

GENERAL INTRODUCTION ROHAULT'S CARTESIANISM

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Jacques Rohault's preface to the *Traité de Physique* is a special document in the history of philosophy and science. The author was a well-known Cartesian, a professor of mathematics in Paris, and a reputed experimentalist. For a long time, associating Cartesianism with the empirical investigation of nature was quite uncommon. However, recent studies are blurring the boundaries.¹ To be sure, this is not the only historiographical problem raised by the case of Rohault. The historian of science is equally challenged by explaining the very good reception of Rohault's treatise in early modern English universities, where the book was popular mainly due to several annotated editions prepared by the Newtonian Samuel Clarke.² The current study aims to address these historiographical challenges, while introducing a critical edition of four early modern versions of Rohault's preface to the *Traité*: the original French, the first Latin translation (by Théophile Bonet and amended by Antoine Le Grand), the second Latin translation (by Samuel Clarke), and the English translation (by John Clarke).

The preface is a programmatic text meant to introduce a large textbook on natural philosophy. Rohault comments upon the progress of natural philosophy, reflecting upon the role of ancient authority in the process. Aristotle's authority among the scholastics provides the crux of Rohault's arguments, which he contrasts with the natural philosophy of the moderns. In addition, the author provides a careful analysis of the proper method for the study of nature, and the place of mathematics in it. The preface was most probably written shortly before the publication of the book in 1671.³ Manuscript evidence – two sets of conference notes taken during the 1660s – and reports of Rohault's public lectures in Paris cover most of the topics discussed in the main text of the *Traité*.⁴ However, the general reflection on the evolution of natural philosophy is missing in the conference notes, which supports the conjecture that Rohault wrote the preface while preparing to publish the (old) material of his public lectures. This is not a mere passing remark about the chronology of publication

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of Rohault's *Traité*. Rather, it offers a crucial clue to understand both texts – the main body of the *Traité* and its preface – and to situate his experimental practice quite early among some of the famous experiments of the time.

Perhaps the most famous experimental series receiving such a misdated treatment is the one about void, discussed in chapter 12 of the first part of the *Traité*.⁵ The chapter was commented by numerous scholars, highlighting either Rohault's Cartesian commitments, his experimental procedures and the use of instruments, or his methodology.⁶ What is at odds in these accounts is the scholars' expectations about Rohault's explanatory aims and his actual empirical investigations. While one would expect the Cartesian Rohault to directly engage with Robert Boyle's experiments with the air-pump, the reader discovers that most of Rohault's experimental setups are described in Blaise Pascal's pneumatic trials.⁷ Rohault belongs to Pascal's tradition, which points to a different context and, by consequence, to a different philosophical significance of his experiments. But what would that context be?

As noted, Rohault's *Traité de Physique* was long-time in the making, and it was only published in 1671. Rohault died at the end of 1672, such that he was not able to reply to comments nor to improve the claims and experiments included in the book. Yet the general reception was favourable: several reissues were printed in the first years (in Paris, Amsterdam, and Lyon) and a Latin translation was produced in Geneva by Théophile Bonet. Numerous other editions followed: in French (1672, 1673, 1675, 1676, 1681, 1682, 1683, 1692, 1696, 1705, 1708, 1723, 1730), Latin (1682, 1691, 1692, 1697, 1700, 1702, 1708, 1710, 1713, 1718), and English (1723, 1728-1729, 1735). The history of the Latin version of the treatise is more complex. Bonet's initial translation was amended by Antoine Le Grand in 1682, and subsequent publications followed that edition, which also included comments by Le Grand to various passages of Rohault's book.⁸ A similar strategy was used by a young graduate from Cambridge, who, in 1697, had produced a new Latin translation of the *Traité*. His name is Samuel Clarke, and while he was not yet the Newtonian of the famous dispute with Leibniz, he was still able to offer a different perspective upon Rohault's natural philosophy.⁹ Clarke's annotations varied across five editions (1697, 1702, 1710, 1718, and 1723), with two substantial changes made in 1702 and 1710. Scholars have long acknowledged Clarke's Newtonianism becoming more prominent in his annotations.¹⁰ Be that as it may, Rohault's treatise was a popular book for several decades and it was a compulsory reading for second year students in Cambridge and Oxford.¹¹ Therefore, the circulation of the treatise – in its various editions – complemented a corpus of Cartesian writings that were quite popular in the English universities at the end of the seventeenth century.¹²

The *Traité* is a large book, and it was usually printed in two volumes. It consists of four sections, with the first part dealing with general natural philosophy, and covering the entire first volume. The second volume includes the other three sections: cosmology (part two), the earth and meteorological phenomena (part three), and living bodies and medicine (part four).¹³ The structure resembles Descartes's *Principles of Philosophy*: I. The Principles of Human Knowledge; II. The Principles of Material Things; III. The Visible Universe; IV. The Earth.¹⁴ However, the metaphysics is

missing, while a section on medicine and the animated body is added at the end. Moreover, it is important to note that Rohault combines the use of experiments and observations with mechanical explanations, in which macroscopic natural phenomena are explained in terms of motion of invisible particles. The natural philosopher is bound to perform experiments and to test possible explanations before committing to a theory. What is peculiar to Rohault's experiments discussed in the treatise is that he performed many of them in front of the audience gathered either at his own house for the "Wednesday Conferences" or in other Parisian salons of the time.¹⁵ Nevertheless, Rohault was not a keen collector of experimental reports – although he refers to a significant number of other observations and experiments – but rather a natural philosopher directly involved in the study of nature. Quite curious in this context is that his natural philosophical explanations are usually framed as a contrast between the school philosophy (not Aristotle's, but the Scholastics') and the modern accounts. For him, the moderns provide a superior framework, with more explanatory power, while avoiding the confusion of scholastic terms (e.g., the multiplication of "occult qualities"). Thus, his explanations uncover mechanisms of matter in motion, which are conveniently expressed accordingly to Descartes's principles. There is more to be said here, because Descartes's philosophy is considered by Rohault as a development of Aristotle's views, which were, in turn, altered by the commentary tradition. As explained below, Rohault argues in his preface that Aristotle's general philosophical outlook should be followed and amended when necessary.

Rohault authored just a few writings, which he published only later in his life. Immediately after the imprint of the *Traité* in 1671, a second publication was issued. It was the *Entretiens sur la philosophie*, a text written as a dialogue between Rohault and an unnamed professor from the Sorbonne (a theologian, presented under the initials M.N.).¹⁶ Just as the content of the *Traité* was known before the publication of the book due to the unofficial manuscript copies of conference notes, the text of the *Entretiens* was available as a copy of a letter addressed to his Sorbonne's interlocutor (Monsr. Guyard), a document which circulated in the summer of 1671. The history of the publication of the *Entretiens* is slightly convoluted, and it involves accusations of heresy, Rohault's faith in the Christian doctrines being called into question.¹⁷ Another reason for the difficult reception of the *Entretiens* is to be found in contemporary polemics between Cartesians (coordinated by Rohault's father-in-law, Claude Clerselier) and the opponents of Cartesianism.¹⁸ From this point of view, the content of the *Entretiens* was more provocative than the one of the *Traité*. It discussed the metaphysical issues of matter, form, and accidents, and the Cartesian replacement of the scholastic theory of qualities, with special focus on the controversy around the theory of the animal-machine. However, it appears that these more metaphysical topics were of less concern to Rohault than the problems in natural philosophy or mathematics.

Besides the large text of his treatise on natural philosophy, Rohault authored – but never published in his lifetime – several treatises on mathematics and practical mathematics, which were printed for the first time by Claude Clerselier in 1682 under the title of *Œuvres posthumes*. The fragments were presented by Clerselier as typical private lessons offered by Rohault to some of his well-established patrons.¹⁹ Among

the mathematical writings, a treatise of mechanics proved to be very successful. It circulated widely at the end of the seventeenth century and the beginning of the eighteenth, first as an annex to some of the Latin editions of the *Traité*, and then as a stand-alone treatise, translated into English in 1716.²⁰

The reception of Rohault’s writings is not the only curious thing about him. Rohault’s early life is equally enigmatic.²¹ As a son of a wealthy wine merchant in Amiens, Rohault was attracted to the study of mathematics, which he graduated in Paris in the 1640s. From that moment onwards, he was known as a “mathematics professor,” but since there was no institutional affiliation related to his name, Rohault was most probably involved in private teaching. During the 1650s, he took part in the Parisian intellectual life, debating on different natural philosophical topics, but most remarkably, performing experiments in front of an audience. This was also the time when Rohault started his own conferences, the so-called “Wednesday meetings” at his house in Paris. Around the 1660s, his lectures and experiments were famous enough to attract foreign travellers to the French capital.²² In 1664, Rohault married Claude Clerselier’s daughter, Geneviève; this event probably sealed his affiliation to the Cartesian camp.²³ Unfortunately, there are only a few scattered sources available to address the question of Rohault’s Cartesianism before 1664. The most important is a letter he addressed to Clerselier as a reply for Pierre de Fermat in the celebrated dispute about Descartes’s law of refraction.²⁴ But again, due to the late publication of this source (the letter dates from 1658, but it was only published in 1667), his late Cartesianism is projected back upon his early career.

As soon as Rohault begun to lecture on natural philosophy, unauthorised conference notes started to circulate. An early set of notes was recorded by an unnamed lawyer (“F.”), with some of the material dating from 1669.²⁵ The second set of conference notes was published recently under the title of *Physique nouvelle (1667)*.²⁶ The year on the cover might be misleading – is it the year when Rohault delivered the lectures? Does it indicate when the manuscript was acquired by the owner, as the modern editor suggests? Still, some insights about Rohault’s views in natural philosophy can be derived from a comparative study of the three sources: two (unofficial) manuscripts based on Rohault’s conferences and the published *Traité*.²⁷

The available evidence suggests that some of the topics included in the *Traité* were a late development (e.g., the discussion of comets; the entire fourth section of the treatise, dealing with medicine), while others remained almost unchanged (e.g., the pneumatic experiments; the explanation of magnetic phenomena, etc.). A conclusion one might draw is that throughout the 1660s, Rohault was most of the time repeating some of his early experiments, which were, incidentally, the ones that made him famous among his contemporaries (e.g., experiments with magnets, variations of the Torricellian experiment with mercury and glass-tubes, showcasing a macroscopic model to explain the production of vision). During that decade, new content was only slowly produced (e.g., the appropriation of the new astronomical evidence to support his cosmology; or the section on medicine).²⁸

A tentative conclusion for what was presented so far is that despite his reputation as the leading Cartesian of the time, Rohault’s biography has significant gaps, such that it requires a more careful analysis.²⁹ Moreover, insights derived from

Rohault's experimentalism and his mathematics might offer support for a more complex intellectual formation than a simple inclusion in the Cartesian camp.³⁰ A nuanced view about his Cartesianism is useful to explain the success of his natural philosophy in England.³¹ Rohault expresses the status of the *new* natural philosophy at a time of change, when the experiment was gaining ground in the production of science, the role of mathematics was seen as fundamental in framing natural philosophical explanations, and the interplay between theory and practice was considered a crucial task of natural philosophers. Likewise, his constant use of instruments in performing experiments and observations was adjoined to a public dimension, which was only overpassed by the emerging scientific institutions of the early modern period.³² Of course, Rohault's pedagogical use of experiment was not unique. Among the Cartesians, Burchard de Volder was doing something similar at the University of Leiden.³³ But the point worth stressing is that *Cartesianism* was not the only trait of Rohault's treatise, and, for this reason, his text was well equipped to spread among a broader audience.

A repeated claim about Rohault's reception in England is that Newtonian natural philosophy was not yet well established in the early years of the eighteenth century.³⁴ In this sense, Clarke's editions are often depicted as a vehicle of transmission of the new Newtonian philosophy at the expense of the Cartesian one, which is seen as "mining all within," as one commentator has put it.³⁵ It is thus very tempting to frame Clarke's editions of the treatise as a "battleground" between Cartesian and Newtonian views.³⁶ The argument put forward in this study aims to challenge this narrative and to support the influence of multiple sources in Rohault's book, which were further developed in different directions. The reception of the treatise is thus an issue that must be addressed, and two early modern figures have contributed to diffuse Rohault's views to their contemporary audience: Antoine Le Grand and Samuel Clarke. Before discussing these topics, a brief overview of the content of the preface introducing Rohault's treatise is in place.

The text of the preface

What was Rohault's motivation for writing the *Traité*? The preface provides at least part of the answer. Simply put, part of the reason is his own diligence in pursuing the progress of natural philosophy. Vexed by the lack of progress of the two preceding millennia, Rohault sought to investigate several natural philosophical topics by grounding his reason "upon mathematical Truths, and sure Experiments."³⁷ What followed were the "Wednesday lectures" mentioned above, delivered at the advice and encouragement of his most esteemed peers. "[A] great many of my Friends," Rohault writes, "whose Abilities all the World, I saw, had a great Value for, advised me to communicate it to others by publick Conferences, or at least by private Conversation" (Eng. 366R–368R). The public conferences grew more and more successful, prompting Rohault to create a coherent written version of the lectures. As noted, other versions were already circulating as lecture notes recorded by members in the audience. This is why Rohault, who claimed he had "insensibly wrote a Book" (377R) undertook the task of replacing the pirate drafts with his own written treatise. If there is any truth to Rohault's short biographical hints, we have even more reason to believe

that the preface was written much later than the contents of the *Traité* – even more than ten years later than some parts of the book, since his conferences were delivered starting from the late 1650s.

There is another deeper and more implicit motivation for writing the *Traité*, which is constantly suggested throughout the entire preface: Rohault's profound dissatisfaction with the methodology, progress, and public trust of natural philosophy in the preceding two millennia. As he puts it, natural philosophy became “so barren as not to have produced any Fruit, in so much that twenty Ages have passed, without any new Discovery made in it” (Eng. 32R–33R). The causes of the lack of progress in science lie, according to Rohault, in its defective methodology and in its improper reception by the public. This verdict shapes the whole structure of the preface, which becomes a thorough account of the main impediments of scientific progress and its possible improvement. Needless to say, one might find familiar undertones of this topic in the early modern period. For example, in his 1969 introduction to the reprint of John Clarke's 1723 English translation of Rohault's *Traité*, Larry Laudan comments that “In some ways, the Preface reads like a page from Francis Bacon.”³⁸ Indeed, the resemblance is quite strong: Rohault foregrounds the hope for progress in natural philosophy by crucial methodological components, he insists on the importance of experiments in acquiring knowledge of nature, and he even highlights the tentative nature of scientific knowledge. In addition, the preface is organized in the lines of five defects which Rohault identifies as the main problems of natural science – four methodological ones and a social/political one. This general structure of Rohault's preface can be read as reminiscent of Bacon's idols, as identifying the intellectual hindrances which restrain scientific progress.³⁹ All this, however, is not to downplay his Cartesian affinities, which are apparent even in his writing style. For example, his narrative tone is quite personal and includes, from time to time, autobiographical references. Rohault frames the text as a collection of personal reflections on the faults and hopes of natural philosophy. They are presented as his own conclusions, which cover jointly ancient and modern approaches. The preface ends with a discussion of his own reasons for and against the publication of the *Traité*, as well as with the announcement that he plans to prepare a Latin translation. This autobiographical style, combined with a methodological reflection upon the status of natural philosophy, may remind the late seventeenth-century reader of Descartes's *Discourse on Method*.⁴⁰

As already noted, Rohault identifies five main defects of natural philosophy, which “were a certain Bar to hinder the Approaches towards Truth” (Eng. 54R). He ascribes the first four to the faulty *manner* of philosophizing. Let us discuss them in more detail. The first defect is the undue credit to the authority of the ancients. Rohault argues that natural philosophers were blinded by excessive faith in the ancients. In a typical Cartesian fashion, he claims that “[r]eason is to be found in every Place and every Age” (Eng. 61R–62R), so there is no reason why we should believe that the minds of the ancients were superior to the minds of the moderns. On the contrary, excessive faith in the ancients' knowledge makes minds dull and actions sluggish; it hinders our natural desire to acquire knowledge and restrains our intellectual capacities. Yet Rohault is prudent when mentioning Aristotle: he limits his criticism to the way in which philosophers interpreted and used Aristotle's works, and

does not criticize Aristotle's works *per se*. He highlights that constantly searching for knowledge of nature in Aristotle's texts and writing commentaries on his philosophy is simply a waste of time. The same applies to the Schools' endless disputations on Aristotelian notions, creating needless divisions amongst philosophers. It should be emphasized, however, that this defect concerns the habits of Scholastic and modern philosophers. Rohault did not want to outrightly dismiss Aristotle, nor did he want to fully embrace his philosophy.

The second defect identified by Rohault is treating natural philosophy in "a [m]anner too metaphysical" (Eng. 100R). *Prima facie*, this verdict might sound surprising coming from a Cartesian. Yet Rohault's examples elucidate the reason for his disappointment. Philosophers have the habit of "Disputing about Questions so abstract and general" (Eng. 100R–101R) to no useful purpose. These abstract notions "would not help to explain the least particular Effect in Nature" (Eng. 102R). This vice is exemplified by the disputes about the divisibility of matter. For Rohault, it makes no difference to the natural philosopher if matter is infinitely divisible or not, as long as it can be actually divided into parts small enough to serve every (practical) purpose. Note the experimental affinity of Rohault's idea: natural philosophy, he tells the reader, "ought to descend immediately to Particulars" (Eng. 103R). The same fault concerns the metaphysical disputes about the nature of motion. The Aristotelian definition of motion as "The Act of a Being in Power, so far forth as it is in Power" should simply be used for examining the properties of motion and for the piecemeal establishment of each natural effect of motion. Otherwise, natural philosophers would fall for the vice of explaining effects by giving "Words instead of Reasons" (Eng. 117R). Further, Rohault argues against this habit by appealing to the common trope of occult qualities as means of explanation. This is a typical Cartesian argument, as is his choice of examples. There is no knowledge to be gained if we suppose that natural effects are caused by analogous "qualities" or "virtues" inhering in a subject; for example, when one investigates the reason why a loadstone attracts iron. Rohault claims that there is no difference between the answer of a peasant and that of a philosopher if the former says "that he does not know the Reason of it, and the other says, it is done by some Vertue or occult Quality" (Eng. 125R–127R). On the contrary, the answer of the philosopher might actually be worse, because the philosopher may have a false impression of (certain) knowledge.

The third defect of natural philosophy is more subtle: it is the improper balance between reasoning and experiment in the study of nature. Rohault denounces two methodological extremes in natural philosophy, which put too much emphasis either on experiment or on reason. Neither position, taken independently from the other, can provide good explanations, because each has its own harmful outcome. By focusing solely on reasoning, philosophers neglect the best source of discovery and theoretical confirmation. The constant appeal to reason and argument is sterile, for arguments alone are never enough to carry conviction to opponents. On the other hand, discarding reasoning and yielding everything to experiments is equally detrimental, for it restricts knowledge acquisition to our senses. Philosophers falling in this extreme position are voluntarily depriving themselves of conclusions, which could oftentimes be drawn just from a single adequate experiment.

Instead, the approach favoured by Rohault implies that one must join reason and experiment in natural philosophy: “it cannot but be very advantageous to mix Experiments and Arguments together” (Eng. 143R). This statement expresses a common trope in the early modern period, equally valid for Cartesian and non-Cartesian natural philosophers. As an argument for the necessity of blending reasoning and experiments, Rohault introduces a distinction between three types of experiments. His taxonomy is meant to illustrate beneficial ways of mixing the two. First, there is “the mere simple using our Senses” (Eng. 171R), which can be accidental – when it concerns things one stumbles upon. The second type includes those experiments produced when one “deliberately and designedly make Tryal of any Thing, without knowing or foreseeing what will come to pass” (Eng. 174R–175R). This second type does not imply prior hypotheses about natural effects. It aims at exploring and producing natural effects and making sure that such effects are recorded in order to be reproduced. This type of aimed observation can bring new things to one’s attention, while still not by itself being theoretically integrated into natural philosophy. The third type of experiments refers to “those which are made in Consequence of some Reasoning in order to discover whether *it* was just or not” (Eng. 184R–186R). Only this last type of experiment relates observation with reason, as it represents a search for an agreement between hypotheses and natural outcomes. Rohault concludes that while all three types of experiments are useful in natural philosophy, the latter type is more important than the others. One obvious question to be raised at this point is: What does this taxonomy refer to? Is Rohault referring to his own usage of experiments in the *Traité*? Is he referring to the experimental practice of the English and/or French communities? Is it simply a normative taxonomy about the role which experiments *should* play in a proper methodology? The most common answer in the literature is that Rohault refers, at least implicitly, to his own practice (described in the *Traité*) as well.⁴¹

Remarkably, a very similar view on the role of experiments is endorsed at the end of the century by Étienne Chauvin in his celebrated *Lexicon* (1692, 1713). Chauvin was himself a natural philosopher and an experimenter. His entries for *experientia* and *experimentum* incorporate both Baconian and Cartesian elements, which are helpful in the current context to illustrate Rohault’s contribution to the early modern debates about method in natural philosophy.⁴² Chauvin states the importance of experiment for physics: not only of the necessity of performing experiments, but also of the virtues of jointly using reason and experience. He compares the use of reason independently of experience with a ship without a guiding pilot. In his book, Chauvin also describes three types (*genus*) of experiments (*experientia*). These are: 1. the simple use of the senses; 2. trials – observations made without specific expectations about the experimental outcome; 3. experiments that are preceded by reason, such that their effects are anticipated. Even if Rohault’s name is not mentioned, the resemblance with his tripartite division is striking, especially regarding the role ascribed to the third type of experiment. Chauvin believes that this experiment leads to the “philosophical” meaning of experimentation, which is the requisite goal: to derive conclusions in natural philosophy on the basis of experimental practice. In his description of this process, Chauvin uses the terms *fructus* and *lucis*, which suggests an appropriation of

Bacon's taxonomy of "fructiferous" and "luciferous" experiments.⁴³ Note that this is not a collection of different views about experimental practices, nor an attempt to chart all varieties of early modern forms of experimentation. Rather, it is Chauvin's own attempt to offer a unified description of experiment and experimental practices, which is presented as relying on two main components. One is the use of Baconian language of *fructiferous* and *luciferous*. The other is Chauvin's use of a similar tripartite distinction of experiments as one finds in Rohault's preface to the *Traité*. If Chauvin's distinction is directly borrowed from Rohault, this example hints to an early modern reading of the preface which brings Baconian and Cartesian methodologies closer together. This is again providing grist to the mill for the explanation provided above for the success of Rohault's treatise at the end of the seventeenth century. On the other hand, it is possible that the tripartite taxonomy of experiments was more of a commonplace for late-seventeenth century French natural philosophy. In this case, we have reason to doubt that Rohault's taxonomy was referring to his own experimental practice.

The fourth and last methodological defect is, according to Rohault, the systematic neglect of mathematics in natural philosophy (see Eng. 205R–209R). The biggest fault here lies at the level of school education. Rohault expresses his astonishment that, even if mathematics is usually included as a proper part of philosophy, it is oftentimes not even taught in schools.⁴⁴ What follows is a multitude of arguments by which Rohault shows the benefits of knowing (and using) mathematics. He starts from considering mathematics as a formative practice in educating the youth. Mathematics is a way of exercising the mind and teaching children "to discern Truth from Falsehood infinitely better, than all the Precepts of Logick without Use can do" (Eng. 215R–216R). The superiority of mathematics to logic in discerning truth from falsehood is, of course, a recurrent theme in Cartesian philosophy. Yet Rohault claims that the foremost benefit of mathematics for natural science is that it teaches the properties of geometrical figures. Without entering in any disputes about the active or passive role of geometrical figures in nature, Rohault stands firm in his belief that geometry is an essential part of natural philosophy. In the same way in which a knife can cut *because* of its pointed figure, and in the same way in which workmen tools produce diverse effects *because* of their geometrical shape, mathematics is able to reveal the reasons of natural effects even at the micro-level. In Rohault's words: "it is reasonable to think that the most imperceptible Parts of Matter, seeing they have every one a certain Figure, are also capable of producing certain Effects in Proportion to their Bigness, like those which we see produced by the grossest Bodies" (Eng. 246R–249R). The micro-level of small parts of matter is, therefore, analogous to the macro-level in terms of its causal structure. Rohault continues his plea for the usefulness of mathematics by considering the advances and discoveries of recent artisanal practices. Artisans and craftsmen, according to Rohault, owe many of their inventions to the successful application of mathematics. And the fact that artisans do not usually have a formal education is not an argument against the benefit of learning mathematics. On the contrary, artisans would progress much faster if they would have a proper mathematical education. Rohault ends by an appeal to the authority of Plato's academy, in which "*none but Geometricians should enter*" (Eng. 287R);

and even by appealing to “the several Applications [Aristotle] has made of Mathematicks in many Places” (Eng. 288R–289R). Rohault appropriates the authority of Aristotle, claiming that knowledge of the *Elements* of Euclid is a prerequisite for understanding Aristotle’s works in natural philosophy (see Eng. 290R). This is a signal, as we will see, for the complex way in which Rohault relates to the philosophy of Aristotle.

So much for the four methodological defects of natural philosophy that need to be improved. There is, however, a fifth problem which may not be within the reach of natural philosophers, namely the reception of their writings. Rohault claims that many people who read natural philosophy are guilty of this problem: they have an aversion towards philosophers. They often attack and damage the reputation of natural philosophy authors, without even understanding their work. The main reason for such aversion is the general reluctance to novelty and to the departure from traditional Aristotelian doctrines. People often assume that a novel natural philosophy is contrary to Aristotle, “yet because they have read nothing of this Philosopher but only those Citations which they found in their philosophical Lectures, it very often happens that the Thing which they thus attempt to confute, is what Aristotle himself has said in express Terms” (Eng. 318R–321R). Rohault’s strategy in dealing with this issue is to maintain a delicate balance between rejecting some ancient and modern philosophical authorities, while generally accepting others. This is why Rohault claims, at the end of the preface, that his philosophy is not contrary to Aristotle, but rather against Aristotle’s commentators. Many natural philosophers have had such a detrimental reception because of the prejudices associated to novelty in natural philosophy; an example is William Harvey’s work on the circulation of the blood. Rohault therefore needs to maintain a right balance of the old and the new in his philosophy, spending “some Years in reading the Ancients and Moderns, but with a firm Resolution not to follow them any further than I could see the Reasons of each of them” (Eng. 359R–361R). By this design, Rohault justifies his basic natural philosophical principles as coherent with Aristotelian philosophy: “I have taken all the general Notions from *Aristotle*, either for the establishing the Principles of natural Things, or the chief Properties of them” (Eng. 382R–383R). Many times, however, he investigates novelties “which neither *Aristotle* nor his Followers have treated of at all” (440R), and sometimes he departs from Aristotelian doctrines, noting that, “I did not think it very ill in me to depart from some particular Notions, when I found that these Notions were disagreeable to Truth” (Eng. 442R–444R). Yet one authoritative reference in Rohault’s preface seems to be wholeheartedly accepted: it is the philosophy of Descartes. Within the body of the *Traité*, the name of Descartes is not mentioned at all, in order “to avoid perpetual Repetition” (Eng. 400R–401R), but nonetheless, as Rohault confesses in the preface, Descartes is the philosopher whom he had used most of all in his work.

Translations and editions

The current critical edition comprises four different versions of Rohault's preface: the original French text, two Latin translations, one by Théophile Bonet with emendations by Antoine Le Grand, the other by Samuel Clarke, and the English translation of the latter, made by John Clarke. As mentioned above, numerous editions of Rohault's treatise were printed in the early modern period, and the book was adopted as textbook in natural philosophy in many European universities.⁴⁵ While Rohault's death soon after the publication of the *Traité* has impeded his project to translate the book into Latin, this task was undertaken by a printer in Geneva, who commissioned it to a local physician, Théophile Bonet.⁴⁶ Bonet's version was printed in 1674 and it was amended by Antoine Le Grand in 1682, when George Wells and Abel Swalle have published a revised version that includes "*animadversionibus Ant. LeGrand.*" This is a significant edition, as it proves to be more than an update of the available Latin translation.⁴⁷ Printed in London, Le Grand's version of the text circulated in the universities of Oxford and Cambridge. Due to the very popular demand of the book in such places – but also due to other reasons that will be discussed below – a new Latin translation was done in the late 1690s. Samuel Clarke argued that a new version of the Latin text was needed, to correct the mistakes of the old version (Bonet's edition of 1674, updated by Le Grand in 1682). Thus, the results of his effort were seen in 1697, when the new Latin translation was made available by the London publisher James Knapton. Clarke's edition is remarkable for the notes added to Rohault's text, which were altered during the early years of the eighteenth century, especially in the subsequent two editions (of 1702 and 1710, respectively).

The following two sections of this study will examine the context of Clarke's editions and the differences between the texts included in the current edition, the French original of the preface and the early modern translations, with a particular focus upon the Latin text. Our study will conclude with an editorial note, where we explain the choice of the editions – i.e., 1705 for the French, 1682 for Bonet/ Le Grand's translation into Latin, 1718 for Samuel Clarke's Latin, and 1735 for John Clarke's English translation of Samuel Clarke's Latin version of Rohault's text. This allows us to record not only variant readings, but to also illustrate a dynamic of the editorial practices undertaken by early modern translators and printers of this remarkable textbook.

Samuel Clarke's Latin Translation of the *Traité* and its historical significance

The question of Samuel Clarke's motivations in translating and annotating a Cartesian treatise on natural philosophy is important.⁴⁸ It concerns Rohault's Cartesian commitments as well as Clarke's evolution towards Newtonianism, thus being essential for assessing the reception of Rohault's treatise. This section will investigate the context of Clarke's translation and the evolution of his annotations.

What we know about Samuel Clarke as a student and how he came to translate anew Rohault's *Traité* is based on two sources, both published in the same year: Benjamin Hoadley's preface to John Clarke's 10-volume edition of his brother's Samuel, *Sermons*, and William Whiston's *Historical Memoirs*.⁴⁹ The two accounts are usually taken on word, as they portray the traditional narrative focused on the

Newtonian success and the demise of Cartesianism. However, they simplify the intricate story of the struggle between Newtonians and the Cartesians – including Clarke's own struggle between the two camps – and a more nuanced image emerges if we take a critical look at these two accounts.

We learn from Hoadley that in 1691 the sixteen-year-old Samuel Clarke entered Gonville and Caius College at Cambridge, under the tuition of John Ellis. Hoadley explains: “The Philosophy of *Des Cartes* was then the *Established Philosophy* of that *University*; and the System of Nature hardly allowed to be explained any otherwise than by *His Principles*.”⁵⁰ Writing some 40 years in retrospect, he can declare those principles to be “evidently no more than the Inventions of a very Ingenious and Luxuriant Fancy,” with “no Foundation in the Reality of Things.”⁵¹ The tutor Ellis is said to be no less than a “Zelot” of Cartesian Philosophy, imparting to his pupils “the most favourable Impressions of what He had so closely embraced Himself; and but little Encouragement to strike out Any Light in another way of thinking.”⁵² Thus, in Hoadley's account, the young Clarke had to overcome the respect he had for Ellis in order to set himself to the study of the “True Philosophy,” that is, the Newtonian. This can hardly be true. Here we have the “lad of Caius” who, dissatisfied with mere Cartesian “hypotheses” and guided only by his love for truth, ignores all prejudices around him and starts to read by himself the *Principia*. Everything speaks for a posthumous glorification by Hoadley.⁵³ And while it is true that Clarke was one of the first to defend, as an undergraduate, in the public schools a question from the “Newtonian philosophy,” it is probable that it was Ellis himself who introduced Clarke to Newton's work.⁵⁴ Ellis was a close friend of Newton, being one of the three regular visitors at his rooms at Trinity in the 1680s, according to a recollection by Humphrey Newton.⁵⁵ They also collaborated in observing the comet of November 1680.⁵⁶ In fact, Ellis' knowledge of Descartes and his proximity to Newton might be the key to that curious *mélange* of Cartesianism and Newtonianism that historians are trying to understand.⁵⁷

A similar independence of Clarke comes up in Hoadley's account of the Rohault project. Clarke is depicted as arriving by himself at the idea of a new translation of Rohault's treatise, which is described as “entirely founded on the *Cartesian Principles*; and very ill translated into *Latin*” (note that this characterization remained in place up to this day):

But His Aim was much higher than the making a Better Translation of it. He resolved to add to It such Notes, as might lead the Young Men insensibly, and by degrees, to Other and Truer Notions than what could be found there.⁵⁸

There are three points worth considering here: the person who initiated the project of a new translation, the bad Latin as the motivation for it, and the idea of appending critical notes.

The first one is straightforward from Whiston's *Memoirs*: Ellis, “that eminent and careful Tutor,” had put Clarke to do a new translation.⁵⁹ The rest of the story can be summarized as follows: in 1697, Whiston accidentally met Clarke at a coffee-house

in Norwich; the young student knew him from the University and started a conversation about Cartesian philosophy. Clarke asked his opinion about the suitability of a translation of Rohault. Whiston claims he remembers his answer well, and quotes himself as saying:

Since the youth of the University must have, at present, some System of Natural Philosophy for their Studies and Exercises; and since the true System of Sir *Isaac Newton* was not yet made easy enough for that Purpose; it was not improper, for their Sakes, yet to translate and use the System of *Robault*, [who was esteemed the best Expositor of *Des Cartes*,] but that as soon as Sir *Isaac Newton*'s Philosophy came to be better known, that only ought to be taught, and the other dropp'd.⁶⁰

What Whiston seems to remember less well is the year of their meeting. Bear in mind that the first edition of Clarke's translation appeared in the year mentioned by Whiston, 1697: could it be that by then Clarke was still thinking about the opportunity of such a translation? Also, the translation is dedicated to the Bishop of Norwich, John Moore, to whom Whiston was chaplain at that time. The latter only introduced Clarke to Bishop after their talk at the coffee-house. It is not impossible that all these happened during the same year, but somewhat improbable.⁶¹

The previous quote does not support Gascoigne's conclusion that "Whiston claimed that it was he who persuaded Clarke to include some reference to Newton in his translation of Rohault"; however, Gascoigne is right when he writes: "Ellis may [...] have played a part in encouraging Clarke to include some references to Newton."⁶² A stronger case might be made for this, by reconsidering the other two points made above.

First, let us focus on the "bad Latin" argument. Was the Latin of the previous translation that faulty? Most probably, the version used by Ellis and Clarke was the one revised by Antoine Le Grand, published in London in 1682 (see also below). Thus, a version in which Bonet's Latin was already emended. Could it be that Ellis's dissatisfaction actually concerned Le Grand? This is bound to remain a speculation. Yet, one could question whether the "bad Latin" was the true reason behind the project of a new translation. As we will see in the next section of the study, Clarke gives in his preface some examples of ill-translated sentences, but are they enough to justify a completely new translation of the two-volume treatise? The hypothesis put forward here is that the bad Latin was secondary, and that the main rationale for translating Rohault anew was in fact the addition of critical notes. Le Grand already appended *animadversiones* to Bonet's translation; consequently, reusing the old translation for this purpose was not an option. But it is important not to confuse this project initiated by Ellis with what the textbook later became in the hands of Clarke alone.⁶³ If one examines the first edition of Clarke's translation, one will discover that references to Newton are balanced with updates from the Cartesian camp, namely from authors like Nicolas Malebranche, Pierre-Silvain Régis, Claude Perrault, and Jean

Le Clerc.⁶⁴ The idea of having both Cartesian and Newtonian notes fits very well with what we know about Ellis. He could not have wanted the treatise to be supplemented only with Newtonian notes; Rohault could be seen as needing revisions from the Cartesians themselves. In the end, it meant to supplement the textbook with the latest discoveries and experiments, whereby Cartesianism and Newtonianism were obviously not seen as being mutually exclusive.⁶⁵ However, with each new edition, the notes became more and more Newtonian, while the Cartesian ones were dropped or rewritten. The balance was broken, resulting in the “monstrous” Cartesian–Newtonian textbook that keeps perplexing historians of science.⁶⁶

Rohault’s Preface(s): a comparative study

So far, we have examined the context in which the treatise and the preface were written, and the reception of Rohault’s text in the early modern period, highlighting historical and historiographical problems related to all these aspects. This section targets a comparative reading of the four versions of Rohault’s preface, paying close attention to where the texts differ from one another. As argued below, the translations do not exhibit significant differences in terms of meaning alteration by comparison with the original French edition, but slight variations in nuance due to (mis)translation are noticeable. While the texts rendered in the two modern languages do not reveal striking differences, it would be enticing to have a closer look at the Latin editions of the preface, which are considerably different.⁶⁷

Before proceeding further, one important clarification is required. As already explained, the first Latin translation of Rohault’s *Traité* was undertaken by Bonet in 1674 (Geneva: J.H. Widerhold). With the growing popularity of the treatise among the intellectual and academic circles in Europe, a few years later, Antoine Le Grand reviewed the text by adding his own commentary as annotations [*animadversiones*] and published it in 1682 under the title *Tractatus Physicus cum Animadversionibus Antonii Le Grand* (London: Wells and Swalle). The title page of the book makes it explicit that Le Grand grounds his examination on the existing Latin text of Bonet (the full title reads: “published in French, and recently translated in Latin by Th. Bonet”). However, the 1682 edition does not seem to be identical with the one from 1674 and it appears that, besides his annotations, Le Grand made several changes with respect to the Latin translation, as it can be observed from the footnotes of the current edition.⁶⁸ A new Latin translation was made by Samuel Clarke in 1697 (London, J. Knapton). The transcript of the 1718 text which we chose to include in this study is based on the 1697 translation and represents the fourth edition of Clarke’s text, where minor corrections were made (most of them at the orthographic level) in order to make the text easier to read.

In light of the above, a pressing question must be clarified: why did Samuel Clarke consider that a completely new Latin translation is necessary, since Bonet’s translation, reviewed by Le Grand, was already available? In the translator’s foreword, the reader finds a justification for the “bad Latin” argument.⁶⁹ From the very first lines, Clarke states that two reasons underlie his decision to provide a new Latin translation: the value of Rohault’s treatise [*Tractatus ipsius utilitas*] – reaffirming the (surprising) prestige of the *Traité* even in a growing Newtonian setting – and the

inadequacy/deficiency of the previous translation [*prioris*⁷⁰ *Versionis ineptia*]. He further criticises the prior translator who did a disservice to Rohault because of his ignorance [*Interpretis haud satis felicis inscitia*], providing a few examples by opposing the original in French and the translation in Latin. But here lies another question: which Latin edition of the text does Clarke have in mind when he makes these claims? If we check the given quotations within the already existing Latin versions (1674 Bonet vs. 1682 Le Grand), only one minor difference can be identified: when referring to PII.21.8., that is to say chapter 21, article 8 (part II) of the *Traité*.⁷¹ Clarke quotes a paragraph which includes the following wording “*maius* esse debere augmento apparente Iovis.” In Bonet’s version the structure is rendered as “*maiozem* esse debere augmento apparente Iovis,” while in Le Grand’s version we read “*maius* esse debere augmento apparente Iovis.” Could this be a clue that Clarke uses Le Grand’s reviewed translation of the text? Be that as it may, what it is essential to bear in mind is the need of a new translation argued for by Clarke, regardless of which Latin text is taken as the benchmark.

Hence, Clarke’s declared aim is to accomplish a new and better translation of Rohault’s French treatise. In achieving this goal, the notorious Newtonian claims that he has been “faithfully and scrupulously [*fideliter & dilucide*] rendered the meaning intended by the author,” trying to offer a much clearer version of the text, “accommodated to the reason of the more recent philosophers.”⁷² However, what is the extent in which the translator succeeded to surpass in quality and adequacy the previous Latin translation? We focus on the particularities in language and meaning of Le Grand’s [Bonet] and Clarke’s Latin, offering interlinear references to the French and English editions as well, if necessary. First, the syntactic layer is analysed, followed by an investigation of the differences in the terminology used to express the same philosophical concepts.

Even though the content of the two texts is loosely the same in terms of meaning, one should note that Clarke’s translation is not a mere revision of the previous Latin edition – as it is the case with the 1682 annotated Latin edition of Le Grand, where only minor textual changes can be identified, with respect to Bonet’s edition of 1674 – but the ideas are expressed in different words and in a different word-structure. With respect to the format of the text, it is worth mentioning that Clarke does not always respect the paragraph structure as it appears in the original French text, and sometimes he combines two paragraphs into one.⁷³ The reason why this happens is difficult to determine. However, it accounts for the sporadically lack of symmetry in the interlinear distribution of the text, easily noticeable on a first glance at the edition below.

Syntax

The analysis of the 1682 and 1718 Latin translations reveals three main differences on the syntactic level. One of the most obvious is the frequent use of *ad* + gerund/ gerundive structures to express purpose, necessity, or obligation in Le Grand’s [Bonet] edition. It is replaced by *ut*-clauses in Clarke’s translation. Such an example can be found in the discussion about the experiments of the third type, as

featured in the preface, and discussed above. The following sentence appears in the French original:

1671: Enfin, les experiences de la troisième sorte sont celles que le raisonnement prévient, & qui servent à justifier ensuite s'il est faux, ou s'il est juste [...]. (Fr. 183–185)

The phrase was rendered in Latin in two different ways:

1682: Tandem Experimenta⁷⁴ tertiæ speciei eæ sunt, quæ antecedit ratiocinatio, quæque deinceps in usum ducuntur *ad iudicium ferendum verane* sit ea necne (Lat. B 165–166)

vs.

1718: Postremo, Tertium genus est eorum, quæ præcedente ratiocinatione capiuntur, *ut eam vel falsam vel aptam esse ostendant* (Lat. C 156R–157R).

Moreover, showing the enormous contribution brought by mathematics to natural philosophy, Rohault claims that “Enfin, que les Mathematiques soient d’une très grande utilité pour les autres parties de la Philosophie [...]” (Fr. 282–283; see below). As indicated earlier, Le Grand [Bonet] renders this sentence by using an *ad*-structure (“Tandem, quo pateat Mathematicas scientias maximi esse usus ad cæteras Philosophiæ partes assequendas”; Lat. B 253–254), while in Clarke’s version we observe an abandonment of these types of structures (“Postremo, quàm utilis in reliquâ Philosophiâ sit Mathematica”; Lat. C 240R). Instances of this kind are numerous throughout the two Latin prefaces and can be easily spotted even on a hasty reading of the text.

In Neo-Latin (or, more precisely, in the Latin of the early modern period), these constructions with gerund and gerundive are expected to be less common, since they are very specific and hardly correspond to the patterns of vernacular languages.⁷⁵ This way, Clarke’s translation appears to be more straightforward in style and bears resemblance to vernacular languages; the lack of these type of structures could stand as a proof of his intention to update the old Latin version of the text, making it more modern.

At the same time, regarding Clarke’s Latin as being more direct and clearer, it is noteworthy that in the sentence topic he does not always follow the order of the words of the original French (as Le Grand [Bonet] usually does). Instead, he changes the word ordering, on the one hand, in favour of the clarity of the ideas raised across the treatise and, on the other hand, in order to be more faithful to how ideas are naturally expressed in Latin. For example, compare the following sentences and pay attention to the sentence topic:

1705 [1671]: J'ay pris d'Aristote toutes les notions generales, soit pour l'établissement des principes des choses naturelles, soit aussi pour ce qui regarde leurs principales propriétés. (Fr. 384–386)

1682 [1674]: Ab Aristotele notiones omnes generales desumpsi, sive ad constitutionem principiorum rerum naturalium, sive quoad ea quæ earum proprietates naturales spectant. (Lat. B 347–348)

1718 [1697]: Generales omnes Notiones, tum quæ ad principia rerum naturalium definienda, tum quæ ad præcipuas earum proprietates pertinerent, ex Aristotele desumpsi. (Lat. C 327R–328R)

Lastly, we observe a more prevalent use of verbal and pronominal forms in the first-person singular peculiar to Le Grand's [Bonet's] translation. Clarke almost entirely replaces forms as such by using either the passive forms of the verb, or first-person plural. By doing this, the tone of the discourse becomes more detached and rigorous. Examples include:

notandum Experimentorum⁷⁶ tres esse species; Primum, *ut sic dicam* nihil aliud est quàm simplex Sensuum usus (1682)

vs.

observandum est tria esse experimentorum genera. Primum genus, *si propriè loquemur*, nihil aliud est nisi simplex sensuum usus (1718)

Ad qui, *rogo*, exempli gratia longæ illæ & argutæ de divisibilitate materiæ disputationes? (1674)

vs.

Quorsum, exempli gratiâ, longæ & subtiles illæ de aptâ ad dividendum materiæ naturâ disputationes? (1718)

Terminology

One general remark that could already be made here is that, in terms of the concepts and terminology used, Clarke proves to be more consistent and accurate, which might be due to an increased familiarity with the philosophical language of the period, as opposed to Le Grand [Bonet]. A sample of the vocabulary frequently employed by the translators is offered in the table below (see Table 1), with an emphasis on the variations traced in the use of philosophical terms. However, greater attention should be paid to Latin inconsistency; note that the words are recorded in their basic form.

Table 1. Terminological differences between the four editions

1705 [1671] French	1735 [1723] English	1682 [1674] Latin	1718 [1697] Latin
les mathematiques	mathematicks	artes/disciplinæ/scientiæ mathematices	mathematica
la connoissance	knowledge	notio/scientia/cognitio	cognitio
les experiences	experiments	experimentum ⁷⁷	experimentum
la divisibilité de la matiere	the divisibility of the matter	divisibilitas materiæ	[ad] dividendum materiæ
le vuide	vacuum	vacuus	inanis
les anciens	the ancients	antiqui	antiqui/veteri
les modernes	the moderns	neoterici	recentiores

Therefore, let us investigate the semantics of some key terms included in this table. Overall, in terms of accuracy, Clarke’s Latin seems to be more faithful both to the French text and to the philosophical terminology of the time. For instance, in translating the word “*les mathematiques*,” Le Grand [Bonet] lacks consistency and precision. Even though the French original reveals no alterations in the use of this term, throughout the 1674 and the 1682 Latin translation the correspondent is given in alternative renderings, formed by putting together a noun (e.g., “*artes*,” “*disciplinæ*,” or “*scientiæ*”) and the adjective “*mathematicus*.” In contrast, Clarke always uses a more direct translation: “*mathematica*.” This divergence between the two translators might show the evolution and stabilization of the term “*mathematicks*” in literature.⁷⁸ Contrary to the imprecision revealed in the first case, at the time when Clarke translated the text, and through the lens of his intended audience, it was no longer needed to use the distinctions implied by “*artes*,” “*disciplinæ*,” or “*scientiæ*.”⁷⁹

A similar trouble related to the consistency of using certain words is visible when tracking the translation of the word “*la connoissance*” (usually in structures referring to the “*knowledge of natural things*”). While Clarke regularly uses the standard Latin word *cognitio* (e.g., “*rerum naturæ cognitione*,” “*rerum naturalium cognitionem*”), we noticed a greater variation in Bonet and Le Grand’s translations, both lacking uniformity, bearing evidence of an instability regarding the meaning of the term. For example, compare: “*rerum naturalium scientiæ*” (Le Grand [Bonet]; Lat. B 321–322) and “*rerum naturæ cognitione*” (Clarke; Lat. C 303R); furthermore, “*notionesque nostras angustissimis limitibus concludentes*” (Bonet) is amended by Le Grand as “*nostramque cognitionem angustis limitibus coarctare*” (Lat. B 146–147), while Clarke translates “*cognitio nostra satis angustis finibus continebitur*” (Lat. C 139R–140R).

Moreover, the Latin rendering as “*experimenta*” (preferred by both Le Grand and Clarke) for the French “*les experiences*” is much more suitable with respect to the scientific terminology of the time, compared to Bonet’s former translation as

“*experientia*.” Despite both words having the same root [*experiri*] and their meaning in Classical Latin being roughly synonymous,⁸⁰ in the seventeenth century a clear distinction between them was made by Francis Bacon: “*Restat experientia mera, quæ, si occurrat, Casus; si quasita sit, Experimentum nominator.*”⁸¹ From this perspective, the reviewed translations demonstrate greater awareness to the philosophical and scientific context of its time.

Equally interesting is the choice of Le Grand [Bonet] to translate the noun “*les modernes*” using a Greek borrowing, “*neotericus*” [νεωτερικός]. Although not restricted to it, the term is usually employed in a different context, connected to the Latin poetry, referring to a group of new poets of the first century BC⁸² By means of generalization, it became a “modern person.” It is possible that Clarke did not consider the word accurate enough due to its association to the poetic sphere, therefore he replaced it with “*recentiores (Philosophi)*.”⁸³

Note on the texts

Our edition is structured as follows: in the first part, the French text of the preface runs parallel with the English translation; in the second, the two Latin translations are reproduced on facing pages. The principle behind this arrangement was not chronological; our aim was to provide: (1) convenience for the modern reader, by having the preface first in two modern languages (French and English); (2) the means for a comparative reading of the two Latin translations.

The French Text

We have chosen the 1705 edition, with variant readings from the first edition (1671). The 1705 edition is more polished in terms of orthography and punctuation, making the text more accessible to the modern reader. The differences of the 1705 edition (recorded in the critical apparatus) must stem from its editor, since Rohault died in 1672. The “&” has been preserved.

Source: Rohault, Jacques. *Traité de Physique*. 2 vols. Paris: Chez Guillaume Desprez, 1705.⁸⁴

The English Translation

We have chosen the third edition of the English translation (1735), as being John Clarke’s (1682–1757) final word. The text is indeed the most polished version; however, it introduces two mistakes that were not present in the previous edition (Eng. 59R, 202R). Variations like “Ancients” / “Antients” have been preserved.

Source: *Rohault’s System of Natural Philosophy, Illustrated with Dr Samuel Clarke’s Notes Taken mostly out of Sir Isaac Newton’s Philosophy*. Done into English by John Clarke, D.D. Dean of Sarum. The Third Edition. London: Printed for James Knapton, 1735.⁸⁵

Bonet’s Translation (1674) with Le Grand’s Interventions (1682)

We have chosen the first edition of Bonet’s translation (1674), as well as the first edition that contained Le Grand’s emendations (1682), since later editions did not contain relevant changes.

Sources: *Jacobi Robaulti Tractatus physicus Gallice emissus et recens Latinitate donatus per Th. Bonetum D.M.* Genevæ: Sumptibus Ioannis Hermanni Widerhold, 1674.

Jacobi Robaulti Tractatus physicus Gallice emissus et recens Latinitate donatus, per Th. Bonetum D.M. Cum Animadversionibus Antonii Le Grand. Londini: Impensis G. Wells & A. Swalle, 1682.⁸⁶

Samuel Clarke’s Translation

We have chosen the fourth edition of Clarke’s Latin translation (1718), with variant readings from the other, earlier editions. A note is in place about Clarke’s changes in the translation: once a word or phrase was modified, it was retained in all subsequent editions (hence, in the text below, it is indicated with “added since”).

Source: *Jacobi Robaulti Physica. Latinè vertit, recensuit, & adnotationibus ex illustrissimi Isaaci Newtoni Philosophia maximam partem haustis, amplificavit & ornavit Samuel Clarke, S.T.P.* Editio Quarta, in quâ Annotationes sunt dimidia parte auctiores, additæque octo Tabulæ æri incisæ. Londini: Impensis Jacobi Knapton, 1718.⁸⁷

The Latin Translations

We have standardised the following cases:

- “I” and “i” for “J” and “j”
- “V” and “v” for “U” and “u”, and vice versa, when needed
- the ligatures “æ”, “œ” have been preserved, as well the “&”
- accents have been preserved

All versions of the preface are unpaginated; however, we have indicated where each page ends (“ | ”), in each of the early modern sources we have included in the current edition.

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- ² On Clarke's annotations, see George Sarton, "Second Preface to Volume 38: The Study of Early Scientific Textbooks," *Isis* 38, no. 3–4 (1948): 137–48; Michael Hoskin, "'Mining All Within': Clarke's Notes to Rohault's *Traité de Physique*," *The Thomist* 24, no. 2 (1961): 353–63; Volkmar Schüller, "Samuel Clarke's Annotations in Jacques Rohault's *Traité de Physique*, and How They Contributed to Popularising Newton's Physics," in *Between Leibniz, Newton, and Kant: Philosophy and Science in the Eighteenth Century*, ed. Wolfgang Lefèvre (Dordrecht: Springer, 2001), 95–110; Mihnea Dobre, "Mixing Cartesianism and Newtonianism: The Reception of Cartesian Physics in England," in *Scientific Cosmopolitanism and Local Cultures: Religions, Ideologies, Societies, Proceedings of 5th International Conference of the European Society for the History of Science*, ed. Gianna Katsiampoura (Athens: National Hellenic Research Foundation/Institute of Historical Research, 2014), 126–31; Dmitri Levitin, *The Kingdom of Darkness: Bayle, Newton, and the Emancipation of the European Mind from Philosophy* (Cambridge: Cambridge University Press, 2022), 664–67; Grigore Vida, "Samuel Clarke: From Cartesianism to Newtonianism," in *Cartesian Physics and Their Receptions: Intellectual and Institutional Contexts*, ed. Mihnea Dobre, Rodolfo Garau, and Pietro Daniel Omodeo (Leiden: Brill, forthcoming).
- ³ See the arguments in Mihnea Dobre, "Jacques Rohault and Cartesian Experimentalism," in *Oxford Handbook of Descartes and Cartesianism*, ed. Steven Nadler, Delphine Antoine-Mahut, and Tad Schmaltz (Oxford: Oxford University Press, 2019), 388–401.
- ⁴ On Rohault's conferences, see Trevor McClaughlin, *Jacques Robault and the Natural Sciences* (PhD dissertation, University of Cambridge, 1972); Pierre Clair, *Jacques Robault (1618–1672). Bio-Bibliographie* (Paris: Centre National de la Recherche Scientifique, 1978). For the relation between Rohault's lectures and the emerging experimentalism in early modern France, see Trevor McClaughlin, "Was There an Empirical Movement in Mid-Seventeenth Century France? Experiments in Jacques Rohault's *Traité de Physique*," *Revue d'histoire des Sciences* 49, no. 4 (1996): 459–81; Trevor McClaughlin, "Descartes, Experiments, and a First Generation Cartesian, Jacques Rohault," in *Descartes' Natural Philosophy*, ed. Stephen Gaukroger, John Schuster, and John Sutton (London: Routledge, 2000), 330–46; Mihnea Dobre, "Rohault's Cartesian Physics," in *Cartesian Empiricisms*, ed. Mihnea Dobre and Tammy Nyden (Dordrecht: Springer, 2013), 203–26; Sophie Roux, "Was There a Cartesian Experimentalism in 1660s France?," in *Cartesian Empiricisms*, ed. Mihnea Dobre and Tammy Nyden (Dordrecht: Springer, 2013), 47–88; Tad Schmaltz, *Early Modern Cartesianisms: Dutch and French Constructions* (Oxford: Oxford University Press, 2017); Mihnea Dobre, *Descartes and Early French Cartesianism: Between Metaphysics and Physics* (Bucharest: Zeta Books, 2017); Aaron Spink, "The Experimental Physics of Jacques Rohault," *British Journal for the History of Philosophy* 26, no. 5 (2018): 850–70. Rohault's manuscripts referred here are Jacques Rohault, "Conférences sur la physique, faites en 1660–1661, par Jacques Rohault, et recueillies par un de ses auditeurs qui, dit-il, y a ajouté du sien" (Manuscript in the archives of the Bibliothèque Sainte-Geneviève, Paris); Jacques Rohault, *Physique nouvelle (1667)* (Paris and Milan: Séha and Archè, 2009).
- ⁵ References to Rohault's text will be given to the early modern English translation, *Robault's System of Natural Philosophy: Illustrated with Dr. Samuel Clarke's Notes Taken Mostly out of Sir Isaac Newton's Philosophy*. 2 vols. (London: James Knapton, 1735). When needed, other early modern editions will be mentioned. For modern reprints of Rohault's treatise, see Jacques Rohault, *A System of Natural Philosophy*. With a New Introduction by L. L. Laudan (New York: Johnson Reprint, 1969); Jacques Rohault, *System of Natural Philosophy, Illustrated with Dr. Samuel Clarke's*

Notes, Taken Mostly Out of Sir Isaac Newton's Philosophy, 2 vols. (New York: Garland Publishing, 1987); Jacques Rohault, *Traité de physique* (Paris: Comité des Travaux Historiques et Scientifiques, 2014). From now on, references to Rohault's treatise will include: the part of the treatise in Roman numerals (I to IV), the chapter number, and the number of the article. In the case referred here, there is no article number to include, hence, it refers to PI.12.

⁶ Unlike other experiments, which are seldom discussed in the literature, the experiments included in PI.12. are more prominent in scholarly studies. See for example, Paul Mouy, *Le développement de la physique cartésienne: 1646–1712* (Paris: J. Vrin, 1934); McClaughlin, “Was There an Empirical Movement?”; McClaughlin, “Descartes, Experiments”; Roux, “Was There a Cartesian Experimentalism?”; Dobre, “Rohault's Cartesian Physics”; Schmaltz, *Early Modern Cartesianism*; Spink, “The Experimental Physics”; Ovidiu Babeş, “‘Whether the World Be Full or Not, It Is the Same Thing’: The Experimentalism of Jacques Rohault,” in *Cartesian Physics and Their Receptions: Intellectual and Institutional Contexts*, ed. Mihnea Dobre, Rodolfo Garau, and Pietro Daniel Omodeo (Leiden: Brill, forthcoming).

⁷ See especially Blaise Pascal, *Expériences nouvelles touchant le vuide* (Paris: P. Margat, 1647); *Traitez de l'équilibre des liqueurs, et de la pesanteur de la masse de l'air* (Paris: Guillaume Desprez, 1663).

⁸ For example, Milani claims that Le Grand's edition is a new translation and counts not two, but three early modern Latin translations; see Nausicaa Elena Milani, “Motion and God in XVIIIth Century Cartesian Manuals: Rohault, Régis, and Gadrois,” *Noctua* 2, no. 1–2 (2015): 481–516. For Le Grand's annotations, see Mihnea Dobre and Ioana Bujor, eds., *Antoine Le Grand and Jacques Rohault. A scholarly edition of Le Grand's annotations to Rohault's treatise on natural philosophy, Society and Politics* 16, no. 1 (31) (forthcoming 2022); Ioana Bujor, “Antoine Le Grand's Annotations in the Second Part of Rohault's *Traité de Physique*,” in *Cartesian Physics and Their Receptions: Intellectual and Institutional Contexts*, ed. Mihnea Dobre, Rodolfo Garau, and Pietro Daniel Omodeo (Leiden: Brill, forthcoming). See also the section “Translations and editions,” below.

⁹ On the Leibniz–Clarke correspondence, see *A Collection of Papers, Which Passed between the Late Learned Mr. Leibniz, and Dr. Clarke, in the Years 1715 and 1716. Relating to the Principles of Natural Philosophy and Religion* (London: James Knapton, 1717); *The Leibniz–Clarke Correspondence: Together with Extracts from Newton's Principia and Opticks*, ed. H. G. Alexander, (Manchester: Manchester University Press, 1956). The best study of the correspondence remains Ezio Vailati, *Leibniz & Clarke: A Study of Their Correspondence* (New York: Oxford University Press, 1997). See also Grigore Vida, ed., *The Correspondence between Leibniz and Clarke. A Critical Edition, Together with 18th-Century Translations, and Letters and Manuscripts Related to the Controversy*,” *Society and Politics*, (forthcoming 2023).

¹⁰ See Sarton, “Early Scientific Textbooks”; Hoskin, “Mining All Within”; Schüller, “Clarke's Annotations.”

¹¹ See for example Daniel Waterland, *Advice to a Young Student, with a Method of Study for the Four First Years* (London: John Crownfield, 1730), 22–24. For more details about the teaching of natural philosophy in Oxford and Cambridge, see John Gascoigne, *Cambridge in the Age of the Enlightenment. Science, Religion and Politics from the Restoration to the French Revolution* (Cambridge: Cambridge University Press, 1988); Nicholas Tyacke, ed., *The History of the University of Oxford. Volume IV: Seventeenth-Century Oxford* (Oxford: Oxford University Press, 1997).

¹² A database with library holdings at Cambridge and Oxford, which includes Cartesian and Newtonian authors is available: Mihnea Dobre et al., “Cartesian and Newtonian Authors: A Database [Data Set]” (Zenodo, 2022), <https://doi.org/10.5281/zenodo.6923317>. The collection is limited to a selected list of Cartesian and Newtonian authors, yet it is indicative for the availability of Cartesian resources for early modern readers.

¹³ Rohault describes the content of his book in the preface: “The first treats of natural Bodies in general, and their principal Properties [...]. The second treats of the *System of the World, or of Cosmography* [...]. The third Part is taken up in explaining the Nature of the *Earth* and of *terrestrial Bodies* [...]. Lastly, I have endeavoured in the fourth Part to comprise all that is hitherto, with any Certainty, known of the *Animal Body*.” See the text of the preface below; Eng. 406R–424R. The text will be referred to by indicating the line number of the respective edition (Fr., for the French; Eng., for the English; Lat. B for the first Latin translation; and Lat. C, for Clarke’s Latin text); see the section Note on the text, below.

¹⁴ See René Descartes, *Œuvres de Descartes*, ed. Charles Adam and Paul Tannery, second edition, 11 vols. (Paris: Vrin, 1964–74), vol. VIII-1 / IX-2; René Descartes, *The Philosophical Writings*, trans. John Cottingham et al., 3 vols. (Cambridge: Cambridge University Press, 1984–1991), vol. I.

¹⁵ On Rohault’s public conferences and the use of experiment as a pedagogical tool, see some of the references presented above: McClaughlin, “Was There an Empirical Movement?”; McClaughlin, “Descartes, Experiments?”; Roux, “Was There a Cartesian Experimentalism?”; Dobre, “Rohault’s Cartesian Physics?”; Spink, “The Experimental Physics.” In the preface to the *Œuvres posthumes de M. Robault*, Claude Clerseilier explains the format of Rohault’s conferences, which consisted in the empirical illustration of a phenomenon, followed by the discussion of the possible causal explanation; see Jacques Rohault, *Œuvres posthumes de M. Robault*, ed. Claude Clerseilier (Paris: Guillaume Desprez, 1682).

¹⁶ See Jacques Rohault, “Entretiens sur la philosophie,” in *Jacques Robault (1618–1672). Bio-Bibliographie*, ed. Pierre Clair (Paris: Centre National de la Recherche Scientifique, 1978). “M.N.” probably stand for “Monsieur N.,” while “N” is what we would designate today by “X”.

¹⁷ See the discussion of this episode in Clerseilier’s unpaginated preface in Jacques Rohault, *Œuvres posthumes*; Clair, *Bio-Bibliographie*; Trevor McClaughlin, “Censorship and Defenders of the Cartesian Faith in Mid-Seventeenth Century France,” *Journal of the History of Ideas* 40, no. 4 (1979): 563–81; Tad Schmaltz, *Radical Cartesianism: The French Reception of Descartes* (Cambridge: Cambridge University Press, 2002); Sophie Roux, “The Condemnations of Cartesian Natural Philosophy Under Louis XIV (1661–91),” in *The Oxford Handbook of Descartes and Cartesianism*, ed. Steven Nadler, Tad Schmaltz, and Delphine Antoine-Mahut (Oxford: Oxford University Press, 2019), 755–79.

¹⁸ For an overview of the events and debates around 1671, see especially Trevor McClaughlin, “Claude Clerseilier’s Attestation of Descartes’s Religious Orthodoxy,” *Journal of Religious Studies* 20 (1980): 136–46; Roger Ariew, “Censorship, Condemnations, and the Spread of Cartesianism,” in *Cartesian Empiricisms*, ed. Mihnea Dobre and Tammy Nyden (Dordrecht: Springer, 2013), 25–46; Schmaltz, *Radical Cartesianism*; Tad Schmaltz, “Claude Clerseilier and the Development of Cartesianism,” in *The Oxford Handbook of Descartes and Cartesianism*, ed. Steven Nadler, Tad Schmaltz, and Delphine Antoine-Mahut (Oxford: Oxford University Press, 2019), 303–18; Tad Schmaltz, “Robert Desgabets and the Supplement to Descartes’s Philosophy,” in *The Oxford Handbook of Descartes and Cartesianism*, ed. Steven Nadler, Tad Schmaltz, and Delphine Antoine-Mahut (Oxford: Oxford University Press, 2019), 402–16.

¹⁹ See Clerseilier in the preface to Rohault, *Œuvres posthumes*.

²⁰ See Jacques Rohault, *Jacobi Robaulti ... De arte mechanica; tractatus mathematicus. E Gallico sermone Latine factus* (London: Abelis Swalle; Timothei Child, 1692); Jacques Rohault, *A Treatise of Mechanicks: Or, the Science of the Effects of Powers or Moving Forces, as Apply’d to Machines, Demonstrated from Its First Principles*, trans. Thomas Watts (London: Edward Symon, 1716). Rohault’s mechanics is discussed in Mihnea Dobre, “Rohault, Jacques,” in *Encyclopedia of Early Modern*

Philosophy and the Sciences, ed. Dana Jalobeanu and Charles T. Wolfe (Cham: Springer International Publishing, 2019), 1–6.

²¹ For Rohault's life, see McClaughlin, *Robault and the Natural Sciences*; Clair, *Bio-Bibliographie*; Dobre, *Descartes and Early French Cartesianism*.

²² An account of Rohault's public lectures is provided by Clair, *Bio-Bibliographie*; Dobre, "Rohault's Cartesian Physics"; Roux, "Was There a Cartesian Experimentalism."

²³ The episode is discussed in Adrien Baillet, *La Vie de Monsieur Des-Cartes* (Paris: Daniel Horthemels, 1691), vol. II, 241–42; McClaughlin, *Robault and the Natural Sciences*; Clair, *Bio-Bibliographie*.

²⁴ The letter is an important document about Rohault's early life. It was written in 1658 but published only in 1667 as part of Clerselier's edition of Descartes's correspondence; see *Lettres de M. Descartes* (Paris: Charles Angot, 1667), vol. III, 215–21, letter 46. What is particularly striking for this example is that Clerselier acknowledges to Fermat that he kept some of Descartes's letters hidden from Rohault. So, the defender of Descartes's explanation was impeded to access all the relevant sources of that dispute. This raises questions about Rohault's Cartesian commitments at that date. The episode is discussed in Mihnea Dobre, "Jacques Rohault's Mathematical Physics," *HOPOS: The Journal of the International Society for the History of Philosophy of Science* 10, no. 2 (2020): 414–39. For Clerselier's strategy to support Cartesianism by using Descartes's unpublished letters, see Roger Ariew, "Descartes' Correspondence before Clerselier: Du Roure's *La Philosophie*," *Journal of Early Modern Studies* 1, no. 1 (2012): 43–63.

²⁵ See Rohault, "MS 2225." The notes might very well reflect the philosophical interests of lawyer F., but they are still useful in grasping the topics and the typical examples discussed by Rohault at that time. In addition, the notes are crucial for setting up a more accurate chronology of Rohault's experimental practice in the 1660s Paris.

²⁶ See Rohault, *Physique nouvelle*.

²⁷ See the comments included in the modern edition, Michel Blay, "Introduction," in *Physique nouvelle (1667)* (Paris and Milan: Séha and Archè, 2009), V–XIX; Sylvain Matton, "Remarques sur le manuscrit de la *Physique nouvelle*," in *Physique nouvelle (1667)* (Paris and Milan: Séha and Archè, 2009), LXXIII–XC; Simone Mazauric, "Préface," in *Traité de physique*, by Jacques Rohault (Paris: Comité des Travaux Historiques et Scientifiques, 2014), vii–xxxvi.

²⁸ For the latter see Mihnea Dobre, "Rohault's Private Lessons on Cosmology," in *Descartes in the Classroom*, ed. Davide Cellamare and Mattia Mantovani (Leiden: Brill, 2022), 456–76; Mihnea Dobre, "Jacques Rohault on Medicine," in *Descartes and Medicine: A System with Obscurities and Lights, and Its Reception*, ed. Fabrizio Baldassarri (Turnhout: Brepols, forthcoming). For the former, see Roux, "Was There a Cartesian Experimentalism."

²⁹ Clair coined the phrase "champion du cartésianisme"; see chapter 9 in Clair, *Bio-Bibliographie*.

³⁰ This is suggested, for example in Dobre, "Rohault and Cartesian Experimentalism."

³¹ The case of the English reception is more prominent, due to Samuel Clarke's editions of the treatise. However, a similar case for Rohault's success might be made for other geographical contexts, too. See for example Geert Vanpaemel, "Rohault's *Traité de Physique* and the Teaching of the Cartesian Physics," *Janus: Revue Internationale de l'Histoire des Sciences, de la Médecine et de la Technique* 71 (1984): 31–40.

³² For the scientific institutions of the early modern period, see Harcourt Brown, *Scientific Organizations in Seventeenth Century France (1620–1680)* (Baltimore: The Williams and Wilkins Company, 1934); Roger Hahn, *The Anatomy of a Scientific Institution: The Paris Academy of Sciences, 1666–1803* (Berkeley: University of California Press, 1971); Michael Hunter, *The Royal Society and Its Fellows, 1660–1700: The Morphology of an Early Scientific Institution* (Chalfont St. Giles: British Society for the History of Science, 1982); Mary Boas Hall, *Promoting Experimental Learning: Experiment and the Royal Society 1660–1727* (Cambridge: Cambridge University Press,

1991); Luciano Boschiero, *Experiment and Natural Philosophy in Seventeenth-Century Tuscany: The History of the Accademia del Cimento* (Dordrecht: Springer, 2007).

³³ See Tammy Nyden, “De Volder’s Cartesian Physics and Experimental Pedagogy,” in *Cartesian Empiricisms*, ed. Mihnea Dobre and Tammy Nyden (Dordrecht: Springer, 2013), 227–49; Andrea Strazzoni, *Burchard de Volder and the Age of the Scientific Revolution* (Cham: Springer, 2019).

³⁴ The claim is based on one of Whiston’s remarks in his account of Samuel Clarke’s life; see William Whiston, *Historical Memoirs of the Life of Samuel Clarke. Being a Supplement to Dr. Syke’s and Bishop Hoadley’s Accounts* (London: Fletcher Gyles and J. Roberts, 1730). It has often been repeated in modern studies, especially in connection to Clarke’s annotations; see Hoskin, “Mining All Within”; Schüller, “Clarke’s Annotations.”

³⁵ Hoskin, “Mining All Within.”

³⁶ See Dennis Des Chene, “Cartesian Science: Régis and Rohault,” in *Blackwell Companion to Early Modern Philosophy*, ed. Steven Nadler (Oxford: Blackwell, 2002), 185.

³⁷ For convenience, the preface will be quoted from the English edition, transcribed below; see Eng. 365R.

³⁸ See Rohault, *A System of Natural Philosophy*, xv.

³⁹ The literature on Bacon’s theory of the idols is vast. See, for example, Stephen Gaukroger, *Francis Bacon and the Transformation of Early-Modern Philosophy* (Cambridge: Cambridge University Press, 2001), 118–27; Perez Zagorin, “Francis Bacon’s Concept of Objectivity and the Idols of the Mind,” *British Journal for the History of Science* 34, no. 4 (2001): 379–93; Sorana Corneanu and Koen Vermeir, “Idols of the Imagination: Francis Bacon on the Imagination and the Medicine of the Mind,” *Perspectives on Science* 20, no. 2 (2012): 183–206.

⁴⁰ For Descartes’s natural philosophy and the evolution of his project from the *Discourse* to the *Principles*, see William Shea, *The Magic of Numbers and Motion: The Scientific Career of René Descartes* (Canton: Science History Publications, 1991); Daniel Garber, *Descartes’ Metaphysical Physics* (Chicago: University of Chicago Press, 1992); Stephen Gaukroger, *Descartes: An Intellectual Biography* (Oxford: Clarendon Press, 1995); Jean-Robert Armogathe and Giulia Belgioioso, eds., *Descartes: Principia Philosophiae (1644–1994)* (Napoli: Vivarium, 1996); Stephen Gaukroger, *Descartes’ System of Natural Philosophy* (Cambridge: Cambridge University Press, 2002); Peter K. Machamer and J. E. McGuire, *Descartes’s Changing Mind* (Princeton: Princeton University Press, 2009); John Schuster, *Descartes–Agonistes: Physico-Mathematics, Method & Corpuscular-Mechanism 1618–33* (Dordrecht: Springer, 2012).

⁴¹ See for example McLaughlin, “Descartes, Experiments”; Dobre, “Rohault’s Cartesian Physics”; Schmaltz, *Early Modern Cartesianisms*; Dobre, “Rohault and Cartesian Experimentalism.”

⁴² The first edition of the *Lexicon* is not paginated: Étienne Chauvin, *Lexicon rationale; sive Thesaurus philosophicus: ordine alphabetico digestus, in quo vocabula omnia philosophica explicare, et univèrse quae lumine naturali sciri possunt, non tam concludere* (Rotterdam: Van der Slaart, 1692). For the second edition, see Étienne Chauvin, *Lexicon philosophicum* (Leeuwarden: Franciscus Halma, 1713), 229–30. For Chauvin and his *Lexicon*, see Giuliano Gasparri, *Étienne Chauvin (1640–1725) and His Lexicon Philosophicum* (Hildesheim: Georg Olms, 2016).

⁴³ On Francis Bacon’s theory of experiment, see, among others, Lisa Jardine, “*Experientia Literata* or *Novum Organum*? The Dilemma of Bacon’s Scientific Method,” in *Francis Bacon’s Legacy of Texts: “The Art of Discovery Grows with Discovery,”* ed. William A. Sessions (New York: AMS Press, 1990), 47–67; Laura Georgescu and Mădălina Giurgea, “Redefining the Role of Experiment in Bacon’s Natural History: How Baconian Was Descartes before Emerging from His Cocoon?,” *Early Science and Medicine* 17, no. 1–2 (2012): 158–80; Peter Anstey, “Philosophy of Experiment in Early Modern England: The Case of Bacon, Boyle and Hooke,” *Early Science*

and *Medicine* 19, no. 2 (2014): 103–32; Dana Jalobeanu, *The Art of Experimental Natural History: Francis Bacon in Context* (Bucharest: Zeta Books, 2015).

⁴⁴ For the scholastic teaching, and how the Cartesian philosophy differs from it, see for example Dennis Des Chene, *Physiologia: Natural Philosophy in Late Aristotelian and Cartesian Thought* (Ithaca: Cornell University Press, 1996); Helen Hattab, *Descartes on Forms and Mechanisms* (Cambridge: Cambridge University Press, 2009); Roger Ariew, *Descartes among the Scholastics* (Leiden: Brill, 2011); Roger Ariew, *Descartes and the First Cartesians* (Oxford: Oxford University Press, 2014); Dobre, *Descartes and Early French Cartesianism*.

⁴⁵ For an overview of the early modern editions, see Clair, *Bio-Bibliographie*, 5–10. An illustration of the availability of Rohault's books in the libraries of the universities of Oxford and Cambridge is offered in the database Dobre et al., "Cartesian and Newtonian Authors."

⁴⁶ On Bonet, see Ernest E. Irons, "Théophile Bonet 1620–1689. His Influence on the Science and Practice of Medicine," *Bulletin of the History of Medicine* 12, no. 5 (1942): 623–65.

⁴⁷ For Le Grand's annotations, see Dobre and Bujor, "Antoine Le Grand's Rohault."

⁴⁸ See especially Hoskin, "Mining All Within"; Schüller, "Clarke's Annotations"; Dobre, "Mixing Cartesianism."

⁴⁹ For Hoadley, see vol. I in Samuel Clarke, *Sermons by Samuel Clarke, D.D. Late Rector of St James's Westminster, Published from the Author's Manuscript by John Clarke, D.D. Dean of Sarum*, ed. John Clarke, 10 vols. (London: W. Botham for James and John Knapton, 1730). The text of preface was reprinted in the first volume of Samuel Clarke, *The Works*, 4 vols. (London: James and John Knapton, 1738). For Whiston's account, see Whiston, *Historical Memoirs of the Life of Samuel Clarke*.

⁵⁰ See Clarke, *Sermons*, vol. I, ii; Clarke, *Works*, vol. I, i.

⁵¹ *Ibid.*

⁵² Clarke, *Sermons*, vol. I, iii; Clarke, *Works*, vol. I, i.

⁵³ Hoadley's glorification is twofold. On the one hand, it is Clarke's merit to be an early defender of Newtonianism; on the other hand, it is an indirect glorification of Newton, who is suggested to have been studied at an earlier date than traditionally ascribed. For the early reception of Newton, see for example Mordechai Feingold and Andrej Svorenčik, "A Preliminary Census of Copies of the First Edition of Newton's *Principia* (1687)," *Annals of Science* 77, no. 3 (2020): 253–348; Steffen Ducheyne, "Early and Earliest Uses of the Word 'Newtonian,'" *Notes and Queries* 67, no. 4 (2020): 483–85; Steffen Ducheyne and Jip van Besouw, "Readers of the First Edition of Newton's *Principia* on the Relation between Gravity, Matter, and Divine and Natural Causation: British Public Debates, 1687–1713," *Centaurus* 63 (2021): 381–95; Jip van Besouw and Steffen Ducheyne, "Characterisations in Britain of Isaac Newton's Approach to Physical Inquiry in the *Principia* between 1687 and 1713," *Early Science and Medicine* 26, no. 4 (2021): 341–72.

⁵⁴ As argued in Gascoigne, *Cambridge in the Age of the Enlightenment*, 143–44. Rouse Ball thought that Clarke was persuaded to defend a Newtonian thesis by Richard Laughton, who became a tutor at Clare in that year (1694); see Walter William Rouse Ball, *A History of the Study of Mathematics at Cambridge* (Cambridge: Cambridge University Press, 1889), 75, quoted by Gascoigne.

⁵⁵ Humphrey Newton to John Conduitt, 17 January 1727/8 (Keynes MS 135); see Richard S. Westfall, *Never at Rest: A Biography of Isaac Newton* (Cambridge: Cambridge University Press, 1980), 191–92; D. T. Whiteside, "General Introduction," in *The Mathematical Papers of Isaac Newton* (Cambridge: Cambridge University Press, 1967–81), vol. VI, xv–xvi.

⁵⁶ Isaac Newton, *The Correspondence of Isaac Newton*, ed. H. W. Turnbull et al. (Cambridge: Cambridge University Press, 1959–77), vol. II, 342 and 347, note 6. The episode is discussed in Gascoigne, *Cambridge in the Age of the Enlightenment*, 143. Ellis had previously been the tutor of

Henry Wharton, who apparently was to be only Cambridge undergraduate to examine Newton’s mathematical manuscripts; see Whiteside, “General Introduction,” xvi, quoted by Gascoigne.

⁵⁷ See for example Sarton, “Early Scientific Textbooks.”

⁵⁸ Clarke, *Sermons*, vol. I, iv; Clarke, *Works*, vol. I, ii.

⁵⁹ Whiston, *Historical Memoirs of the Life of Samuel Clarke*, 4.

⁶⁰ *Ibid.*, 4–5.

⁶¹ The point worth stressing here is that both Hoadley’s and Whiston’s accounts are projecting back a narrative that was becoming more prominent in the 1730s. Whiston’s case makes this more evident due to the reference to his own words, as uttered in a coffee-house more than thirty years before the recollection.

⁶² Gascoigne, *Cambridge in the Age of the Enlightenment*, 144, for both quotes.

⁶³ See for example the explanation provided in Hoskin, “Mining All Within.”

⁶⁴ For an account of the use of names in the various editions of Rohault, see Mihnea Dobre, “Layers of Natural Philosophy: Constructing Authority in an Early Modern Textbook on Natural Philosophy,” in *Cartesian Physics and Their Receptions: Intellectual and Institutional Contexts*, ed. Mihnea Dobre, Rodolfo Garau, and Pietro Daniel Omodeo (Leiden: Brill, forthcoming).

⁶⁵ This is consistent with the status of the book, as textbooks tend to collect various – and sometimes opposing – views. However, it is not the place in the current study to examine and to compare the content of the different sets of annotations, so it is sufficient to highlight the possibility – at least at the moment of the first Clarke edition of Rohault – of mixing Cartesianism and Newtonianism. An alternative account is provided in Marina Frasca-Spada and Nick Jardine (Cambridge: Cambridge University Press, 2012), 176. According to Frasca-Spada, the successive Clarke editions of Rohault are the attempts of a young graduate to find a voice and the annotations resemble the common place books tradition. This suggestion has the advantage to explain the inclusion of many references to the ancients (Plutarch, Pliny), beyond the obvious opposition between Cartesian and Newtonian authorities.

⁶⁶ The literature was referred above. See especially Sarton, “Early Scientific Textbooks”; Hoskin, “Mining All Within”; Rohault, *A System of Natural Philosophy*; Schüller, “Clarke’s Annotations.”

⁶⁷ Another reason in favour of such comparison is the constant neglect of the Latin editions, which is easily explained by the wide availability of the early modern edition in French and English. However, the Latin editions display a more dynamic transmission of natural philosophy at the end of the seventeenth century. With the emergence of the *new philosophy*, written in the vernacular, they also reflect the problem of finding the proper Latin words. For the problem of translation in the early modern period, see for example Sietske Fransen, Niall Hodson, and Karl A.E. Enenkel, eds., *Translating Early Modern Science* (Leiden: Brill, 2017).

⁶⁸ The basic text for the current edition is the one of the 1682 edition of Le Grand, but we marked in the critical apparatus the differences with respect to Bonet’s translation of 1674.

⁶⁹ Above, we examined three hypotheses meant to explain why Clarke was interested in the project of translating Rohault. First, the “bad Latin” argument seems to have played a secondary (and probably only a rhetorical) role. Second, the motivation argument, which is obscured by the two Newtonian witnesses, Hoadley and Whiston. Third, the annotations, which were meant to replace Le Grand’s extensive comments. In this section, we are interested in the textual evidence to support the claim that a new Latin translation was needed.

⁷⁰ The 1697 edition reads *vulgata*. All other Clarke’s Latin editions (1702, 1710, and 1718) use *prioris*.

⁷¹ The title of Rohault's article reads "Why these Planets [Mars, Jupiter, Saturn] appear bigger when they are retrograde, and why their apparent Bigness increases unequally"; see Rohault, *System*, vol. II, 55.

⁷² It is interesting that in the 1697 edition, at the end of this paragraph, Clarke acknowledges some possible limitations of his laborious effort: the unattainable gap between Philosophy and Latin [*adeò toto caelo inter se distare Philosophiam & Latinitatem*]. In 1718, the sentence is deleted.

⁷³ See line at Lat. C 94R–95R, which states "Motus naturam in universum investigare sine dubio utile est [...]."

⁷⁴ The 1674 edition reads *experientia*.

⁷⁵ See Albert Blaise, *Manuel du latin chrétien* (Strasbourg: Le latin chrétien, 1955); David Butterfield, "Neo-Latin," in *Blackwell Companion to the Latin Language*, ed. James Clackson (Malden, MA: Wiley-Blackwell, 2011), 303–18.

⁷⁶ The 1674 edition reads *experientia*.

⁷⁷ Note that the 1674 edition reads *experientia*.

⁷⁸ An alternative explanation is that Bonet, the first Latin translator, was not paying particular attention to these distinctions, nor to the new shifting boundaries between the philosophical disciplines. He was trained as physician, and the general notions in natural philosophy might have been still the traditional ones. By contrast, Clarke's Latin already benefitted from the inclusion of the new philosophy in the university curricula, and hence, it was more prone to novelties.

⁷⁹ On the evolution of natural philosophy in the early modern period, see Gary I. Brown, "The Evolution of the Term 'Mixed Mathematics,'" *Journal of the History of Ideas* 52, no.1 (1991): 127–45; Des Chene, *Physiologia*; Edward Grant, *A History of Natural Philosophy From the Ancient World to the Nineteenth Century* (Cambridge: Cambridge University Press, 2007); Roger Ariew, "The Mathematization of Nature in Descartes and the First Cartesians," in *The Language of Nature: Reassessing the Mathematization of Natural Philosophy in the Seventeenth Century*, ed. Geoffrey Gorham et al. (Minneapolis: University of Minnesota Press, 2016), 112–33.

⁸⁰ See s.v. *experientia* and *experimentum* in *Thesaurus Linguae Latinae* (Leipzig: Teubner, 1900).

⁸¹ See Francis Bacon, *The Oxford Francis Bacon*, vol. XI: *The Instauration magna Part II: Novum organum* and Associated Texts, ed. Graham Rees and Maria Wakely (Oxford: Clarendon Press, 2004), 130–31.

⁸² See R. Lyne, "The Neoteric Poets," *The Classical Quarterly* 28, no. 1 (1978): 167–87.

⁸³ To note the missing "novatores," another term largely employed to denote the new philosophers. On the troubled history of the term "novatores," see Daniel Garber, "Novatores: Rejecting Aristotle and Forging a New Philosophy in the Seventeenth Century," in *Encyclopedia of Early Modern Philosophy and the Sciences*, ed. Dana Jalobeanu and Charles T. Wolfe (Cham: Springer International Publishing, 2019), 1–6; Daniel Garber, "Novatores," in *The Cambridge History of Philosophy of the Scientific Revolution*, ed. David Marshall Miller and Dana Jalobeanu (Cambridge: Cambridge University Press, 2022), 35–57.

⁸⁴ The French sources consulted for the current critical edition are: Jacques Rohault, *Traité de physique*, 2 vols. (Paris: Chez Guillaume Desprez, 1705); Jacques Rohault, *Traité de physique* (Paris: Denys Thierry and Charles Savreux, 1671).

⁸⁵ The English sources consulted for the current critical edition are: Rohault, *System of Natural Philosophy*, 1723; Jacques Rohault, *Robault's System of Natural Philosophy*, 2d. ed., *System of Natural Philosophy* (London: Printed for James and John Knapton, 1728); Jacques Rohault, *Robault's System of Natural Philosophy*, trans. Samuel Clarke and John. Clarke, 3d. ed., 2 vols., *System of Natural Philosophy* (London: James, John, and Paul Knapton, 1735).

⁸⁶ The Latin sources consulted for the current critical edition are: Jacques Rohault, *Tractatus Physicus Gallice Emissus et Recens Latinitate Donatus*, trans. Théophile Bonet (Geneva: J.H.

Widerhold, 1674); Jacques Rohault, *Tractatus Physicus ... Cum Animadversionibus Antonii Le Grand*, trans. Théophile Bonet (London: G. Wells & A. Swalle, 1682).

⁸⁷ The Latin sources of Clarke's Rohault consulted for the current critical edition are: Jacques Rohault, *Physica*, trans. Samuel Clarke (London: J. Knapton, 1697); Jacques Rohault, *Physica*, trans. Samuel Clarke (London: J. Knapton, 1702); Jacques Rohault, *Physica*, trans. Samuel Clarke (London: J. Knapton, 1710); Jacques Rohault, *Physica*, trans. Samuel Clarke (London: J. Knapton, 1718).