now, if we want to make fully sense of this reshaping, we have to go one step further. So far, the impact of the building of modern physics on early modern logic has not been considered at a large scale. It is true that the question of what

it means to center philosophy around the study of nature has been considered. The main features of the persona of the early modern natural philosopher have been illuminated from a moral, political and theological point of view (Gaukroger 2006; Harrison 2006, 2007; Georgescu 2010). Scholars have shown that methodological prescriptions not only constituted ‘the scientific method’ but also were instrumental in the cultivating of virtue, insofar as they also provided tools for perfecting the mind. In particular, it is now established that, in this intellectual background, the antic idea of philosophy as *medicina mentis* was reframed in connection with speculations and experimentations about what a human way of life should consist in (Corneanu 2011; Corneanu et al. 2012; Jalobeanu 2015). In different ways, much attention has been paid to the early moderns’ sense of the interconnectedness of knowledge (Garber 2006; Charrak 2009).

But histories of the origins of modernity have been tempted to focus on the “glorious” outcome of early modern philosophy, the progressive building of a new approach to nature, and to leave the fragmentation of logic in the background (Koyré 1966, 1973a, 1973b; Kuhn 1996). Not only is this opposition between “winners” and “losers” biased (Garber 2016); this narrative also gives a reductive account of the reconfigurations of the system of knowledge during that period. Basically, it displays a preference for what makes disciplinary unity possible. It is as if the difficulties the historical actors had to deal with, which led them to reject some of the logical tools at their disposal and to invent new ones, did not really matter, or deserve proper inquiry. Thus, as such, it delivers a static and incomplete image of early modern philosophy.

Second, the impossibility of accounting for the evolution of early modern logic according to a unitary disciplinary pattern has not so far been considered. It is known that there were reforms of logic both within and without academic frameworks, that is, both with and without pedagogical purposes. It is also known that there were some exchanges between both frameworks. These exchanges have already been very well documented. A philosopher like Descartes could have his remarks about logic turned into a logic textbook or a logic textbook chapter. His biographer Adrien Baillet attests to this phenomenon in his biography, by listing Descartes’ texts used in this perspective and by giving the names of the authors involved in this rewriting process (see Baillet 2012; Ariew in this issue). A philosopher like Gassendi could also make use of traditional logic materials in order to build his own theories on the topic (see Cassan 2012; Corneanu and Garau in this issue). Thus logic, understood as a discipline in a broad sense, was a kind of laboratory where some of the major changes constitutive of early modern philosophy were being prepared. But the modalities of construction and the contents of this laboratory still have to be researched about.

Third, it is true that two historiographical categories have been created and made use of in order to account for the writing of new types of logic by philosophers going from Bacon to Locke: “logic of ideas” (Yolton 1955, 1956; Auroux 1993; Easton 1997; Schuurman 2001), “facultative logic” (Buickerood 1985; Yolton 1955, 1956). The story goes this way. To begin with, the study of Locke’s epistemological doctrines in terms of a “way of ideas,” as they are put forward in *An Essay Concerning Human Understanding*, showed his concern with the “logic of ideas,” that is, with the issue of the directness of human knowledge and with the issue of the immaterial factors likely to be involved in this process. In this context, “logic of ideas” is an expression qualifying an early modern philosophical activity of investigation into the causality of ideas (Yolton 1955, 1956). From scholarly research into the structure of the *Port-Royal Logic* onwards, the “logic of ideas” gets a technical and formal meaning, grounded on the identification of the “loi de Port-Royal,” according to which the extension of a concept is increasingly inversely proportional to its comprehension (Auroux 1993, p.67). This research takes place in connection with investigations into the history of linguistics and the rise of the science of language in the seventeenth century (Chomsky 1966; Aarsleff 1982; Pariente 1985; Formigari 1992; Cassan forthcoming). From this point on, “logic of ideas” is also used as an umbrella term designating the kind of logic then understood to supplant contemporary views of formal logic (Easton 1997; Schuurman 2001, 2003). A more refined use of this expression follows from enlightening reappraisals of Locke’s logic legacy (Buickerood 1985; Serjeantson 2008; Wolfe 2016). At this point, scholars discuss whether the *Essay* is structured more around ideas or around the faculties that provide us with the ideas. They label “facultative logic” as a logic whose goal is “to formulate the principles of the habituated regulation of the mind in the apprehension of truth and the acquisition of knowledge and properly grounded opinion” (Buickerood 1985, p.163) To put it in a nutshell, they agree on the fact that in the seventeenth century reference to the cognitive faculties clearly plays more than merely the structural role in the exposition of logical theory it could have in the Middle Ages or in the Renaissance. They share the conviction that this novel emphasis on mental faculties contributes to the shaping of a new kind of logic, more subject oriented than in the past. They rely on two main devices in order to set the corpus of works structuring this field. They use “facultative logic” as a subdivision of “logic of ideas,” illustrating this subdivision with discussions about Locke’s *Essay* and Malebranche’s *Recherche de la vérité* (Schuurman 2001). They also address the new logic of ideas from the viewpoint of the different geographical and cultural territories it involves. From this perspective, they undertake research into the specific features of these lands and examinations of their connections. In this framework, “Cartesian Logic” and “Lockean Logic” become widely used categories (see Gaukroger 1989; Schuurman 2001, 2003;

Ariew 2006, 2014; Savini 2011; Cassan 2015b; Pécharman 2016b; Petrescu 2018; Blank 2018). These categories provide instantiations of logic understood as “art of thinking” (Pariente 1985; Corneanu and Vermeir forthcoming).

But from a heuristic point of view all these hermeneutic categories are only efficient to a certain extent. On the one hand, they attest to the wideness of the scope of early modern logic. They make it possible to observe a complex phenomenon: the room made in texts about logic for research into the way the mind acquires knowledge of the world, as well as for hypotheses about the operations of the mind, and about their right conduct in the search for truth. They reveal that the purpose of logic in the seventeenth century was largely that of determining how to make use of intellectual materials in order to reason without error. But, on the other hand, first, they do not suffice to making sense of everything that is going on in the field of logic during that period. Second, while showing that logic in this period is a reality with a mixed form, a hybrid stuff, they push into the background the question of the specific consistency of the new shape taken by this discipline.

This special issue intends to address this question by providing some significant and original contributions to the reconstruction of the history and importance of logic in the building of early modern philosophy. Our main concern is this: why, despite such widespread rhetoric of the rejection and rupture with the logical tradition, did early modern philosophers devote so much attention to logic in the construction of their systems of knowledge? What kind of change and continuity in the understanding of the role of logic does this reflect? What does this gesture tell us about the building of the philosophical discourse?

The first two papers of this volume deal with two essential figures of early modern philosophy, namely Francis Bacon and René Descartes, whose names frequently come together in the framework of the traditional historiography of the period, hailed as two “Founding Fathers” of philosophical modernity (Cassan 2014). In this volume, Bacon and Descartes are considered from the standpoint of their contribution to the reshaping of the logic of their time. Is there such thing as a “Baconian logic”? Is Cartesian logic fully defined by a break with traditional scholastic logic? At stake in these two questions is the project to show that however new early modern philosophy may have been, it did not arise in a virgin land, immune from historical determination, but owes its novelty to its reworking of traditional materials. We claim that the field of logic is particularly representative of this phenomenon. More precisely put, we explore the part played by the early moderns reshaping of logic in the perspective on their invention of early modern philosophy. We contend that a philosophical history of logic is instrumental in the making of a history of early modern philosophy that is not reduced to the listing of its authors, but is characterized by its themes, concepts and problems.

The last two papers illustrate this reading strategy by focusing on an important case study. They are dedicated to the empiricist philosophy of Pierre Gassendi, who is incrementally coming to the foreground, after having spent too long behind the scenes of early modern scholarship (see Rochot 1955; Bloch 1971; LoLordo 2007; Bellis 2019). Both papers emphasize the dialectical relation entertained by Gassendi with the history of logic of his time. On the one hand, Gassendi explicitly deals with the past. At the same time, he acknowledges the importance of the history of logic in the building of his own logic project and puts this theoretical claim into practice, by revisiting in his logic the Thomistic notion of the movement of reasoning, and by attaching importance to the figure of Bacon. On the other hand, his use of logical materials borrowed from the past serves his own philosophical projects. First, Gassendi's conception of the logical role of the imagination answers to his empiricist epistemology, his naturalized view of the mind (which involves a defense of thinking in animals), and his notion of a natural logic. It is also operative in his pairing of the formal mechanism of logical operations with a progressive mechanism of the operations of the mind; and it serves as a counterpart to his experimental understanding of the progress of knowledge. Second, Gassendi's praise of Bacon's logic does indeed mean that he should be seen as a Baconian logician. This gesture shows that two apparently contradictory statements about the development of early modern empiricism are true. The first is that the form of early, "continental" empiricism, such as that developed by Gassendi, can be understood as originating from a specific milieu—that of the Peiresc circle and of his extended network of scientists and intellectuals. Secondly, at the same time, the influence of Bacon's "logic" on Gassendi's *Institutio* imposes to refuse a narrative about early modern empiricism based on founding figures and on geographical zones. We rather have to reconstruct the shared discursive spaces between the actors.

In the end, our conclusions are two fold. Firstly, a study of the early moderns' reshaping of logic provides a tool for a better understanding of their philosophical move. Second, a new understanding of the part played by logic in the building of early modern philosophy significantly contributes to current debates about the rise of seventeenth century science and about the formation of the modern concept of human being. Concerning the former point, our working hypothesis is that the shape taken by logic during that period is determined in part by metaphysical preoccupations. As it is well known, from Aristotle's *Organon* onwards, logic has been dealing both with formal and material truth. To be sure, in this vast framework, research about valid forms of deductive arguments has been coupled with theories formalizing how to communicate about the way the world is, either from the point of view of science, or from the point of view of everyday human practice. It is also well-known that, in this context, the consideration of the structure of inferential

process not only in itself, but also in the variety of its applications was coordinated with the developing of assumptions concerning the nature of things, not only as they are, but also as they are conceived of by the human mind.

To be sure, the necessity of not taking the traditional ontological categories for granted anymore, in order to secure the process of discovery, imposes a need to explore the way the mind naturally works and to attribute to this exploration an important part within the field of logic. Our second hypothesis is that undertaking a study of the operations of the mind for the purposes of logic has an anthropological import in the context of the mechanization of nature marked by the question of whether the activity of thinking is a human property. The illumination of the logical groundings of the modern concept of the human being importantly complements the physical, moral and political components of this concept that scholars have already shed light on.¹

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