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## Descartes on Place and Motion: A Reading through Cartesian Commentaries

Andrea Strazzoni\*

**Abstract:** This paper offers a reconstruction of the interpretations of Descartes's ideas of place and motion by Dutch Cartesians (Henricus Regius, Johannes de Raey, Johannes Clauberg, and Christoph Wittich). It does so by focusing on the reading of Descartes's *Principia philosophiae* (1644) offered, in particular, by the dictated commentaries on it. It is shown how such commentaries bring to the light new potential Aristotelian-Scholastic sources of Descartes, and the different ways Dutch Cartesians brought to the fore, also with the help of such sources, the rationale of the Cartesian text: in doing so, they constituted a philosophical school.

**Keywords:** René Descartes; *dictata*; Dutch Cartesianism; place; motion; Copernicanism;

### 1. Introduction

In this paper I reconstruct how René Descartes's (1596–1650) ideas of place and motion were interpreted and developed by Cartesians active in the United Provinces in the 1650s–1660s, taking into account, in particular, the handwritten dictated commentaries (*dictata*) on Descartes's *Principia philosophiae* (1644) by Johannes de Raey (1620/1622–1702), as well as similar and printed sources by his fellow Cartesians. My main aim is to show how the *dictata* can be revelatory of the Aristotelian-Scholastic sources of Descartes's own theories. Secondly, I reconstruct how the Cartesian commentaries and defences of Cartesian philosophy fostered discussions of the issues raised by Descartes's definitions of place and motion, also in the light of the aforementioned sources.

The Cartesian *dictata*, in which Descartes's texts were commented on by using single words

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or phrases as points of reference, as in the Scholastic tradition, and dictated especially in private lectures,<sup>1</sup> are now at the centre of scholarly attention: as they are evidence of a close reading of Descartes, they are increasingly studied as the potential source of the development of new ideas derived from the Cartesian text. Theo Verbeek has published an overview of the Cartesian *dictata* extant in Dutch libraries and a comparative study of two commentaries by Johannes Clauberg (1622–1665) on Descartes’s *Principia*, while Domenico Collacciani has more recently brought to light two previously unknown commentaries by De Raey—a prolific Cartesian teacher who has also been surveyed by Antonella Del Prete in his first teaching assignments at Leiden—and Davide Cellamare has provided the first study of the Cartesian commentaries of Christopher Wittich (1625–1687). The latter study was made possible by the project *The Secretive Diffusion of the New Philosophy in the Southern Low Countries: Evidence on the Teaching of Cartesian Philosophy from Student Notebooks 1650–1750*.<sup>2</sup>

In this paper, I will consider the Cartesian *dictata* to investigate their potential value, hitherto unexplored, in shedding light on the Scholastic sources of Descartes, as well as on the intricacies consequent upon Descartes’s re-foundation of knowledge, namely the difficulties inherent in deciphering and making sense, in his philosophical system, of his re-formulation, criticism, and re-use of Scholastic ideas, whose sources are not always clear. As these commentaries were used to teach Cartesianism at the Universities, that is to audiences well imbued with traditional, Aristotelian thought, and dealing with Aristotelian sources in order to introduce and defend Cartesianism in the light of the established world-view, these sources promise to shed light on both issues.

The Scholastic sources of Descartes are the subject of a vast secondary literature: starting with the *Index scolastico-cartésien* (1913) by Étienne Gilson—now undergoing a complete re-making under the editorship of Igor Agostini—and still growing thanks in particular to studies by Roger Ariew (who has ascertained the Scotist influence in Descartes’s metaphysics), Dennis Des Chene and Cees Leijenhorst (who have considered the theory of natural change preceding and at Descartes’s time), Han van Ruler and Helen Hattab (who have taken into consideration late Scholastic and Cartesian theories of forms).<sup>3</sup> In the course of the paper, I will further refine such exploration by considering, first of all, Descartes’s own conceptualization of the ideas of place and motion (sections 2 and 3). This will be the basis of a systematic consideration of the Scholastic-Jesuit sources usually considered as constituting the background of his philosophy, in particular, his

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1 For an extensive discussion of the structure and kinds of Cartesian *dictata*, and of the extant manuscripts relating to this tradition, see Strazzoni 2023.

2 Verbeek 1999; Collacciani 2015; Collacciani 2022; Cellamare 2020; Del Prete 2022.

3 Van Ruler 1995; Des Chene 1996; Leijenhorst 2002; Hattab 2009; Ariew 2011.

polemical objectives on the ideas of *ubi*, *locus*, and *situs* (section 4), up to now unsystematically dealt with in the secondary literature, showing how Descartes's considerations embodied a generalization and summary of the positions of a number of authors, without a univocal polemical goal. I will then survey these ideas by considering their further discussion in the Cartesian context, namely in the cases of Henricus Regius (1598–1679), who endorsed a definition of place based on that of *situs* and inspired by mechanics (section 5), and of De Raey (section 6), and his revealing of further Aristotelian sources belonging to Descartes's background, namely Bartholomäus Keckermann (ca. 1572–1609) and Franco Burgersdijk (1590–1635), who might have inspired Descartes with their theory of the immobility of place. The cases of Keckermann and Burgersdijk offer paths of investigation into Descartes's Aristotelian background other than those of the Jesuit-Scholastic sources—on which scholarship has mostly focused. I show how De Raey dealt with Descartes's Aristotelian sources in order to highlight his theory of planetary motion against what he labels as the Copernican account (based on the idea of self-motion), exploring the modalities in which Cartesianism was taught in the United Provinces in the 1650s–1660s. Eventually (sections 7 and 8), I consider how other Cartesians, notably Wittich and Clauberg, faced the issues raised by Descartes's ideas of place and motion, in particular, the possibility of identifying a body in movement with respect to its surroundings (either by dynamic or kinematic criteria), and the different, overall perspectives informing their teaching of Descartes (either, physical, theological, meta-philosophical, or logical), arguing for a division of labour in Dutch Cartesianism. In this tradition we can identify some authors—De Raey, Clauberg, and Wittich—who constituted more than (parts of) a network, but a culturally localized community or school that used Descartes (mixed with other influences) in a systematic way, in which each author, while sharing certain tenets and arguments with the others, highlighted his ideas from different, complementary standpoints: physical (especially De Raey), theological and meta-philosophical (Wittich), and logical (Clauberg).

## 2. Descartes on space and place

In order to shed light on Descartes's theory of place and motion and on its Aristotelian-Scholastic underpinnings, it is necessary, first, to consider Descartes's own ideas on these topics, as he systematically presented them in his *Principia*, or the treatise that he conceived as a new textbook in natural philosophy—and ideally dealing with and opposing Scholastic textbooks.<sup>4</sup> Moreover, it is worth looking at the foremost Aristotelian predecessors that the secondary literature has thus far

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4 Ariew 1996.

identified or discussed. This will enable the reader to appreciate the importance of the *dictata* (and related sources) in shedding light on matters—such as Descartes’s Aristotelian background—, discussion of which is difficult given the scarcity of textual evidence. Descartes, indeed, rarely mentions his sources and actual polemical objectives.

In *Principia* II.10–15 Descartes discusses two fundamental ideas in his theory of motion, namely those of space and place. He does so by (1) re-defining the philosophical meaning of “space” and “place” (*spatium* and *locus*), in the light of his idea of matter as three-dimensional extension (discussed in *Principia* II.4–7), and (2) by showing, in the light of such philosophical meaning, what some philosophical errors, derived by the lay use of such terms, consist in. His rationale is as follows: provided that we can establish the meaning viz. the conceptual contents brought to mind by some terms, in a way that such contents can match or represent external reality,<sup>5</sup> i.e. that we can assign to them a philosophical meaning, it is possible to understand why the layman falls into philosophical errors while using them by clarifying the mental contents usually associated with them—ultimately but obscurely expressed by Aristotelian definitions.

For the sake of his re-definition, Descartes discusses the uses of three main ideas: (A) space, (B) internal place, and (C) external place. All three notions involve the ideas of size, figure, and position or *situs*. Philosophically speaking (*Principia* II.10–12), (A) “space” is synonymous with (B) “internal place,” and in material reality it is no different from the corporeal extension of a given body.<sup>6</sup> The differentiation between space/internal place and body/extension consists only in our different ways of conceiving them, as space/internal place can be intended, from a lay perspective, as a certain volume of extension identified with respect to some external body, which is in fact the primary factor in defining its space, and considered independently from the different bodies which come to have, at different times, the same position with respect to certain other bodies, viz. to fill it. Hypostatizing such a way of considering extension *in genere*, or attributing to it an external reality, accordingly, is a main cause of believing that a vacuum is possible, and that a void, extended space, is filled by extended bodies (*Principia* II.12). Hence (*Principia* II.13–15), Descartes discusses the idea of (C) external place, which is entailed by that of space/internal place, and which serves him to address Aristotle’s own definition of place. Space/internal place, indeed, is defined through the ideas of (i) figure, (ii) size, and (iii) position or *situs*; though, *situs* is more overtly entailed—from a lay perspective—by the idea of place as such—or external place—by which (in Descartes’s reconstruction) one more expressly means the position of a body with respect to other bodies rather

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<sup>5</sup> On Descartes’s theory of meaning and representation, see Ben-Yami 2021.

<sup>6</sup> I will assume that in a Cartesian material continuum it is still possible to differentiate individual parts or bodies: on this issue, see Garber 1992, chapters 3 and 5; Des Chene 1996, part II.9; Slowik 2002, chapter 4; Zepeda 2014.

than its figure and size (*Principia* II.14). Philosophically, the lay idea of place as such is rendered by Descartes by the idea of external place (*Principia* II.15): this is, in a plain Aristotelian way, “the surface which most closely surrounds the thing placed.” Such a surface is, as for Aristotle, immobile. Its characterization in terms of immobile surface and *situs* involves two conditions: Descartes intends it as (1) the ideal boundary between the body-in-place and the surrounding ones, as different bodies can come to surround the body-in-place while such a surface does not change, since in a lay (viz. Aristotelian) perspective surrounding bodies can change, even if the place remains the same. As put by Joseph Zepeda, the “only difference between Descartes’ internal and external place is dimensionality: external place is a closed surface that bounds a volume, while internal place is the volume bounded.”<sup>7</sup> Moreover, (2) this surface is intended to be keeping the same position or *situs* with respect to further, non-contiguous bodies “which we consider to be at rest”: so that, for instance, a boat in a river can be said not to change place if it keeps the same position with respect to the banks.<sup>8</sup> External place, in summary, can be conceived as the relation of the ideal surface which is between a body A and the surrounding ones (B), with certain other, distant bodies (C) considered as at rest, constituting a fixed reference frame to evaluate if any other body moves i.e. change its *situs* with respect to it.

### 3. Descartes’s definitions of motion

Descartes’s definition of external place (which he generally uses as synonymous with “place”) serves him to present what he labels the “vulgar” idea of motion. According to it (*Principia* II.24), motion “is nothing other than the action by which some body travels from one place to another.”<sup>9</sup> This kind of definition—viz. the idea of motion as the mere transference from place to place—was made famous by Augustine, and generally used to describe local motion, as by Johannes Kepler (1571–1630) and Pierre Gassendi (1592–1655);<sup>10</sup> moreover, it was repeatedly used by Descartes himself (in various forms) before the appearance of his *Principia*, viz. in his *Le monde ou Traité de la lumière* (written ca. 1629–1633), *Dioptrique* (1637), *Meditationes de prima philosophia* (1641) (endorsing the idea of motion as change of position or *situs*), and in his correspondence with Jean-Baptiste Morin (1583–1656),<sup>11</sup> who accused him of “equivocating between motion and its cause,”

7 Zepeda 2014, 26.

8 Descartes 1982, 46; AT VIII-1, 48–49.

9 Descartes 1982, 50; AT VIII-1, 53.

10 See *infra*, n. 104.

11 “[...] moi, je n’en connais aucun que celui qui est plus aisé à concevoir que les lignes des Géomètres, qui fait que les corps passent d’un lieu en un autre, et occupent successivement tous les espaces qui sont entre deux,” AT XI, 39–40; “la lumière n’est autre chose, dans les corps qu’on nomme lumineux, qu’un certain mouvement, ou une action fort prompte et fort vive,” AT VI, 84; “[s]itum, quem diversa figurata inter se obtinent, et motum, sive mutationem istius situs,” AT VII, 43; Descartes to Morin, 12 September 1638: “le mouvement est l’action par laquelle les parties de

as Descartes did not differentiate between an action and the movement it produces (an issue which came to be discussed by Dutch Cartesians).<sup>12</sup> In turn, the standard, Aristotelian definition given in the *Physica* III.1, according to which motion i.e. change as such is “the act of what exists in potency, in so far as it exists in potency” (201a10–11) was briefly dismissed by him as obscure.<sup>13</sup>

For Descartes, the vulgar definition has two main weak points, which he considers especially in their interrelation, i.e. its including (1) the idea of action (analysis of which exceeds the scope of the present paper) and (2) that of place, encompassing in turn that of *situs*. As: (i) given that by *situs* one can define a body both as at rest and moving (depending on the bodies of reference), one can define oneself to be moving even if not feeling one is performing any action (*Principia* II.24); (ii) the idea of action leads not to not differentiating the mover and the mobile (thus intended as a self-mover) (*Principia* II.25); (ii) if we do not perceive any action in a state of rest, we believe that rest is the absence of action (*Principia* II.26): rest being, on the other hand, a positive mode of matter (viz. something modifying it), namely the ultimate glue of bodies (*Principia* II.55–56), the breaking of which requires overcoming resistance.

Descartes aims at avoiding these shortcomings—characterizing his own earlier conceptualization of motion—by a proper definition (*Principia* II.25), according to which motion “is the transference of one part of matter or of one body, from the vicinity of those bodies immediately contiguous to it and considered as at rest, into the vicinity of [some] others.”<sup>14</sup> This definition served to provide a non-ambiguous idea of motion, thus (1) not allowing to arbitrarily differentiate motion and rest (or the condition of non-detachment of bodies), and (2) identifying the motion which is proper or unique to one body rather than common with others (*Principia* II.28), fitting the epistemic criterion that proper motion is more easily identified than common ones (*Principia* II.31): all in a way consistent with the overall didactic purpose of the *Principia*.<sup>15</sup> Two other elements characterize this definition, namely (3) its entailing that any motion, as far as it is a detachment between parts of matter, is per se reciprocal (*Principia* II.29) viz. that (a) both bodies are transferred away from each other, and (b) “the same force and action is required for the one transference as for the other,”<sup>16</sup> and—still—that (4) one can consider one of the two bodies involved

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cette matière changent de place,” AT II, 364.

12 Des Chene 1996, 258.

13 As in his *Le Monde*: “[m]otus est actus entis in potentia, prout in potentia est, lesquels sont pour moi si obscurs, que je suis contraint de les laisser ici en leur langue, parce que je ne les saurais interpréter,” AT XI, 39. See also his *Regulae ad directionem ingenii* (written ca. 1619–1630), XII (AT X, 426), and his letters to Marin Mersenne of 1635–1636 (AT IV, 697) and 16 October 1639 (AT II, 596). Unless taken from an English edition, all quotes have been translated by the author.

14 Descartes 1982, 51; AT VIII-1, 53.

15 Garber 1992, chapter 6.

16 Descartes 1982, 53; AT VIII-1, 55–56.

as at rest (*Principia* II.30–31). Descartes offers two arguments for the latter point: (A) in the case of a small body moving on the surface of the Earth, claiming that the Earth is moving would be at odds with everyday language; (B) in the case of two bodies moving on the Earth in opposite directions, one would attribute contrary motions to the Earth, this being, if not a contradiction per se (as in fact one should consider the relative motion of the Earth and the bodies), a source of “too much embarrassment” (according to the French version of the *Principia*, 1647).<sup>17</sup>

Rather than being just part of a strategy to avoid the accusation of admitting the mobility of the Earth and endorsing Copernicanism after the condemnation of Galileo Galilei (1564–1642) and the subsequent abandonment of Descartes’s *Le monde* (as argued, notoriously, by Henry More, 1614–1687),<sup>18</sup> these points can be interpreted as instances of Descartes dialoguing with the Scholastics. As Daniel Garber suggests, “Descartes [...] is using aspects of the vulgar and improper (though not unintelligible) sense of motion and rest [...] to define the proper sense of motion and rest, [...] making use of notions we understand to define a new and less familiar notion,”<sup>19</sup> in fact, intending rest in terms of unchanging *situs* (as it was used by some Scholastics, as I discuss in section 4). Or, as Des Chene puts it, “Descartes, perhaps to accommodate the Aristotelian conception of local motion as an *exitus* from one *locus* to another, allows his reader momentarily to regard the *motus* as inhering in the mobile alone, and not in its vicinity also.” Notwithstanding such concessions to the tradition, “Descartes should not be treated as doing ineptly what Huygens and Newton later did well. He is trying to do better what in his view the Aristotelians had done poorly: to explain what is true of a thing at each moment of its absolute motion.”<sup>20</sup> What is important to note, in fact, is that the reciprocal nature of motion—the underlining of which serves Descartes to identify univocally motion itself—is not relative (even if reciprocity is a relation): viz. the reciprocity of motion should not be interpreted through the Newtonian idea of a reference frame considered to be absolutely at rest, through which one can non-arbitrarily attribute a state of motion or rest to any given body; neither should we consider the reciprocal nature of motion in relative terms (as done by Christiaan Huygens, 1629–1695), namely, by allowing the possibility to arbitrarily define one of the two detaching bodies as at rest, and to infer the laws of impact as valid regardless of the state of rest or motion attributed to the bodies involved (something indeed not allowed by Descartes’s rules of impact).<sup>21</sup>

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17 AT IX-2, 79.

18 More 1662, xi. For a discussion, see Garber 1992, chapter 6; Des Chene 1996, chapter 8 (especially 271–272).

19 Garber 1992, 169.

20 Des Chene 1996, 271–272.

21 Garber 1992, 166–172; Des Chene 1996, 262. On Descartes’s theory of motion and the problem its relational nature, see also Slowik 1999; Slowik 2002, chapter 6.



These points, viz. the use of the idea of action, the reciprocity of motion, the state of rest of the surroundings, the idea of place, were variously interpreted by Dutch Cartesians: not as a consequence of radically different agendas or interests (they all in one way or another were attempting to make Descartes's texts graspable by students and acceptable to the authorities—and all belonged to the same network, with the partial exception of the renegade Regius, who in any case endorsed Cartesian positions in his textbooks), but rather as (1) the very result of a long process of interpretation of the Cartesian text, from which different solutions emerged, across time, in the same framework, and (2) of a sort of division of labour between them, as different authors focused on different disciplines and explored various solutions to the same problems. This being said, they also came to share certain solutions. This process of interpretation, moreover, was rooted in the apprehension of the Aristotelian sources of Descartes, which served, especially for De Raey, to interpret the Cartesian text to students and to highlight its rationale. In order to appreciate the different ways in which Descartes was adapted and taught, therefore, it is necessary to look first at his overall Aristotelian background, as it has so far been identified in the secondary literature. After this, it will be possible to fine-tune our view of it by looking at the interpretations (and critiques) offered by the Dutch Cartesians.

#### **4. The Scholastic ideas of *ubi*, *locus*, and *situs***

The Scholastic framework of Descartes's philosophy has been considered by historians at least since the appearance of the *Index scolastico-cartésien* by Gilson, with some attention paid to the idea of place (and related notions)—in connection with Descartes's conceptualization—by Des Chene, Ariew, and Zepeda.<sup>22</sup> Given that Descartes scarcely mentions his Scholastic polemical objectives overtly, the studies on Descartes and the Scholastics—starting with Gilson—have had to focus on a vast bulk of sources and to reconstruct positions, none of which exactly matches Descartes's attacks or re-use. However, it has been possible to identify certain philosophical traditions upon which Descartes drew, as the Scotist one in metaphysics (as shown by Ariew).

Three notions central to the discussion of the idea of place in the late Aristotelian tradition have been so far identified: *ubi*, *locus*, and *situs*, whose treatment by Scholastic authors can fit Descartes's considerations. If we look at a selection of sources overall representative of Descartes's Scholastic background (Franciscus Toletus, 1532–1596, Francisco Suárez, 1548–1617, the Conimbricenses, Eustache de Saint-Paul, 1575–1640, and Charles-François d'Abra de Raconis,

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<sup>22</sup> Gilson 1912; Des Chene 1996, 262–265; Ariew 2011, 87–92; Zepeda 2014, 22–24.

1580–1646),<sup>23</sup> *ubi* can be identified with Descartes’s internal place. First, *ubi* was defined by Toletus in his commentary on the *Physica* (1574), following the account of Gilbert de la Porrée (1070–1154), as “being in a place, and contained by a place,” or as “the passive circumscription coming from a circumscribing place,” where place (viz. external place: *locus extrinsecus*) is to be intended as the surface of the circumscribing body.<sup>24</sup> Moreover, he adopted the idea of intrinsic place (*locus intrinsecus*), identified with space and intended as a *proprium* of a body following from its quantity (such as time follows from motion), which a body “occupies according to its corporality,” not in the sense that there exists an empty space filled by bodies—which for Toletus would be completely fictitious—but that we can legitimately consider, by abstraction, an imaginary space common to all bodies, which is at rest (as we abstract from the motions of bodies), and, in it, the distance and position (*positio*) of its singular parts, as mathematicians do.<sup>25</sup> The ideas of *ubi* and internal place were hence identified by Suárez (*Disputationes metaphysicae*, 1597), who rejected Toletus’s idea of an abstract space, equated by Suárez with empty space, which even if possible (thanks to the power of God) would not fall into any logical category. In turn, *ubi* or *locus intrinsecus* is intended by him as “a certain real and intrinsic mode of that thing which is said to be somewhere, by which such a thing has that it is here or there. Which mode, in itself, does not depend on the surrounding body or by any other extrinsic [one],” but which can be explained only by the distance with other bodies.<sup>26</sup> Suárez uses the example of the walls of a room, which can be, thanks to the power of God, a void space: the walls will nonetheless keep their distance even without any body between them, since the bodies and their *ubi* are real.<sup>27</sup> For Suárez, *ubi* does not depend on place intended as the surface of the circumscribing body, for the reason that such a body can change without a change of *ubi* (as in the case of a stone in a river), and that it cannot change, while the *ubi* changes (as in the case of a man in a moving ship).<sup>28</sup> So far, Suárez’s conceptualization of *ubi* is a close match with Descartes’s idea of internal place, although he did not rely on the idea of a geometrical space. This was, on the other hand, endorsed by the Conimbricenses (commentary on the *Physica*, 1592), labelling *ubi* as “the existence in space: this however is nothing else than the quantity of the mobile, as far as it exists in this or that part of space, or a certain mode, which quantity assumes, as it matches now this, now that part of space, either real or imaginary,”<sup>29</sup> and (commentary on the *Organon*, 1606) does not depend on external

23 Other sources might include Pedro da Fonseca (1528–1599), Benedict Pereira, Antonio Rubio (1548–1615), and Rodrigo de Arriaga (1592–1667).

24 Toletus 1593, 118r (book 4, chapter 5, *textus* 49, *quaestio* 4).

25 Toletus 1593, 121v–122r (book 4, chapter 5, *textus* 49, *quaestio* 8).

26 Suárez 1856–1878, volume 26, 975–976 (*Disputationes metaphysicae*, disputation 51, section 1, §§ 12–13).

27 Suárez 1856–1878, volume 26, 996–997 (*Disputationes metaphysicae*, disputation 51, section 4, § 28).

28 Suárez 1856–1878, volume 26, 976 (*Disputationes metaphysicae*, disputation 51, section 1, § 15).

29 Conimbricenses 1610, volume 1, 492 (book 3, chapter 3, *quaestio* 2, article 2).

bodies i.e. on extrinsic place, as in that case place would define it, and there would be no need of a *ubi* different from *locus*.<sup>30</sup> Also, it can be identified with intrinsic viz. internal place (and place as such with extrinsic or external one).<sup>31</sup> In the synthesis of Eustache de Saint-Paul (*Summa philosophiae quadripartita*, 1609), *ubi* is more essentially related to place and defined by quantity: it is the “being in a place, and is defined as that which is left from the vicinity of the place in the thing-in-place”: materially, it is the very thing-in-place, while formally it is place itself, and applies neither to immaterial beings, as far as these are not surrounded by bodies, nor to the Empyrean heaven.<sup>32</sup> *Ubi* is moreover labelled as the “existence in space,” and, formally, as a mode “which comes from the quantity of the mobile thing, as far as it matches now this, now that part of space, either real or fictitious,”<sup>33</sup> and can be identified with internal place, namely “that space which is occupied by any body-in-place.”<sup>34</sup> Eventually, for Abra de Raonis (*Summa totius philosophiae*, 1617) “*ubi* is a real and intrinsic mode resulting from the very existence of a thing in a place, through which mode the thing is formally said to be here, and not elsewhere,” though it does not depend solely on place, as it can be intended either as “definitional” (*definitivum*) or “circumscriptive” (*circumscriptivum*). Definitional *ubi* characterizes immaterial beings like angels, which are not in a place or *locus* (defined with respect to external bodies), but “are defined by space,” while circumscriptive *ubi* is determined by place, and characterizes bodies whose parts correspond to parts of the place.<sup>35</sup>

*Locus* or external place, in turn, was generally discussed on the basis of its definition, provided in Aristotle’s *Physica* IV.4 as the “the innermost motionless boundary of the containing body” (212a20), in particular, by addressing the issue of its immobility. A widespread solution to this problem was that of Duns Scotus (1265/1266–1308), according to which *locus* is just the relation of the container with the contained thing: so that a body can keep its place even if its container changes (as in the case of a tower in the wind), as its different containers can be said to be the same container by equivalence.<sup>36</sup> This solution was rejected by Toletus, who argued for the immobility of *locus* by accepting the position of the realists, such as Thomas Aquinas (1225–1274). According to this solution, one can maintain that a place is the same even if the containing surface changes—and without admitting that place is a mere relation between the contained and the

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30 Conimbricenses 1630, part 1, 522–523 (chapter 9, *quaestio* 2, article 1).

31 Conimbricenses 1630, part 1, 352 (chapter 4, *quaestio* 2, article 1).

32 Eustache de Saint-Paul 1620, volume 1, 88 (part 1: *De rebus dialecticis*, part 1, treatise 3, disputation 2, section 8).

33 Eustache de Saint-Paul 1620, volume 2, 68 (part 3: *De rebus naturalibus*, part 1, treatise 3, disputation 4, *quaestio* 6).

34 Eustache de Saint-Paul 1620, volume 2, 88–89 (part 3: *De rebus naturalibus*, part 1, treatise 3, disputation 2, *quaestio* 2).

35 Abra de Raonis 1629, volume 1, 102 (part 1: *Logica*, part 1, treatise 2, disputation 2, section 1, *quaestio* 8).

36 For a full blown-discussion, see Cross 1998, chapter 11.

container—insofar as one considers the distance between the surfaces identifying a place, and the parts of the world, viz. the heavens. Even if the heavens change place, one can assume that their distance with respect to the surface is the same as far as one considers them as imaginary parts of the world—from which the distance remains the same.<sup>37</sup> This kind of explanation was assumed by Suárez as well, who admitted that one can define place in Aristotelian terms as the surface of the surrounding body, viz. as external place as such (while *ubi* is internal place: in fact, the primary meaning of “place” for him), and that such a surface is immobile as far as even if being a physical surface, it does not change its position with respect to imaginary space, e.g. with respect to the poles.<sup>38</sup> In turn, the Conimbricenses (followed by Abra de Raconis) claimed that a containing surface can be intended either as imaginary viz. mathematical, or physical: in the first case, it can be considered as motionless, so that it undergoes no physical change.<sup>39</sup> Eventually, Eustache de Saint-Paul summarized four different solutions, namely that (1) the thing-in-place always keeps its “space or intrinsic place,” (2) the containing surface is considered as imaginary, (3) the containing bodies viz. the changing surfaces are the same by equivalence, (4) the thing-in-place does not change, per se, its place, but it is rather the place that changes.<sup>40</sup>

As to *situs*, according to Des Chene it had limited application in physics,<sup>41</sup> being mostly treated in logical treatises, as the category of κείσθαι. Though, as seen above, it had a central role in Suárez’s account of *ubi*, and served Descartes as a primary means to describe the idea of place (internal and external): in fact, it was a central idea retained in the readings of Descartes’s physics, especially by Regius, thanks to the fact that *situs* had a central role in the non-philosophical viz. in the mechanical interpretations of natural change, and offered an idea of place alternative to the Aristotelian one. Toletus (commentary on the *Organon*, 1572) differentiated between *positio*, which is the order of parts of a body with respect to each other (*ordo partium inter se*), and *situs*, which is the order of parts of a body with respect to the parts of the place, and includes the idea of place.<sup>42</sup> This differentiation was rejected by Suárez, who defined *situs* as position, namely as “an intrinsic mode of the situated body, from which it is said to be sitting, laying, or similar”: a definition making it difficult to be differentiated from *ubi*, being in fact not a different mode, but rather a different way of considering *ubi* itself, namely by considering only the “order of parts with each

37 Toletus 1593r–v, 119 (book 4, chapter 5, *textus* 49, *quaestio* 5). On Aquinas’s position, see Grant 1981.

38 Suárez 1856–1878, volume 26, 981 (*Disputationes metaphysicae*, disputation 51, section 2, §§ 4 and 6).

39 Conimbricenses 1610, volume 2, 37–38 (book 4, chapter 5, *questio* 1, article 2); Abra de Raconis 1629, volume 3, 81 (part 3: *Physica, Cortex physicae*, treatise 2, disputation 1, section 3).

40 Eustache de Saint-Paul 1620, volume 2, 57–58 (part 3: *De rebus naturalibus*, part 1, treatise 3, disputation 2 *quaestio* 1).

41 Des Chene 1996, 263.

42 Toletus 1580, 89v (*In librum Categoriarum*, chapter 10).

other.”<sup>43</sup> For the Conimbricenses, similarly, “*situs* is an intrinsic mode, by which a thing is in place, not absolutely (*ubi*, indeed, fulfils this [role]), but according to a certain disposition of the parts,” viz. it is the “position, or coordination of the parts of *ubi*,” from which it is differentiated as action and passion are, viz. virtually, not actually.<sup>44</sup> In turn, Eustache de Saint-Paul, while accepting the idea that *situs* is a “certain disposition of the parts of the thing-in-place to the parts of the place,” overtly differentiated (like Toletus) between *situs* and the disposition of the parts with respect to each other: though, unlike Toletus, for him the latter disposition can be reduced to the idea of figure, so that *situs* can be intended only in the former meaning.<sup>45</sup> Eventually, Abra de Raconis distinguished between an improper and proper meaning of “situs,” i.e. between *situs* mistaken for place, and *situs* as a mode resulting from the correspondence of the parts of the body with that of the place.<sup>46</sup>

Amongst these different views on place and related ideas, one cannot precisely pick out a source or polemical aim of Descartes, though all of them represent different aspects of Descartes’s conceptualization of the idea of place in the *Principia*, as (1) the differentiation of space and body, (2) the identification of internal place with a mode of the body matching or filling this or that part of space, (3) the identification of external place with a surface considered with respect to certain bodies of reference, (4) the explanation of its immobility through reference to distant bodies and by considering it in ideal/geometrical terms—including the very idea of *situs*. This being the result of a revision of his earlier positions, as in his *Regulae ad directionem ingenii* (written ca. 1619–1630), XII, he rejected the idea of place intended as the surface of the surrounding body, on the ground of the criticism that the surrounding body can change without a change of the place of the surrounded body and vice-versa,<sup>47</sup> and—positively—claimed that “place” means “the simple and self-evident nature in virtue of which something is said to be here or there. This nature consists entirely in a certain relation between the thing said to be at the place and the parts of extended space”—in fact, an account of *ubi*. Indeed, Descartes meant this nature as what some improperly labelled as intrinsic *ubi*, since place (*locus*) was usually meant as the surface of the surrounding body. At the same time, he claimed that when people “define place as ‘the surface of the surrounding body’, they are not really conceiving anything false, but are merely misusing the word ‘place’,” seemingly allowing for a potentially correct use of the idea of place as the surface of the surrounding body.<sup>48</sup> In fact, again in his letter to Marin Mersenne (1588–1648) of 23 June 1641 and in his *Sextae Responsiones* he

43 Suárez 1856–1878, volume 26, 1008 and 1009 (*Disputationes metaphysicae*, disputation 52, section 1, §§ 7 and 9).

44 Conimbricenses 1630, part 1, 524–525 (chapter 9, *quaestio* 2, article 2).

45 Eustache de Saint-Paul 1620, volume 1, 94 (part 1: *De rebus dialecticis*, part 1, treatise 3, disputation 2, section 9).

46 Abra de Raconis 1629, volume 1, 103 (part 1: *Logica*, part 1, treatise 2, disputation 2, section 1, *quaestio* 9).

47 AT X, 426.

48 CSM I, 53; AT X, 433. For a commentary, see Descartes 1977, 254.

accepted the definition of place as the surface of the containing body, provided that this surface is meant as ideal.<sup>49</sup>

In his confronting Aristotelian-Scholastic notions, Descartes came to appropriate and re-define them: on this process, academic commentaries on the *Principia* can shed some light, insofar as they were aimed at an audience which was being educated on Aristotelian-Scholastic textbooks (amongst others), and were produced in the same context of the elaboration of Descartes's *Principia*, i.e. the Dutch intellectual framework. Of course, they do so through the lens of the issues at stake in the immediate reception of Descartes: in particular, the issue of Copernicanism. In what follows, I consider some Dutch-related interpretations of his natural philosophy in the light of the ideas of place and motion, focusing—besides printed sources—on the academic commentaries of De Raey, offering a close reading of Descartes's *Principia*. In doing so, I attempt to restrict the analysis of Descartes's conceptualization of the idea of place to previously neglected sources, namely Keckermann and Burgersdijk.

## 5. Regius's reappropriation of Descartes's vulgar definition of motion

De Raey can be considered the first and foremost teacher of Cartesian ideas in the United Provinces from 1647, while Descartes was still alive and commended him as the best teacher of his philosophy.<sup>50</sup> He had been a student of earlier Cartesians, though, educated before the appearance of Descartes's works: namely Regius at Utrecht (1641–1643) and Adriaan Heereboord (1613–1661) at Leiden (1643–1647).<sup>51</sup> In turn, he was a teacher of the foremost Cartesians such as Clauberg, Wittich, and Daniel Lipstorp (1631–1684). His positions on place and motion have thus to be considered in the framework of the broad Dutch dissemination of Cartesianism, and rooted in those developed by his immediate (Cartesian) predecessors, Regius in particular.

While Heereboord, in his *Collegium physicum* (1649, later included in his *Philosophia naturalis*, 1654) adhered to the Aristotelian definition of motion (and generally speaking never developed a thoroughgoing Cartesian-inspired natural philosophy),<sup>52</sup> Regius provided a conceptualization of the ideas of place and motion which was acknowledged by De Raey. Before the appearance of Descartes's *Principia*, namely in his *De illustribus quaestionibus physiologicis* (1641) Regius rejected Aristotle's definition of motion as “obscure and contradictory,” and defined

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49 AT III, 387; AT VII, 434.

50 Clauberg 1658, *Tobiae Andreae [epistola]*, 3 (unnumbered).

51 Strazzoni 2022.

52 Heereboord 1654, 6 and 10–11. See also his *Ἐπιμνηνεια logica* (1650), briefly discussing Aristotle's idea of place through a commentary on Burgersdijk's *Synopsis* (1632) of his *Institutiones logicae* (1626): Heereboord 1650, 4. On Heereboord, see Verbeek 2015.

it as a “progression from place to place by an impressed impetus.”<sup>53</sup> The account is developed in the *Fundamenta physices* (1646), where the Aristotelian definition (“the act of what exists in potency, in so far as it exists in potency”) is labelled as “vulgar,” and is criticized both by revealing its internal contradiction (as an act presupposes a being in act, not in potency), and by addressing the explanations of Simplicius and Benedict Pereira (ca. 1535–1610), according to which motion is an imperfect act, namely an act of something which is in potency with respect to a further act (something which does not explain what motion is, as motion is always actual).<sup>54</sup> In turn, motion is defined by Regius by adapting Descartes’s vulgar definition to the proper one, as “the transference of a body from a place to a place, namely from the vicinity of certain bodies, to the vicinity of others.”<sup>55</sup> Accordingly, “place,” becomes “vicinity,” though “place,” (*locus*) is explained by Regius as internal (or space) and external (or surface), defined with respect to the distance or *situs* with regard to other bodies.<sup>56</sup> This account underwent developments in the following editions of the *Fundamenta physices* (viz. *Philosophia naturalis*: 1654 and 1661), where motion is defined (1654 edition) as a transference from place to place “by an impressed and inhering impetus,” viz. by a force (*vis*) existing in the body in motion, which makes it possible to understand which of the bodies, in a situation of detachment, is actually moving.<sup>57</sup> In fact, Regius (1661 edition) does not consider motion as per se reciprocal, or respective (*respectivus*): if a body detaches from another, only the one in which there has been an impetus can be considered as moving. In the case of Virgil’s famous phrase “we move out of the port / and the lands and cities recede” (*Aeneid*, book 3, verses 73–74, a leitmotiv amongst Copernicans),<sup>58</sup> for instance, the motion is only in the ship, while the shores are moving only optically.<sup>59</sup> Regius’s approach, so far, is dynamic rather than kinematic: what matters in defining motion is not pure detachment, or a change of position or *situs*, but the force present in the moving body, which was to become a criterion for the identification of bodies in motion by the Cartesians (regardless of the consequential issue of how to identify such a force, as for Descartes rest, too, requires a certain force). In turn, place is identified by Regius with *situs*, viz. the position of a body with respect to remote or close bodies, so that in a sense a body can be said to be both moving and not moving (although it is only its inner force that allows the attribution to a

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53 Regius 1641b, disputation 2, theses 17–18.

54 Regius 1646, 31–32; cf. Pereira 1618, 688–694 (book 13, chapters 2–4). This kind of explanation was criticized in the *Disputatio physica de motu locali* (1655), presided over by De Raey and authored by the respondent, Petrus a Couwenbergh: De Raey and Couwenbergh 1655, thesis 2. The disputation is devoted to a discussion of Descartes’s definition of motion in the light of the ideas of mover, mobile, *terminus a quo, ad quem*, and time, and the different kinds, properties, and effects of motion.

55 Regius 1646, 7.

56 Regius 1646, 33–34.

57 Regius 1654, 11–12.

58 Koyrè 2009, 56–57; Omodeo 2014, 204.

59 Regius 1661, 14.

body of actual motion).<sup>60</sup> Contrary to Descartes, Regius assigns a philosophical role to the idea of *situs*, which he uses interchangeably with *positura*, one of the *exordia rerum* listed in the famous Lucretian distich used by Regius since his *Physiologia sive Cognitio sanitatis* (1641), where *situs* is a notion crucial to understanding the disposition of parts of the body as a condition of health, and then widely adopted by scholars (including De Raey).<sup>61</sup> While no dedicated discussion is present in the *Physiologia*, it was defined as the “position of a body amongst bodies” (and after all in a Cartesian worldview all bodies are parts of one substance) in his now lost academic lectures, as reported by Martin Schoock (1614–1669) in 1643 (attacking its causal relevance in natural changes), and then in his textbooks.<sup>62</sup> In fact, such a relevance was demonstrated by Regius in his *Fundamenta physices*, while considering the case of weights on a balance, the change of which leads to a loss of equilibrium and to a motion.<sup>63</sup> Provided that there is a communication of motion (and impetus or force), accordingly, *situs* acquires a philosophical relevance, and it does so thanks to a demonstration belonging, strictly speaking, to the domain of the sub-alternate or mixed-mathematical discipline of mechanics rather than of Aristotelian natural philosophy. A domain where the idea of *situs* (or position) had traditionally a substantial role in accounting for the equilibrium of bodies on a balance and other simple machines,<sup>64</sup> which could be therefore easily adapted to a worldview such as Descartes’s (purported) mechanical one.<sup>65</sup>

## 6. De Raey vis-à-vis Aristotle and Copernicus

De Raey, too, accepted Descartes’s vulgar definition of motion, finding it “more tolerable” than Aristotle’s, provided that one gets rid of the idea of action (replaced with that of migration, *migratio*, whose active-passive neutrality is traced back to its linguistic ending—consistently with De Raey’s linguistic interests), and clarifies that of place.<sup>66</sup> Still, he found Descartes’s proper one definitely better, though, without the problematic stipulation of the consideration of one of the

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60 Regius 1654, 51–52; Regius 1661, 57.

61 “Mens, mensura, quies, motus, positura, figura / Sunt cum materia cunctarum exordia rerum,” Regius 1641a, 5; see *infra*, n. 79. On it, see Bos 2009.

62 Schoock 1643, 209–210.

63 Regius 1646, 29.

64 Capecchi 2014.

65 Garber 2002.

66 De Raey and Couwenbergh 1655, thesis 2; De Raey, *Annotata*, 253 and 254 (on *Principia* II.24 and 25): “‘actio’: [...] motus est migratio corporis de loco in locum, haec definitio esset tolerabilis, nam migrationi nomen sumitur in sensu neutro. [...] ‘Translatio’: seu migratio, quae nomina verbalia in io desinentia triplicem habere possunt significationem, vel enim actionem se actum agentis, vel passionem patientis, vel denique statum et conditionem alicuius rei significant, adeoque nec in activa, nec in passiva, sed in neutra sumuntur significatione”; cf. De Raey, *Dictata*, 110–111; De Raey, *Analysis*, 28r–v and 96v; De Raey, *De methodo*. [...] *Principiorum philosophiae pars prima[-quarta]*, 48. In transcriptions from handwritten sources, the use of slashes \ / indicates an addition in the manuscript; transcribed texts have been modernized.



involved bodies as at rest.<sup>67</sup> Both the issue of the idea of place and of that of rest are closely linked to his addressing the Aristotelian and Copernican heritage in Descartes's philosophy, making De Raey the ideal case for the study of how Descartes's ideas were taught through a re-consideration of their Scholastic underpinnings, and by confronting a delicate, theologically-laden issue. The two aspects were related, as far as the discussion of the Aristotelian counterparts of Descartes's ideas was somehow mandatory in the attempt to introduce Descartes at the University and to pre-Cartesian educated students, and so was that of the compatibility of Cartesianism with the Biblical tenet of the immobility of the Earth, given that philosophy was still intended, in the 1640s–1650s, as the handmaid of theology.<sup>68</sup> In the hands of De Raey, the two topics became closely interrelated, insofar as he did not just aim at instrumentally present Aristotelian ideas in order to show how Cartesianism could fit with them and thus be accepted at the University (an approach which characterized his *Disputationes ad Problemata Aristotelis*, 1651–1652, re-published as his *Clavis philosophiae naturalis* in 1654, but much less his *dictata*), but he rather elaborated upon the Aristotelian roots of Descartes's ideas in order to demonstrate how these did not fall into the scope of Copernicanism, viz. the fallacies of the latter's explanation of the movement of planets. Admittedly, his attempt to detach Cartesianism from Copernicanism was also instrumental to the institutional acceptance of Descartes, though De Raey's reading of Descartes against the Copernicans also served to defend the rationale and the specificity of Cartesian cosmology as such, and for doing so he relied on the Aristotelian elements—viz. the idea of place—present in Descartes's physics.

While in his printed texts De Raey largely adhered to a Cartesian treatment of internal and external place,<sup>69</sup> in his commentaries he developed a more diversified approach: revealing, in fact,

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67 De Raey and Couwenbergh 1655, thesis 2; cf. his *Clavis philosophiae naturalis*, 1654 (based on his earlier *Disputationes ad Problemata Aristotelis*, 1651–1652): De Raey 1654, 60

68 Strazzoni 2018.

69 This is the case with the *Disputatio philosophica de loco* (1667), presided over and authored by De Raey, where *locus* is considered as *ubi* itself and is discussed (De Raey 1667, theses 1–8) as *definitive* (viz. as the *situs* amongst bodies, which in the tradition characterized immaterial beings like angels, which cannot be surrounded by bodies), *circumscriptive* (or being determined with respect to surrounding bodies), and *repletive* (usually characterizing God). These ideas are rendered in Cartesian terms, viz. *repletive* place is equated with internal place and *circumscriptive* place with external place; in turn, they both involve the idea of *situs*, which can mean the contiguity or *nexus* of a body with other ones (this being the idea of proper place), or its arbitrary position (theses 9–10). Eventually, the immobility of place is explained in lay or vulgar terms of unchanging position or by the apparent immobility of some bodies, like Earth (theses 11–14), and, philosophically, through the consideration of bodies abstractly from their motion, viz. in an immutable geometrical continuum (theses 15–20). The idea of place is also treated in later texts, namely in the disputations eventually included in his *Cogitata de interpretatione* (1692), namely De Raey's *Specimen logicae interpretationis* (held in 1669–1671), *Disputatio philosophica explicans quid nomina materia, corpus et spatium significant* (1686), and in the *Cogitata* itself (based on disputations taking place from 1673 onwards). In the *Specimen*, which is a commentary on Burgersdijk's *Synopsis*, *ubi* is equated with place; the 1686 *Disputatio* presents a traditional, Cartesian differentiation between internal and external place (with a justification of its immobility through abstraction); in turn, in the *Cogitata*, aimed at exploring which are the usual or vulgar meaning of words, and how these can be used in philosophy, De Raey intends “situs,” “locus,” and

that the *dictata* were a place for the development and in-depth discussion of philosophical ideas rather than mere didactic tools, or rather, that didactics was a place for the production of knowledge rather than mere dissemination. First, a conservative attitude can be noticed in De Raey's *Dictata* (ca. 1659–1661), where he adheres to Descartes's differentiation between the vulgar idea of place and that of vicinity, emphasizing the differentiation between space, surface, *situs*, and place on the one hand, and contiguity (or proximate place) on the other.<sup>70</sup> Moreover, he relates Descartes's idea of external place—viz. as an immobile surface—to Aristotle's definition, criticizing those “spurious Peripateticians” (to whom I return later in this section) rejecting it as incapable of making sense of its immobility, which can be explained, if not on an Aristotelian basis, on a Cartesian one, namely by considering it *in genere* (not as a particular surface), and through its *situs* with respect to other bodies.<sup>71</sup>

Second, in his *Annotata* (ca. 1658) De Raey claims that “place” may signify (as for Descartes), figure, size, surface, and *situs*, though it usually means just *situs*, and there is no need to attempt to define it, but only to consider the common way of speaking (to the analysis of which in fact he was to devote his *Cogitata de interpretatione*, 1692).<sup>72</sup> Still, De Raey assumes Aristotle's idea of place as surrounding surface as capturing the idea of “proper place” and underlying that of motion, as a body can be said, “properly speaking” and “in the actual truth,” to be moving, if such a

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“positio” as synonyms, and capable of meaning not just the position of a body amongst others, but also something pertaining to the body-in-place itself, insofar as it is continuous with certain bodies. See De Raey 1692, *Cogitata de interpretatione*, 96–97; *Specimen logicae interpretationis*, 565; *Disputatio philosophica*, 628–630.

70 On *Principia* II.28: “nostra cogitatione”: quatenus propositum inter ea quae circumstant spatium vel superficiem ambientis determinamus, aut etiam nomina loci tantum intelligimus situm illum cuius determinatio plane a cogitatione pendet, sed vero proxime viciniorum contiguitas non pendet a cogitatione nostra, et verum, reale et proximum locum facit, qui ubi deseritur corpus dicitur propriissime [*sic*],” De Raey, *Dictata*, 112. For a discussion and dating of De Raey's, Clauberg's, and Wittich's commentaries see Cellamare 2020; Strazzoni 2023.

71 On *Principia* II.15: “pro superficie quae proxime ambit locatum”: hic ex. spectat definitio loci Aristotelica, quam multi spurii Peripatetici imperite reiiciunt, locus inquit est ‘immobilis proxime ambientis terminus’ (τὸ τοῦ περιέχοντος, πέρας ἀκίνητον). Et sic Aristoteles concipit locum tanquam vasis concavam superficiem, quae proxime ambit et continet corpus contentum, quae ingeniose loci consideratio est; sed maxime torquent se philosophi investiganda loci Aristotelici immobilitate. Non dicam iam quomodo ex Aristotelica philosophia fundamentis id explicari debeat satis nobis est, quod ex authore nostro id intelligi possit, si dicamus, quod ut spatium et locus internus, non simpliciter notant extensionem molis intrinsecam, sed connotant illius situm inter alia, sic et locus externus non simpliciter significat superficiem ambientis, sed eam notat ut determinatam per situm corporum circumstantium, porro ut spatium non in singulari huius corporis, sed in genere tantum extensionem, sic quoque locus Aristotelicus talem superficiem notat,” De Raey, *Dictata*, 105–106.

72 On *Principia* II.14: “differunt nomina loci et spatii”: est notatu dignum, quaestionem illam de loco et spatio, potius de nomine quam de re esse, quia quaerendum tantum est, quidnam usitate iis nominibus significetur, ex communi loquendi usu. Et sic videbimus 4 significari his nominibus: magnitudinem, figuram, situm, et superficiem ambientis. Nomen loci aliquando nil nisi situm significat, in ordine ad remota vel propinqua corpora, ut: cum locum civitatis alicuius determinamus in regione, in ordine ad montes, fluvios, lacus, sylvas, vel civitates alias circumpositas. Saepe enim de magnitudine et figura civitatis non cogitamus. Vix autem nomina loci aut spatii sic seorsim significant vel ambientis superficiem, vel magnitudinem et figuram, sed connotare solent situm in ordine ad corpora circumstantia. Ineptum ergo est disputare quid praecise locus sit, quia videndum tantum est, quid haec nomina usitate significant/,” De Raey, *Annotata*, 243.

surface changes, as in the case of a ship or a swimmer opposing the stream of a river.<sup>73</sup> The same identification of surrounding surface with proper place and vicinity is also provided in his *Analysis* (ca. 1664–1668), though with a notable difference: as in the *Annotata* De Raey refers to multiple bodies contiguous to the body-in-place, while in his *Analysis* one contiguous body only (or, more ambiguously, only one congeries of bodies) is considered as constituting the proper place of a body, namely, the body-in-place “is contiguous by each single part to one body only.”<sup>74</sup> As I discuss below in this section, this was functional to the discussion of the foremost case of a body-in-place, namely of the Earth surrounded by a vortex of matter, which he discusses especially in the *Analysis*. His varying explanations of the idea of place, in fact, can be read as underpinning his addressing the issue of Copernicanism: the two topics becoming essentially related in De Raey’s hands.

Third, in the untitled commentary probably dictated (and now held) at Amsterdam (ca. 1669–1702) the approach is more detailed: “immobile surrounding surface” is labelled as the true definition of place, and considered in two ways: as a proper place, “determined by surrounding bodies,” and a common place. Proper place is for instance the air surrounding us, though determined with respect to the walls of the room (roughly matching Descartes’s idea of external place), while common place is the surface of a body (as the ship, or the church) including more bodies. Motion is, anyway, the very change of the immediately surrounding surface,<sup>75</sup> or the

73 On *Principia* II.15: “(Locus significat superficiem cum connotatione situs; qui situs cum manet idem, censetur idem esse superficies), τὸ τοῦ περιέχοντος ἀκίνητον πέρας”. Sed non advertit illam immobilitatem non a natura, sed a determinatione nostrae cogitationis, quia nihil in mundo absolute et immobile. Et sic dicimus contra spurios Aristotelicos, Aristotelem hic posse defendi. Advertendum solum nomen loci ambiguum esse, et quandoque alia significare./ ‘Manere in eodem loco’: quatenus nomen loci primario situm notat, quam determinamus per corpora remotiora, quorum respectu navis eandem positionem retinet. Si autem nomen loci cum Aristoteles sumamus pro superficie ambientis, haec navis proprie loquendo, et in rei veritate movetur, quatenus locum proprium mutat, quod evidens ex exemplo natatoris, qui sic fluminis cursu obnititur, ut semper eundem retineat situm inter ripas,” De Raey, *Annotata*, 244–245.

74 On *Principia* II.15 and 31: “pro superficie’: ita ab Aristotele [...] accipitur nomen loci [...]. Et haec loci acceptio nostra opinione omnium optima est, et minus obnoxia, quam ubi locus pro spatio accipitur. [...] \Ita locus quasi vas immobile est proxime comprehendens locatum, ut superficies proxima aquae ambientis piscem, aeris hominem, vasis vinum comprehendit./ [...] \‘Spectantur’: aliquando tamen etiam ut mota spectantur, ut navis contra torrentem nititur, eundem situm inter ripas servando, quamvis locum pro situ accipiendo sentiatur locum non mutare, locum pro vicinia, et superficie ambientis sumendo movetur, quam maxime./ [...] ‘Sibi proprium’: ut est in uno loco sibi proprio, quatenus secundum unamquamque partem uni tantum corpori contiguum est, quae contiguitas unumquaque ambit, et proprium sibi locum facit,” De Raey, *Analysis*, 26r, 29r, and 29v; cf. 97r (on *Principia* II.28): “[a]dditum est: ‘ex vicinia corporum (immediate) contiguum, in viciniam aliorum’, atque ita 1. tollitur ambiguitas vocabuli, loci, 2. ita videmus, quia unum corpus, ab una tantum corporum ambientium congerie, immediate potest contingi, et recedere, uni corpori unum tantum locum, et motum proprium esse.” Cf. De Raey, *Annotata*, 259 (on *Principia* II.31): “una tantum corpora’: quia unum corpus, uno tempore, uno tantum in loco est, ideoque unis tantum corporibus proprium illius locum determinantibus, contiguum, nam secundum duas superficies fieri contactus non potest.”

75 On *Principia* II.15: “pro superficie quae proxime’: hinc Aristoteles elegantissime definiti locum lib. 4 Phys. quod sit proximus et immobilis ambientis terminus: quam definitionem nos defendimus et accipimus pro vera [...] sed eam negant pseudoaristotelici/. Intelligenda autem ibi est superficies in communi get ut determinata per circumstantia corpora: ut superficies aeris, quae nostrum corpus ambit proxime, in quantum determinatur per hos parietes noster locus est. Et hinc dicitur locus proprius. Locus communis Aristotelico sensu dici potest, remota aliqua superficies intra se continens corpora plura: ut concava superficies navis vel templi comprehendit plures

“mutation of continuity.”<sup>76</sup>

In fact, one can also note different positions on the nature of motion in De Raey’s commentaries, who besides defining it in Cartesian terms of change in contiguity and continuity,<sup>77</sup> labels it, in his *Dictata*, a “mutation of *situs* or of immediate contiguity,”<sup>78</sup> and quotes Regius’s famous distich (mentioned above) in his *Analysis*.<sup>79</sup> In summary, these differences can be explained by considering that, let aside the proper, strict definition of motion as detachment between parts of matter, motion can also be meant in terms of participation, or common/*per accidens* motion (to consideration of which the Amsterdam *dictata* seem to be aimed), both for De Raey and for Descartes: so that on a ship (*Principia* II.31) the parts of a clock carried by a passenger have a proper motion with respect to the clock, but at the same time they participate in the motion of the man, who can have a proper motion with respect to the ship, and at once participate in the motion of the ship itself.

The overall problem, accordingly, is how to determine what is the place of a body. Looking at De Raey’s Aristotelian-Scholastic sources—which might also have been Descartes’s sources (as both De Raey and Descartes lived and, with a difference of about a decade, published in the United Provinces)—can shed some light on this.

As mentioned above in this section, in his commentaries De Raey criticized those “spurious Aristotelians” who did not accept Aristotle’s idea of place on the ground of the unaccountability of its immobility.<sup>80</sup> We can identify them in Burgersdijk and (to some extent) Keckermann, mentioned by De Raey as exemplifying a compendium of all pre-Cartesian knowledge—and up to now scarcely considered in Cartesian scholarship.<sup>81</sup> Burgersdijk was indeed the author of the main textbooks—in logic and other disciplines—used in Dutch universities after the School order of

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homines. ‘Manere in eodem loco’: sumendo nomen loci pro situ, quem eundem retinet: sed si per locum intelligas superficiem proxime circumscribentem illud corpus quatenus ab illa recedit dicitur moveri,” De Raey, *De methodo*. [...] *Principiorum philosophiae pars prima[-quarta]*, 44.

76 On *Principia* II.28: “[...] ut motus hoc pacto quam mutatio continuitatis,” De Raey, *De methodo*. [...] *Principiorum philosophiae pars prima[-quarta]*, 50.

77 De Raey, *Annotata*, 260; De Raey, *Analysis*, 28r.

78 On *Principia* III.30: “‘reale est ac positivum’: propter mutationem situs seu immediatae contiguitatis nihil reale est in motu,” De Raey, *Dictata*, 113.

79 De Raey, *Analysis*, 37v.

80 See *supra*, nn. 71, 73, and 75.

81 “Omnis autem scientia quae hactenus habita fuit pro philosophia, vel popularis et empirica, vel sophistica tantum fuit. [...] \Ex omnibus his tribus generibus conflatae Keckermanniana, et ex parte Burgersdicianae/,” De Raey, *Annotata*, 9. Another relevant source of De Raey was Pierre de la Ramée (1515–1572), frequently mentioned in his commentaries and in his *Specimen logicae interpretationis*, devoted also to an examination of Burgersdijk’s logic. So far, Keckermann and Burgersdijk have mostly been considered in reference to the uses that Cartesians, such as Heerebood, Clauberg, and De Raey himself, made of their work: Viola 1975; Strazzoni 2015; Hotson 2022; Efal-Lautenschläger 2023.

1625, and charged with providing a revision of Keckermann's logic.<sup>82</sup> In his *Idea philosophiae naturalis* (1622) Burgersdijk rejected Aristotle's definition of place on the ground, amongst others, that there was no consensus on its immobility. Instead, Burgersdijk endorsed the view according to which place is space, namely a "certain imaginary capacity equal to the body-in-place," whose parts match those of the body-in-place, tracing this position back to Julius Caesar Scaliger (1484–1558), and opposing it to those of the Conimbricenses, Toletus, and Pereira, defending Aristotle's definition. Still, Burgersdijk found acceptable the defence of the immobility of place proposed by Keckermann, who adopted the idea of place as basis (βάσις), which "is subjected" to the thing-in-place, and with respect to which it is immobile.<sup>83</sup> According to Keckermann's *Contemplatio gemina prior ex generali physica de loco* (1598), indeed, place is "the extreme part of the natural body [...] as far as it is ordained at bordering and sustaining another body." The foremost case of place is a floor: as we walk on it, we reach different portions of its surface, and such portions are the places we reach. Its immobility, in turn, is explained in terms of the capacity of the surface to sustain the placed body, as a (moveable) container of wine allows it to be contained without breaking up, or as a river in a storm still allows a ship to navigate it.<sup>84</sup> So that Keckermann concludes that "Aristotle does not actually say that place is the surface of the containing body, but he says this: in that aggregated, whole body by which another body is circumscribed and contained by contact and application, that extremity is to be said to be [...] mainly the place: i.e., that part which, subjected to its parts, does not yield to the moved body, in so much as the body-in-place can move on it," or "what per se and mostly matters for motion or for rest, [...] that is [...] place."<sup>85</sup>

Keckermann's idea of place can be compared with that of Descartes, as (1) place is not the whole surface of a surrounding body (or an aggregate of bodies), but only a section of it, (2) such a section can be defined as a part of a carrier—regardless of the state of motion of the latter. That's the case of a man on a ship: he can move or be at rest on it, as far as he is sustained or carried by the ship; his proper place, in turn, is only the section of the ship contiguous to him, while the air surrounding him cannot be intended as his place, as it does not matter for him to move or to be at rest. Moreover, it does not really matter whether the ship is moving: it is immobile insofar as it can sustain him. In fact, we may suppose that Descartes, in considering the Earth as at rest in order to follow the common way of speaking, had nothing in mind but Keckermann's theory of place.

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82 Van Rijen 1993.

83 Burgersdijk 1652, 20–21; cf. Scaliger 1557, 6–7 (exercise 5, section 3); Conimbricenses 1610, volume 2, 35–38 (book 4, chapter 5, *quaestio* 1); Toletus 1593, 115r–117v (book 4, chapter 5, *textus* 49, *quaestio* 3); Pereira 1618, 618–625 (book 11, chapters 5–7). On *ubi*, which Burgersdijk differentiated from place as only bodies have a place, and as place is a quantity, *ubi* is basically a position, see his *Institutiones logicae*: Burgersdijk 1634, 47.

84 Keckermann 1607, 24 and 27, and 52–53.

85 Keckermann 1607, 61–62.

There is a case, however, to which this account of place is not well suited, and which we may assume to be a reason leading De Raey to mean place more expressly as the whole, surrounding surface of a body, and so to overcome Descartes's idea of mere contiguity in favour of a more standard Aristotelian one: namely planetary motion, where assigning to a body a proper motion would lead to qualifying it as completely detaching from its surrounding body, which can no longer be considered its carrier.

De Raey, as mentioned above, omits the stipulation that in a state of motion one of the bodies in detachment can be labelled as at rest. He notes that everyday language can in fact match the reciprocal nature of motion, exemplified by the case of a man swimming against the flow of a river,<sup>86</sup> viz. the key case used by De Raey to address the issues of the reciprocity of motion and the mobility of the Earth. For De Raey—contrary to other Cartesians, like Regius (as discussed in section 5) as well as Wittich and Clauberg (who interpreted reciprocity in more relational terms, as I discuss in sections 7 and 8), motion is always strictly reciprocal, in the sense that opposing forces are always at work when two bodies separate. Such forces are intended by De Raey to be forces of motion, or contrary *impetus*, necessary to win the resistance opposed by rest as the ultimate factor in granting the cohesion of bodies (*Principia* II.55). With this theory, De Raey addresses an instance escaping Descartes's rules of impact (accepted by him),<sup>87</sup> which in fact do not fit well with the idea of motion as separation for the reason that they all deal with the change in position and velocity of bodies through impact in a vacuum: a situation in which motion, in a strict Cartesian sense, occurs only at the point when one body is detaching from the other after impact. As a matter of fact, not even the approaching of a body to another or their distancing after detachment fits with Descartes's idea of motion, but rather with the vulgar idea of a change in position. To put it otherwise, such rules do not deal with resistance to breaking—and so with overcoming cohesion i.e. rest—and presuppose that no breaking at all happens between two homogeneous bodies in a vacuum, whose impacts affect only their velocities.<sup>88</sup> For De Raey, if we suppose (according to the *Annotata*) that “two bodies are hitherto continuous in one mass, annexed to no other ones but are posited as if in a vacuum,” in order to explain their detachment, viz. the breaking of the whole mass, we need to suppose that an impetus is exerted on half of it in order to be moved in one direction, while the other half is made to resist moving along with this half by an opposite force: a force compared to that of a man swimming against the stream of a river, viz. moving with respect to it

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86 On *Principia* II.30: “tantum spectantur”: imo quandoque etiam secundum usum loquendi contigua corpora, a quibus separatio fit, simul dicuntur moveri, quatenus translatio eorum est totalis, h. e. secundum omnem superficiem eorum: exempla habemus in natatoribus, et in navibus quando obnituntur flumini cursui,” De Raey, *Annotata*, 261; cf. De Raey, *De methodo*. [...] *Principiorum philosophiae pars prima[-quarta]*, 51.

87 De Raey 1654, 112–120.

88 Garber 1992, chapter 8.

and vice-versa, as far as there is a complete separation between him and the water, or, as De Raey puts in the Amsterdam commentary, two contrary impetuses.<sup>89</sup> Accordingly, in his *Analysis* De Raey extensively discusses how the “paradox” of the reciprocal nature of motion serves to understand (1) the initial division of matter, and (2) the explanation of the motion of the Earth and cosmology as such, at which also the “painstaking demonstration of fluidity” is aimed.<sup>90</sup> In summary, the idea of the reciprocity of motion serves De Raey to show that if a body carried by a fluid—like a man in a river or a planet in a vortex of subtle matter—starts to move by a force other than that by which it is carried by the fluid, such a body will undergo a complete detachment with respect to the fluid, and will be, strictly speaking, in motion (while when it is just carried, it can be considered as philosophically at rest).

As to the painstaking demonstration concerning fluidity, this is developed by Descartes in *Principia* II.46–53, and is aimed, generally speaking, at showing what happens to a body immersed into and equiponderant with a fluid. In a static condition of the fluid, all its particles move in all directions, ideally describing circles in it, and impacting with equal force all sides of a solid immersed in it. If one of the particles impacts it with more force, in turn, this causes the solid to move, with a speed proportional to the force of the impacting particle: this serving Descartes to show that, against the fourth rule of impact (holding in a vacuum), it is possible for a small body to move a bigger one, as all the particles contribute to such a motion. Eventually, if all the fluid moves in one direction, the solid is carried with it, and it moves less than if it were moved by a force other than that of the fluid, “for it certainly moves away less from the neighbouring particles of this

89 On *Principia* II.29: “ex vicinia corporis CD’: immediate, quae ante huius motus initium continuitatem efficit, et haec duo corpora coalescere facit in unam contiguam molem. Et ad intelligendum qua ratione reciproca dicatur haec translatio, et eadem ab utraque parte vis requiri dicatur, supponimus haec duo corpora adhuc continua, in una mole aliis nullis annexa esse, sed quasi in vacuo poni, atque tum evidens est mediatatem unam AB, impetum veniente ab E, non posse divelli ac transferri a CD nisi in eo vis quaedam esse nitendi in contrarium: nam sine illa vi contraria, impetu facto in E, tota moles simul moveretur versus dextram. \Si autem supponas, ut supponendum necessario est ad materiae divisionem intelligendam, AB a CD divelli, necesse est reciprocam esse quandam translationem in CD et talis reciprocae translationis exemplum habemus evidens in natatore, qui contra torrentem nititur ita ut ille a flumine et fluvius ab ipso separetur/,” De Raey, *Annotata*, 259–260 (cf. *supra*, n. 86); “[...] tum facile intelligitur fieri non posse ut medietas una AB divellatur et transferatur a CD ac tendat versus F quin, CD vi quadam contraria divellatur reciproce ab AB alios namque hoc totum indivisum moveretur in easdem partes versus F,” De Raey, *Dictata*, 113; “[s]i ergo supponas hoc corpus unum seiunctum esse ab omnibus aliis, evidens est, impetu facto in A moveri debere totam molem cohaerentem, eamque separari posse a CD nisi impetus contrarius sit in D,” De Raey, *De methodo*. [...] *Principiorum philosophiae pars prima[-quarta]*, 50–51. De Raey refers to an image given in AT VIII-1, 56.

90 On *Principia* II.29: “[...] duplex dici potest auctoris scopis in hoc paradoxo astruendo. Primo, et ante omnia enim aliter intelligi non potest prima materiae in partes divisio, uti adhuc corporum fluidorum partes diversis, et contrariis motibus suis manent divisae. 2. Scopus magis particularis, est idem, qui postea erit in operosa de fluido demonstratione, questio nempe de motu terrae, et systemate mundi,” De Raey, *Analysis*, 29r. See also on *Principia* II.53 (on fluidity): “est quaerendum’: in physica generali 1. tum quia durum et fluidum valde generales corporum affectiones sunt, [...] \3. particularis adhuc causa est, nempe determinatio Terrae motus, et planetarum, etc./,” De Raey, *Analysis*, 34v. The issue of the initial division of matter is mentioned in De Raey, *Dictata*, 113; De Raey, *De methodo*. [...] *Principiorum philosophiae pars prima[-quarta]*, 51.

fluid,”<sup>91</sup> and this is what happens to planets. We can make sense of Descartes’s reasoning as follows: given the fact that the speed acquired by a solid in a fluid is proportional to the force of the pushing body, if the pushing body is the fluid itself (e.g. all the particles, or just one of them), there would always be, in dynamic terms, an equilibrium of forces between the solid and the fluid, and in kinematic terms (as put by Descartes with regard to the behaviour of planets: *Principia* III.28) there would not be a complete separation of the solid with respect to the surrounding particles. In fact, for Descartes there is not an absolutely static condition between the Earth and the fluid matter of the vortex: on the contrary, the particles are always faster than the planet (and thus they compose a fluid, as it is in this that the nature of fluidity consists: *Principia* II.58): although, if the planet/solid is just carried, we can consider it as at rest with respect to the fluid. De Raey stresses in his *Analysis* how all this is the “fruit [...] of that painstakingness about fluidity [...] by which it is demonstrated that the Earth is at rest with planets in this fluid, and therefore they are all moved,” a thesis which he attributes even to Virgil of Salzburg, who in fact was widely known for having defended the existence of the antipodes in the eighth century.<sup>92</sup> Not surprisingly, therefore, especially in his *Analysis* he adopts the idea of place as a physical surrounding surface, as this captures the case of the solids immersed in fluids.

In turn, the idea of reciprocity, in De Raey’s hands, serves to stress what happens when a solid is moved by a force other than that of the fluid: contrary to what happens to a man walking on a ship (to which he is in fact attached by the force of gravity), in a situation of a balance of forces, such as that of planets in vortices, there is a reciprocal detachment of the bodies. The case is like that of a man swimming against the stream, though with more far-reaching consequences. In a celestial vortex, indeed, the equilibrium of forces causes the planet to be carried in that part of the vortex where a volume of particles equal to that of the planet has no more force to pursue its motion in a straight line than the planet itself. Therefore, if the planet is moved by a force other than that impressed by the vortex, there will be a complete separation with respect to the fluid, and the planet

91 Descartes 1982, 75; AT VIII-1, 77.

92 On *Principia* III.26: “cinctam”: quod caelum eam in aequilibrio detinet, quatenus non magis ab una, quam ab alia parte videtur moveri. Hic fructus videbimus operositatis illius de fluido. Part. 2, art. 56. Ex quo demonstratur Terram cum planitis in hoc fluido quiescere, atque adeo una moveri, et de hac quaestione totum systema mundi dependet. Episcopus Salisburgensis Vigilius, cum primum hoc traderet, et doceret in concione, damnatus est, depositus, et in exilium missus,” De Raey, *Analysis*, 42r. As reconstructed by Pierre Bayle (1647–1706), according to a number of sources Virgil of Salzburg (ca. 700–784) was allegedly removed from office because he admitted the existence of antipodes; however, there is no substantial evidence that he was actually condemned: Bayle 1697, volume 2, part 2, 1220–1221. Amongst those assenting to the belief of the existence of the antipodes, Bayle mentions Kepler, who in the *Epistola apologetica* opening book 4 of his *Epitome astronomiae Copernicanae* (1621) mentions the case of Virgil as part of his broader defence of Copernicanism (Kepler 1635, 429–430). It might be that De Raey just adopted and misinterpreted (on purpose or not) Kepler’s use of the alleged condemnation of Vergil; see also De Raey 1654, 23. The case of Virgil is also mentioned in—amongst others—Descartes to Mersenne, April 1634, AT I, 288; Clauberg 1652, 402; Lipstorp 1653, *Copernicus redivivus*, 12. On him, see Carey 1989; on the use of anecdotes like this, see *infra*, n. 96.



will move in a layer of the latter where the particles have more force, in order for a new equilibrium to be installed.<sup>93</sup> In other words, the vortex would be no longer its carrier—unless a new equilibrium is reached. In his *Clavis* and commentaries, De Raey stresses that if the Earth and planets moved on their own—“like fishes through water, and birds through air”—<sup>94</sup> for which, in fact, they have no means, it would not be possible to account for the gravity of terrestrial bodies (counting as parts of the Earth), insofar as these would be no longer in equilibrium with the subtle matter surrounding the Earth, and the Earth (and the planets) will be lighter than the matter of the vortex.<sup>95</sup> He does so by addressing the Copernicans (in fact, Kepler), Nicolaus Copernicus (1473–1543) himself, Tycho Brahe (1546–1601), and the “recent Ptolemaics,” accused of not being able to explain the cause of planetary motion,<sup>96</sup> as well as Galileo, who, like Copernicus, for De Raey, could not solve the issue

93 The matter is discussed in detail in Schuster 2012.

94 De Raey 1654, 63–64. The metaphor was usually assumed by the Scholastics to discuss the motion of planets in fluid spheres: see Grant 1994, chapter 13.

95 On *Principia* III.19, 26, and IV.21: “\‘curiosius’: nam Copernicus planetas moveri suoapte impetu, velut pisces per aquam, et aves per aërem, putavit./ [...] ‘Propensionem ad motum’: non enim movetur ut piscis vel avis, quia nec motus instrumenta, nec spiritus et sanguinem habet, a quibus incitatur, nec movetur instar sagittae et turbinis suoapte tantum impetu, quia ea ratione nec in orbem circa Solem, sed motu recto tantum moveretur, et gyRANDO circa proprium axem efficeret, ut nos illius translationem ab ambiente coelo perciperemus, ut id in navi curri turbine, omnibusque motu proprio agitatis evidens est. Terra igitur eo modo moveri nequit quo id Copernicani fingunt [...]. ‘Levis esset dicenda’: nam levitas dicitur motus a centro, demonstratum autem est vim recedendi a centro habere quicquid in gyrum agitur, et quidem tanto maiorem, quanto solidiora sunt corpora. Quam causam esse parte tertia diximus, quare planetae maiores longius a centro recedant, et versus remotiores vorticum partes reperiantur globuli maiores. Atque ita secundum legem naturae universalem, gravia h. e. compacta et solida corpora a centro recedere debent. Quod fieret etiam in Terra si suoapte impetu in gyrum ageretur; atque hoc cum ratione obiectum fuit Copernicanis, nec solvere illud potuerunt,” De Raey, *Annotata*, 337, 343–344, and 459; cf. De Raey, *Dictata*, 148; De Raey, *Analysis*, 42v and 67r; De Raey, *De methodo. [...] Principiorum philosophiae pars prima[-quarta]*, 73–74 and 124–125. In fact, the gravity of terrestrial bodies does not depend just on the condition of equilibrium with subtle matter, as this makes terrestrial bodies weightless: rather, it is the effort of subtle matter to move away from the body of the Earth, by which it is prevented from moving in straight lines, that causes the phenomenon of gravity (*Principia* IV.20–21), though, if the Earth and its parts moved by themselves, they would nonetheless be lighter than the surrounding subtle matter.

96 See De Raey, *Annotata*, 342 and 394 (on *Principia* III.25 and 84): “‘multi mihi videntur errare’: tum inter antiquos, tu inter recentiores philosophos et astronomos. Et in hoc errore haesit Tycho Brahe, cum sectatoribus suis, item Copernicani; nec non Ptolomaiei quidam recentiores. Hi autem rogati qua ratione planetae tam regulariter possint moveri et circuitus suos absolvere, confugiunt ad nescio quam naturam, vel formam substantialem, vel intelligentiam. [...] ‘Vim secum rapiendi’: hinc plurimi astronomi et Copernicani praecipue Solem pro principali imo solitaria causa motus planetarum habent, vocantque hanc Solis vim magneticam”; De Raey, *Dictata*, 146–147 (on *Principia* III.19): “‘causas naturales’: ex hypothesi intelligi debent omnis generis phaenomena e. gr. etiam alienum vel nativa lux. ii. Necesse insuper est ut causam sciamus eorum quae apparent. Atque hoc posterius omnes ante Cartesium philosophi neglexerunt, et ipse Copernicus. [...] Rogatus enim exempli g. ipsa Copernicus, qua de causa et qua vi in tali a Sole distantia per tales circulos moveantur planetae, nihil habet quod respondeat.” See *supra*, n. 95. On retrograde motion, and the causes of planetary motion according to the Copernicans, Brahe, and the Ptolemaics (being unclear whether only the latter are addressed by De Raey as reverting to the ideas of nature, substantial forms, and intelligence), see Goddu 2010; Omodeo 2014. I found no evidence of the reported questioning of Copernicus, an anecdote which had merely a didactic function; it is worth nothing that De Raey also reported another anecdote involving Copernicus, namely that he was once asked why Venus did not show phases, to which he could not answer as he had no telescope—in the same way as Regius could have not answered the criticisms of Jacob Primerose (ca. 1598–1659) on the theory of blood circulation expounded by Johannes Walaeus (1604–1649), if he had not Descartes’s explanation at hand: “\Copernico tum temporis obiiciebatur quomodo Luna comitaretur enim Terram, sic Venus sequeretur Solem, deberetne habere incrementum et decrementum luminis etc. ad quae omnia non potuit respondere, quippe qui latuere ipsum ea quae nobis iam ope tuborum optidorum patent. Hac quoque ratione veritas de circulatione sanguinis contra Dominum Walaeum oppugnata est a Primerosio Anglo, at

of why bodies do not move away from a moving Earth, and allegedly reverted to the idea of gravity, viz. to a *petitio principii*.<sup>97</sup> To them, De Raey opposes not just Descartes's vortex theory, but also repeated references to Aristotle's *De coelo* II.8, viz. to the theory that planets are moved by the heavens.<sup>98</sup> Admittedly, in his *Dictata* he argues that Descartes developed his arguments for the condition of rest of the Earth in *Principia* III.28 (on the basis of the proper definition of motion, as above) and 29 (on the basis of the vulgar idea of motion) as “digression [...] due to the fulmination which Galileo suffered.”<sup>99</sup> Still, De Raey's attacks on the Copernicans go beyond the mere attempt to distance Cartesianism from Copernicanism and to associate Cartesianism with a more genuine form of Aristotelianism (viz. the ideal inspiring his *Clavis*), even in the midst of the quarrels over Copernicanism taking place in the 1650s. With regard to such polemics, in fact, De Raey (along with Wittich and Regius) endorsed a separation thesis, capable of granting philosophy an independence from Biblical interpretation.

## 7. Wittich: dynamics and kinematics

De Raey was not the only one to provide teaching of Descartes's philosophy in the classroom. As is well known, a foremost student and fellow of his was Clauberg, who studied under De Raey at Leiden in 1648–1649 before teaching at Herborn (1649–1651) and Duisburg (1651–1664), at which academies he was a colleague of Wittich, who, after having studied (amongst others) at Leiden in

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ille vix ausus fuisset respondere, nisi a Regio fuisset principiis Cartesianis adiutus/,” De Raey, *Annotata*, 337 (on *Principia* III.19); see Schmaltz 2016, chapter 5. The anecdote on Venus's phases somehow predates another didactic gossip on Copernicus, disseminated by John Keill (1671–1721) (*Introductio ad veram astronomiam*, 1718), according to which Copernicus replied to such a question that in the future the observation of such phases could be performed: Keill 1718, 194; on this, see Blumenberg 2000, 634. Moreover, Copernicus did not personally use the metaphor of the fishes and birds, though he explained the motion of planets, in his *De revolutionibus orbium coelestium* (1543; book 1, chapter 4) as due to their nature, which consists in their being spherical (for a discussion, see Goddu 2010, chapter 9, part 3); moreover, he did not explain their motion as a consequence of an action of the Sun: it was Kepler who, while rejecting recourse to the metaphor of the fishes and birds in his *Astronomia nova* (1609), admitted that they are carried around the Sun by a *species immateriata* coming from it (which determines their circular motion), and that they have elliptical orbits as a consequence of their motive powers, which he compares to the action of oars in water. Eventually, in his *Epitome astronomiae Copernicanae* he claimed that the planets are moved by the magnetic force of the Sun and that their elliptical orbits are not due to their motive powers, but—metaphorically—by their having a sort of oar fixed in a certain position. I owe this reconstruction to Palmerino 2007.

97 On *Principia* IV.21: “‘dissilirent’: [...] [r]espondet quidem Galileus obstare gravitatem quo minus dissiliant corpora huius Terrae, sed non cogitat hanc esse petitionem principi, posito enim quod Terra turbinis instar in gyrum agatur suoapte impetu in singulis ipsius partibus conatus recedenti a centro erit, hoc est levitas non gravitas,” De Raey, *Dictata*, 189. In fact, in the *Seconda giornata* of his *Dialogo sopra i due massimi sistemi del mondo* (1632) Galileo did not use the idea of gravity to explain why the motion of the Earth—or of a ship—does not affect the behaviour of its bodies, but that of the motion common to all them, viz. an inertial, circular motion; for a discussion, see Budden 1998. The same argument and text can be found in Clauberg 1691, *Notae breves*, 560–561.

98 De Raey 1654, 64; cf., for instance, De Raey, *Annotata*, 344: (on *Principia* III.27): “‘quiescat in ea coeli regione’: adeoque Aristoteles l. 2 De coelo cap. 8, pro nobis demonstravit planetas non suoapte impetu moveri per coelum, sed ab orbibus suis deferri.”

99 “Digressio quaedam in hisce sequi 2 articulis propter fulmen quod passus Galilaeus,” De Raey, *Dictata*, 148.

1646–1648 (at the time of De Raey’s graduation and first private teaching), taught at Herborn in 1651 and then at Duisburg (from 1652), Nijmegen (1655), and Leiden (1671).<sup>100</sup>

It was in the hands of Wittich—a professional theologian—that the so-called separation thesis was fully developed, being devised in fact during the early polemics over Cartesian philosophy in the Dutch areas, in particular, the polemics concerning the agreement of Copernicanism (usually associated with Cartesianism) with the *physica sacra*,<sup>101</sup> namely the Wittich affair and the Velthuysen affair, as reconstructed in detail by Rienk Vermij, and taking place in the course of the 1650s: for which Wittich wrote his *Dissertationes duae* (1653), *Consideratio theologica de stylo Scripturae* (1656), and *Consensus veritatis in Scriptura divina et infallibili revelatae cum veritate philosophica a Renato Des Cartes detecta* (1659), devoted to the demonstration of the differences in aim and epistemic premises of revealed truth and philosophy.<sup>102</sup> A strategy which was largely shared not only by De Raey—who discussed, through a peculiar metaphor, the differences between a theological and philosophical approach to the issue of the immobility of the Earth in all his *dictata*,<sup>103</sup> but also by Regius, who in his *Conciliatio locorum S. Scripturae cum diurna et annua telluris circumrotatione* (1658), adhered to the view that the Scriptures only conform to everyday language and contain statements on appearances (exactly like poetic expressions such as Virgil’s). Wittich, however, did not just focus on the meta-philosophical consideration of the domains of rational knowledge: the second of his *Dissertationes duae*, indeed, is a discussion of Descartes’s cosmology, considered from its basics, viz. through a discussion of the vulgar definition of motion (traced back to Augustine’s *De ordine*—revealing the difficulties in understanding motion in a non-ostensive manner—and to Kepler’s *Epitome astronomiae Copernicanae*, 1621),<sup>104</sup> as well as that of Descartes. As to the latter, Wittich notes that (1) there is

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<sup>100</sup>Eberhardt 2018; Cellamare 2020.

<sup>101</sup>Douglas 2015.

<sup>102</sup>Vermij 2002, chapters 12–13.

<sup>103</sup>He sets a differentiation between three kinds of people in a ship: (1) children and ignorant passengers, representing the Aristotelians, who mistake the changes in the position or *situs* between the ship and the shores—namely what De Raey labels optical motions, such as those expressed in Virgil’s phrase and Acts 27.27—for physical motions of either the ship or the shores, making judgments out of sensory appearances. (2) Mariners, namely (Cartesian) philosophers and astronomers, who can know the causes of motion and can therefore exclude error from their judgments, or at least prescind from it, i.e. make statements not concerning actual motions. (3) Neither ignorant nor expert passengers, compared to prophets and apostles, who, like the mariners, prescind from error by not making judgments on physical motion, but considering only changes in *situs* as what they are, namely changes in distance between the eye and the observed body. Like the apparent erratic, retrograde motion of planets, these changes are something real, and can be legitimately referred to in philosophy through everyday language itself. Such changes, in fact, can be captured by abstraction, but are not evidence of the physical motion of this or that body. In summary, Holy Scripture does not philosophize. Cf. De Raey, *Annotata*, 332–333 and 346–348; De Raey, *Dictata*, 144 and 148–150; De Raey, *Analysis*, 42v–43r; De Raey, *De methodo. [...] Principiorum philosophiae pars prima[-quarta]*, 67–68 and 74–75.

<sup>104</sup>Wittich 1653, 196–197; cf. Augustinus 1841, 1003: “[c]ogis nos, inquam, definire quid sit moveri: quod si potes, facias volo. Prorsus, inquit, maneat, quaeso, beneficium tuum, nam manet postulatio mea et ne me prorsus interroges, utrum mihi definire placeat; quando id facere potuero, ipse profitebor. Quae cum dicta essent, puer de

no such a thing as an action or force different from motion itself, which consists only in the transference of matter: he draws an argument from the *Disputatio de finito et infinito, in qua defenditur sententia clarissimi Cartesii de motu, spatio, et corpore* (1651) of Lambert van Velthuysen (1622–1685), where it is argued that as a man makes no more effort to walk, on a ship, in a direction contrary to that of the motion of the ship, than to walk when it is at rest; but if the ship had the force to move in a certain direction different from its very transference, he would need to overcome that force in order to move in the opposite direction.<sup>105</sup> Moreover, (2) Descartes’s idea of vicinity is to be interpreted as referring to discrete parts of the surface surrounding a body, because if a body were completely contained by another continuous body, it could not move except circularly, viz. on itself.<sup>106</sup> Apparently, no reaction-less drive of the container is allowed, not even its breaking and the complete detachment of the contained body from the container (though the portions of their contacting surfaces can, in principle, change). Thus, for Wittich, the simple interaction between two bodies only (the container and what is contained) does not allow to account for their detachment. Wittich’s position comes close to De Raey’s interpretation of the reciprocity of motion as always involving opposite forces of motion necessary to break a body, although it leads to a different outcome on how to interpret what place is: for De Raey, more oriented against a Copernican model, an enveloping surface, for Wittich, a discrete part of it.

Eventually, for Wittich (as for Descartes, *Principia* II.29, and Clauberg, as I discuss in section 8) (3) the reciprocity of motion has to be interpreted as potential, if one looks at the underlying dynamics. That is, in order for two bodies to detach no greater force is required to act on one than on the other, but no equal force is required to act on both bodies. In terms of mere transference, however, motion is always reciprocal (although there is no “universal language,” such as that conceived by Johannes Amos Comenius, 1592–1670, capable of expressing this).<sup>107</sup> At this point, Wittich adopts solutions, for the issue of the claimed state of rest of one of the detaching bodies, which are both dynamic (as it was for Regius, as seen above) and kinematic (as Clauberg’s, as I show in section 8). In the first *Dissertatio*, Wittich considers how to interpret Biblical or poetical phrases like “the sailors began to suspect that some land was approaching them” (Acts 27.27) and the aforementioned “the lands and cities recede.” In fact, he treats them as equivalent—though Descartes’s definition captures only the second one (if we consider the detachment of a ship

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domo cui dederamus id negotii, cucurrit ad nos et horam prandii esse nuntiavit. Tum ego: Quid sit, inquam, moveri, non definire nos puer iste, sed ipsis oculis cogit ostendere. Eamus igitur et de isto loco in alium locum transeamus: nam nihil est aliud, nisi fallor, moveri”; Kepler 1635, 106. The definition of motion as transference from place to place was also appropriated, against the standard Aristotelian definition, by Gassendi in his *Animadversiones in decimum librum Diogenis Laertii* (1649): Gassendi 1649, 458.

<sup>105</sup>Wittich 1653, 200–201; cf. Van Velthuysen 1651, 16–17.

<sup>106</sup>Wittich 1653, 214–215.

<sup>107</sup>Wittich 1653, 215–218.

from the shore)—and addresses only the first, claiming that even if the variation of distance is always mutual, only the ship is moving, for the reason that only the ship is acting, and the shores do not detach from their surroundings: so that claiming that the shores are approaching “is derived from a vulgar fallacy of the sight.”<sup>108</sup> Similarly, the immobility of the Earth with respect to a detaching terrestrial body, addressed in the second *Dissertatio*, is explained by the fact that the Earth does not detach from its surroundings as much as singular bodies on it do: kinematically, it is at rest, as it is in a state of non-detachment. Eventually, Wittich argues for the admissibility of (1) the state of rest of the Earth, as far as it keeps its contact with the neighbouring vortices: namely both in the case that we consider the Earth alone, and the Earth-Moon system (viz. the terrestrial vortex within the solar vortex: *Principia* III.33)—of which he provides a demonstration through a geometrical rendering of Descartes’s vortex theory, in chapter 5 of the second *Dissertatio*—and of (2) its state of motion: this is granted by the differentiation between motion (viz. the motion proper or unique to a body) and *delatio*, namely the motion common to the carrier and the carried bodies, which one might consider as parts of the carrier, or as joined to the carrier.<sup>109</sup> Since Wittich considers the carried bodies as at rest with respect to their surroundings (e.g. the deck of a ship), this solution is dynamic rather than kinematic.

## 8. Clauberg: a logical approach

Wittich and De Raey, although sharing the separation thesis between theology and philosophy, embodied two different approaches to the dissemination of Cartesianism: while Wittich had a foremost theological interest, and his commentaries on Descartes’s works concern only the *Meditationes* and up to article 20 of the first viz. the metaphysical part of the *Principia*,<sup>110</sup> De Raey focused mostly on physics, as Cartesian discussions of metaphysics and theology were formally banned at Leiden in the 1650s, where Cartesianism was accepted first and foremost as a natural-philosophical body of knowledge.<sup>111</sup> This can explain the more detailed level of consideration of the underpinnings of Descartes’s physics by De Raey, and can be intended also as the result of a coordinated effort and division of labour amongst the Cartesians, to which Clauberg contributed with texts addressing Cartesian method, logic, and metaphysics, such as his *Defensio Cartesiana* (1652), *Logica vetus et nova* (1654, 1658), and *Initiatio philosophi sive Dubitatio Cartesiana* (1655).<sup>112</sup> In fact, Clauberg’s treatment of the idea of motion and related notions can confirm this

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<sup>108</sup>Wittich 1653, 59–60.

<sup>109</sup>Wittich 1653, 218–222.

<sup>110</sup>Cellamare 2020; Strazzoni 2023.

<sup>111</sup>For a discussion of the early Dutch reception of Descartes, see Verbeek 1992.

<sup>112</sup>On their coordinated efforts, see Strazzoni 2014.

reading, as he analysed them from a metaphysical and especially logical perspective in his commentaries, as well as in his disputations and textbooks in natural philosophy. At once, his works reveal how certain arguments were shared by the Dutch Cartesians.

In fact, an issue in assessing Clauberg's commentaries on Descartes's *Principia* is that they show literal agreements with De Raey's commentaries: in particular, his *Notae breves* (ca. 1662–1664; published in 1691), which was certainly based on a re-use of De Raey's commentaries.<sup>113</sup> This is noticeable, amongst others, with regard to the reciprocity of motion, where De Raey's account and texts are clearly followed.<sup>114</sup> In turn, in Clauberg's *Dictata philosophica* (dated 1661; prepared ca. 1657) the account is akin to Wittich's, as the reciprocity of motion is explained by considering that (1) the same force is required on either bodies for motion, regardless of the actual body on which it is exerted (as, for instance, a boat can be detached from the shore either by a man pushing it from the shores, or from the boat itself, or from both sides),<sup>115</sup> and (2) that one can nonetheless consider one of the two bodies as philosophically at rest, since one of the two maintains its contact with its surroundings, while the other does not;<sup>116</sup> two arguments which Clauberg also proposes in his series of disputations *De motu* (1656–1658; republished in 1664). Moreover, similarities with De Raey's commentaries can be noticed with regard to the criticisms of the Copernicans, which are provided in both Clauberg's commentaries (though especially in the *Notae breves*).<sup>117</sup> However, Clauberg also embraced a logico-metaphysical approach peculiar to him. In his *Elementa philosophiae sive Ontosophia* (1647), for instance, Aristotle's standard definition of place is used as an example to explain the usefulness of metaphysics for more special disciplines, by considering the *per se/per accidens* differentiation as the *per se* immobility and *per accidens*

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113As discussed in Strazzoni 2023 (considering also the textual agreements between De Raey's and Wittich's commentaries on the *Meditationes*). On Clauberg's commentaries, see also Verbeek 1999.

114Clauberg 1691, *Notae breves*, 520 (on *Principia* II.29–30); cf. the texts quoted *supra*, nn. 86 and 89.

115On *Principia* II.29: “translatio est reciproca’: non melius potest explicari vis reciproca in mutua duorum corporum ab invicem separatione, quam si nobis ponamus ob oculos navigium aliquod haerens in lucto iuxta fluminis ripam, et duos homines, quorum unus stans in ripa navigium manibus pellat, ut illud a terra removeat, eodemque prorsus modo alius stans in navigio ripam manibus pellat, ut illud item a terra removeat; si autem horum hominum vires sint aequales, conatus eius qui terrae insistit, terraeque idcirco coniunctus est, non minus confert ad motum navigium, quam conatus alterius qui cum navigio transfertur. Unde patet actionem, qua navigium a terra recedit, non minorem est in ipsa terra, quam in navigio. Similiter si manus removeatur ab hoc ligno, tum etiam lignum removeatur a manu, aut, si ego a te removeor, tum tu etiam a me removeeris. Si quis distat ab alio, tum alius etiam distat ab illo. In disputationibus publicis super hac materia anno 1657 habitis multa adiiciuntur,” Clauberg, *Dictata philosophica*, 33v. In the disputations *De motu* (1656–1658) it is made more explicit that it is indifferent from which side force is exerted: Clauberg 1664, *Disputationes physicae*, 156–157.

116On *Principia* II.30: “quiescentia spectantur’: eo quod non modo eundem situm retineant inter externa corpora a quibus certo intervallo distant (quae consideratio vulgi est), sed praecipue quia immediatam viciniam cum aliis corporibus ultra existentibus integram servant (quae significatio magis philosophica est),” Clauberg, *Dictata philosophica*, 34r; cf. Clauberg 1664, *Disputationes physicae*, 158.

117On *Principia* IV.21: “proprio motu’: quod Copernicani statuunt,” Clauberg, *Dictata philosophica*, 68r; cf. Clauberg 1691, *Notae breves*, 543 and 560–561 (also on *Principia* III.84 ), and *supra*, nn. 96 and 97.

mobility of the surrounding surface, which makes Aristotle's definition acceptable.<sup>118</sup> In the disputations *De motu*, in turn, the consideration of place and motion assumes also a logical character, as, for instance, Descartes's use of two definitions of motion is interpreted as to make "its nature shining forth from this opposition," and criticizing the vulgar one as (1) the result of a generalization of the experience of our motion, a kind of logical error discussed in the *Logica vetus et nova*,<sup>119</sup> and (2) as including the idea of place, thus contravening the rule for which what is defined (in this case, local motion) must not to be used in the definition itself, even partially.<sup>120</sup> An issue which is kindred to Augustine's difficulty in understanding motion in non-ostensive ways, and which in fact also affects Descartes's philosophical definition, which is however preserved by Clauberg, who points out that even if the idea of transference cannot be included in the definition of motion as a genus of a species (for the reason that it is already synonymous with "motion"), it can still be used since definitions can be causal or "inferred from the causes concurring to constitute the defined thing": as in the case of Descartes's philosophical definition, which includes the *terminus a quo* and *terminus ad quem*, the subject, and the formal *ratio* of motion, viz. transference, which can be considered as concurring causes of motion itself.<sup>121</sup> A line of argumentation which is also followed in the *Dictata philosophica*, where Clauberg, besides (1) remarking how the differentiation between internal and external place (or space and place) was set by Descartes as in order to know things we need to ascertain their differences and similarities, (2) also draws attention to his correction of the improper meaning of certain terms, as that of motion, for which he reverted to a causal re-definition.<sup>122</sup>

## 9. Conclusion

As a conclusion, it is worth drawing attention, first, to the role of the commentaries on Descartes's

118Clauberg 1647, 127–130.

119Clauberg 1664, *Disputationes physicae*, 147–148; cf. Clauberg 1658, 355–356.

120Clauberg 1664, *Disputationes physicae*, 149.

121Clauberg 1664, *Disputationes physicae*, 150–151.

122On *Principia* II.10, 14, and 25: "differunt": res enim cognoscuntur recte, si cognoscam rerum omnium convenientiam et differentiam. Ita ergo author hic etiam explicat convenientiam et differentiam loci et spatii. [...] 'Differunt autem nomina loci et spatii': haec duo quamvis convenient, tamen et in aliquo differunt: nam etiam vocabula synonyma: non omnibus modis sibi respondent. Locus igitur imprimis situm significat, spatium autem maxime figuram et magnitudinem. [...] 'Dicere possumus': quoties enim vocabula non sunt satis apta, licet philosopho ea corrigere, constringere et determinare vagam eorum significationem. [...] 'Translatio': non est genus (nam latio et motus sunt unum et idem), sed est vox quaedam, quae ipsam naturam motus melius explicat, porro haec definitio est causalis, non essentialis," Clauberg, *Dictata philosophica*, 28r, 29r, 31v. The same approach is followed in Clauberg's *Chilias thesium ad philosophiam naturalem pertinentium* (held ca. 1655–1657, published in 1668 and, in an extensively commented form, as his *Dictata physica privata*, 1681), where (1) it is remarked how external place, intended in its Cartesian sense, is immobile as far as one intends it under a general idea rather than as an individual, (2) it is set as a comparison of internal and external place with internal (viz. mental) and external discourse, and (3) the vulgar definition of motion implies that something can be both defined as moving and resting, contradicting logical criteria: Clauberg 1668 and Clauberg 1681, thesis 107.

works as a place of genesis of knowledge: a genesis which came through the discussion of Cartesian ideas in the light of concurring paradigms, or through the discussion of issues not directly faced by Descartes. This can be shown especially in the case of De Raey, where we find a treatment of the idea of place and related notions far richer and more detailed than in his printed works, and entailing a combination of Aristotelian and Cartesian ideas, as well as the addressing of the issues raised by Copernicanism in natural philosophy and theology. Second, Cartesian commentaries and university lectures in the Dutch areas were aimed at an audience educated on Scholastic textbooks which Descartes could not have ignored: an audience which in fact was the ideal target of Descartes, who published his *Principia* in the Netherlands. Therefore, looking at how the *Principia* was discussed in the classroom can serve to disclose the Scholastic sources of Descartes—such as the textbooks of Burgersdijk and Keckermann—complementary to those usually considered by scholars, who have mostly focused on Jesuit-related authors. Third, commentaries offering a close reading of Descartes not only show how the discussion of his ideas fostered the development of new notions, but also bring to light topics which have resurfaced in contemporary reconstructions: that’s the case, for instance, for the reciprocity of motion as opposed to the relational understanding of it, or the coexistence of dynamic and kinematic approaches. Last but not least, Cartesian commentaries are evidence both of the sharing of ideas and texts, as well as of a strategy of the differentiation of approaches to the issues raised by Cartesianism: either from natural-philosophical, metaphysical, theological, or logical perspectives. In a sense, Dutch-related Cartesians were not just part of a network—which has increasingly attracted the attention of scholars in recent years<sup>123</sup> but had constituted a thoroughgoing philosophical school since the early 1650s. It is in the light of the idea of a collective production of philosophical and scientific knowledge that further research on Cartesianism—and early modern philosophy and science—should be undertaken.

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<sup>123</sup>Rossini 2022.



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