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## ► To cite this version:

Anne-Lise Rey. Agonistic and Epistemic Pluralisms: A New Interpretation of the Dispute between Emilie du Châtelet and Dortous de Mairan. Paragraph, 2017, Theories of Quarrels, 40 (1), p.43-60. 10.3366/para.2017.0214 . hal-01476976

**HAL Id: hal-01476976**

**<https://hal.science/hal-01476976>**

Submitted on 30 Jan 2019

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# Agonistic and Epistemic Pluralisms: A New Interpretation of the Dispute between Emilie du Châtelet et Dortous de Mairan

ANNE-LISE REY

## *I. The Deliberative Reading of Controversies*

The quarrels of the early modern period are often analysed as rifts in the rational harmony that is supposed to have presided over the Republic of Letters.<sup>1</sup> In such a view, they are interpreted as what (provisionally) shattered this harmony. This undoubtedly explains why they are so frequently omitted from the literature. Conflictuality is often criticized for its violence, threatening to tear apart the community of savants where it erupts, thereby producing a form of anomia. Accordingly, in his presentation of the polemical tenor of literary quarrels, Antoine Lilti stresses the ‘gears of conflictual mechanics, the stances and movements of the actors, the blows they may deliver, the manner in which they exploit and publish polemical violence itself’.<sup>2</sup> This political analysis of conflictuality (to use Christian Jouhaud’s expression)<sup>3</sup> blurs the lines between ‘persuasive strategies’ and ‘polemical tactics’. In this sense, agonism is a synonym for violent confrontation, with the violence seen as an overflow from a degenerating quarrel in danger of breaking the community apart. This analysis is labelled as political both because it shows how a partially autonomous mechanics of violence arises at the heart of the differend and also because it combines persuasion with conflict: attack becomes a persuasive technique. Alongside the painstaking disassembly of this process, the diagnosis is critical: conflict warps or derails the internal relationships of the community in which it erupts. In contrast, it seems to me that another interpretation of such conflict is possible, one

which sees in dissensus the very building blocks of communities. The arguments in favour of this hypothesis require that we question and challenge three suppositions underpinning the notion that dissensus is synonymous with political excess: (1) the sterile and destructive nature of dispute; and (2) the identification of what is violent with what is political.<sup>4</sup> These first two suppositions rest on a third, more general, supposition which emerges as a horizon for dispute analysis: (3) all disputes must be interpreted as a passing conflict whose resolution will herald a return to the normal state of consensus.

The heuristic function of controversy, and even the effects of conflict, have already been identified: controversy 'reorganizes the economy of knowledge',<sup>5</sup> following Descartes who 'takes great care in choosing his adversaries and integrating their criticisms into his works, to the extent that we could almost speak of controversy being strategically employed as a resource'.<sup>6</sup> It can also be thought of as a trial reformation of the social order.<sup>7</sup> These texts attempt to embrace the element of inventiveness to be found in the very dynamics of conflict. This inventiveness manifests itself through a reconfiguration of the field of knowledge or social order, producing 'new forms of sociability, ritual games, and a memorization of the controversy'.<sup>8</sup> Jean-Louis Fabiani allows for what he calls 'the agonistic forms of sociability', 'which open the way to controversy and enable us to account for the choice of weapons, the ritual nature of confrontations, the establishment of specific game rules, and the ways in which these may be broken. There is room here to draw a comparison with other forms of regulated competition, such as sport or verbal jousts'.<sup>9</sup> To allow disagreement to emerge, the means and rules of the dispute must be agreed upon. Literally, the parties must agree to disagree.

The 'instituting dimension of controversy' is present in order to mark a process of socialization (within the specific rules of the game) rather than to assert the possibility of holding an alternative theoretical position, of maintaining dissensus. Thus, this dimension is only one step, leaving open the question of how controversy should be regulated. Correlatively, the agonistic dimension is situated alongside verbal and physical violence, and the focus is on ways in which it can be regulated, or even self-regulated, and so forth. Thus, antagonism is transformed into a process of socialization (mutual opposition as a means of insertion into the social order) and agonism is turned into the violent expression of this membership. But, in another sense, the political significance of dissensus, that is, the possibility of not reabsorbing conflict and yet not risking the institution of anomia, is

all but abandoned. For these reasons, it seems to me that Lilti's text is useful in highlighting the heuristic dimension of conflict, while it also expresses the fear that the primary political issue, namely, the establishment of the community, may be threatened by the violence of conflict.

In all controversies, the supposition, in the form of an implicit normativity, is that quarrels must come to an end. Analysing quarrels would therefore be tantamount to explaining and theorizing what must, inevitably, steer dispute towards agreement. My approach is different: my aim is to challenge the supposed obviousness of this consensual horizon of broad Habermasian obedience. Habermas indeed shapes the central core of consensus in three different ways:

- (1) He believes in the 'mutuality of rationally motivated convictions',<sup>10</sup> in other words, an agreement whose validity is acknowledged by all. This in itself is a reply to the question he asks in *Moral Consciousness and Communicative Action*: 'How can we justify the principle of universalization itself, which alone enables us to reach agreement through argumentation on practical questions?'<sup>11</sup>
- (2) In his view, finding a norm shared by all is the condition of its validity.<sup>12</sup> This is a way of scaling the principle of universalization down to the smallest common denominator. Ultimately, we could see this approach as the *procedural* or *formal* root of mutual understanding.
- (3) We undertake this quest for consensus because of what Habermas calls an 'ethical breakdown' in the social link, a disturbance in the consensus,<sup>13</sup> a disagreement to be overcome.

These considerations reveal the assumptions underpinning his position: (1) consensus is an ideal; (2) dissensus is a moral problem; (3) organizing communities, including learned communities — or, in this case, epistemic communities — is a matter of finding a hegemonic position around which to unite all members.<sup>14</sup> But conflict analysis could never be reduced to an analysis executed under Habermasian consensualism, in so far as the latter sees conflict as merely a passing political moment. Is it not possible to do as others, such as Jacques Rancière, have done and consider conflict as the very essence of politics?<sup>15</sup>

*II. The Agonistic Alternative*

The approach explored by Chantal Mouffe for the last twenty years or so is interesting in that it proposes an alternative model for reflecting on conflict in politics.<sup>16</sup> Her starting point is to differentiate between agonism and antagonism, considering conflict to be the condition for the political community to be founded and arguing that an irreducible form of agonism is involved, one which is not absorbed but has an essential role in the democratic workings of the system.<sup>17</sup> The essence of her criticism of the consensualist model consists in revealing the prerequisites of the contemporary theorization of democracy carried out in the name of a dominant rationalist approach. Her criticism bears on two central issues: the elusion of the passions in political adhesion and the instrumentalization of rationality in normalizing the outlines of the democratic arena.

Naturally, liberal thinking leaves room for the acknowledgement of a certain form of pluralism, but one which 'describes a world in which different perspectives and different values do exist, all of which, due to empirical limitations, we could never adopt, but which, collectively, form a harmonious and non-conflictual order'.<sup>18</sup> This is not the form of pluralism Mouffe herself defends, since, for her, it seems to lean either on an *aggregative* paradigm grounded in an economic model ('politics [is conceived of] as the establishment of a compromise between the different forces that compete within a society'<sup>19</sup>), or else on a deliberative paradigm which, reacting against the instrumentalization of rationality in politics, leads to politics being subordinated to ethics (with the notion of a communicative rationality, the goal is to 'create, within the political arena, a rational moral consensus through free discussion'<sup>20</sup>). Picking up from Carl Schmitt, she indicates the ultimate limits of rational consensus, which, since it presumes to decide, also boils down to an exclusion (reintroducing an 'us' and a 'them'). Thus, Chantal Mouffe introduces a different form of pluralism, one which does not believe in the possibility of conciliation through discussion but turns conflict into the locus of confrontation for legitimate opponents.<sup>21</sup> As Mouffe concludes: 'We could say that democracy's ultimate aim is to transform antagonism into agonism.'<sup>22</sup>

Fundamentally, the aim of this model is to guarantee that collective identities can still be conceived of in politics, in contrast to an individual conception of decision which would now be the preserve of our 'world without enemies'.<sup>23</sup> This analysis of the agonistic position rests on three important points: (1) the deliberative analysis

model, whose hegemony I have demonstrated in a number of other analyses of classical era controversies,<sup>24</sup> should be replaced with a model which would allow controversy to be conceived of beyond the scope of an inevitable collapse back into rational consensus; (2) it challenges the relevance of models involving the imposition, in the name of rationalization, of political norms; (3) finally, it legitimizes an 'adversarial model' in which pluralism supposes the legitimate coexistence of divergences without presupposing their resolution, while framing these divergences within a common symbolic space where their conflict is played out. The agonistic position demonstrates therefore the necessity, even beyond political decision, of maintaining the possibility of pluralism, of divergence, and, all in all, the necessity of upholding the coexistence of many, opposing, heterogeneous points of view. This position stands in opposition to the 'current unipolar order'.<sup>25</sup> This same idea of pluralism was also developed in epistemology, with the aim of bridging the same theoretical gap: a rational account that legitimizes the consensus of normal science. Epistemological pluralism, embodied by, among others, Hasok Chang, can be seen as a response to this gap.

### *III. The Convergence between Epistemology and Politics: Epistemological Pluralism*

In his *magnum opus* *Is Water H<sub>2</sub>O? Evidence, Pluralism and Realism*,<sup>26</sup> Hasok Chang forged the theoretical tools for his epistemological pluralism.<sup>27</sup> He belongs to the same school of thought as the 'Pluralist Stance' championed by H. Kellert, H. Longino and C. Waters, in so far as he shares their conclusion that any one theory is insufficient for explaining a natural phenomenon; they all agree that the monist explanation of natural phenomena is limited and insufficient. This stance naturally involves a challenge to the unity of science. They define their pluralist stance in these terms: 'a commitment to avoid reliance on monist assumptions in interpretation or evaluation coupled with an openness to the ineliminability of multiplicity in some scientific contexts'.<sup>28</sup> But Chang distinguishes himself from a more radical pluralism by virtue of his idea of cooptation. Indeed, Kellert, Longino and Waters develop instead the idea that it may not be possible to regroup or integrate a plurality of approaches into a single science or even translate the results of one explanatory model into another. To give an idea of the contribution of Chang's interpretation to the

history of science, it must first be stated that his explicit position is one of deconstruction with respect to the Kuhnian conception of scientific revolutions. This deconstruction takes the form of three theoretical decisions: paradigms can coexist, this coexistence represents a cooptation, and this pluralism is normative.

It should also be added that Chang's interpretation rests on a thorough analysis of experimental practice<sup>29</sup> (this shows the extent to which this approach is relevant to chemistry, in so far as the latter is often seen as a practice rather than as a theory with rigorously defined principles), enabling it to re-evaluate a certain number of ideas and authors consigned to oblivion by the traditional history of science which sees them simply as 'defeated'. In this perspective, Chang has proposed a reconfiguration of the scientific field by proposing that other questions should be formulated than those aimed only at discovering the winner out of two competing hypotheses. Naturally, we can see the possible fate of such a method in deconstructing the opposition between the Ptolemaic and Copernican models, usually presented by history only through the lens of archaic resistance on one side and unexpected attachment to the lure of Copernican modernity on the other. What makes Chang's approach interesting is that it does not presuppose an end to the controversy nor does it entail a search for the reasons why the winning idea, historically and officially, won. Rather, it considers the competing theories as distinct models adapted to satisfying distinct objectives, that is, very specific research inquiries, less broad and only partially convergent with the overarching question traditionally accepted for explaining scientific revolutions. Thus, this method aims at deconstructing an interpretation of the history of science predominantly focused on a search for the arguments that made a group of savants switch their support for a general explanation of some set of natural phenomena which were, up to then, unsatisfactorily explained by another model. It is less a case of knowing who was right or wrong at a given time and more a question of knowing which model was most efficient in explaining some particular phenomenon. As I see it, the particularity of Chang's theory is twofold. First, it does not consider the historian of science's task to be the analysis of the procedures and arguments that lead to one model attaining hegemony, but rather to be the demonstration of how models (sometimes judged to be antinomic) have historically coexisted (the phlogiston and oxygen theories being a perfect example of this). Secondly, it revises the (less broad) questions that these theories — those we are attempting to evaluate — purported to answer. It seems

to me that, in the manner of E. B. Davies, this is another example of an epistemological pluralism<sup>30</sup> that does not, a priori, presuppose ontological pluralism.

Obviously, one of the problems arising from Chang's epistemological pluralism is that the search for truth is lost from view to make way for a description and analysis of the particular research questions that acted as guides for the actors of a particular era. Contrasting with reductionism, the emphasis is placed on what strongly risks being a form of contextual relativism. This raises a crucial question: does casting aside 'Kuhnian' processes of rationalization, based on the supposed identification of a recurrent structure to scientific progress, necessarily involve abandoning the requirement of truth? The aim of trying to identify the locus of convergence (of intersection, some would say) between agonistic political pluralism and epistemological pluralism is to lay bare the presuppositions of a consensualist interpretation. The idea is to reveal the theoretical benefit of maintaining heteronomy with respect to epistemic inventiveness.

#### *IV. For an Alternative Analysis of the Controversy between Emilie du Châtelet and Dortous de Mairan*

The question of the controversy's heuristic dimensions must therefore be reconsidered and reformulated. In conducting this analysis, the idea is neither to evaluate and display the superiority of certain arguments nor to identify the reasons why one explanation may have won out over another. We will explore the reasons giving rise to tension or divergence, but we will do this by uncovering the epistemic model upon which the actors in the controversy agreed — *that is, their relation to experimental proof* — and then building on the common ground of this model, to show the causes and reasons for the divergence. Summarizing the characteristic traits of this new analytical instrument, we can say that it is not a case of determining who is right or wrong, or of presuming that the differend will be simply reabsorbed. Rather, we want to know on what basis, on what stage, the differend was manifest (the conflictual consensus), and how this coexistence of paradigms should be interpreted, without having recourse to the usual terms employed when describing resistance to the establishment of a new theory.

This opens up the possibility of interpreting the dispute in a way that guarantees a form of inventiveness. Emilie du Châtelet used the



argumentative tools of experimental philosophy as a foundation to the Leibnizian principle of conservation. In doing this, she established a brand-new epistemic model in France. Before going any further, I must underline the fact that the controversy to be analysed here displays a tension between the idea of agonistic pluralism, according to which conflict is necessary and unresolvable, and the idea that a cooptation exists between heterogeneous positions (that is, the coexistence of hypotheses that could be seen as contrary to each other). My aim is to show how this cooptation allows us to understand the coherence of the link between experimental recourse and the Leibnizian principle of conservation. Is it a case of developing an element already to be found in Leibniz's own words by means of an a posteriori demonstration of the principle of conservation of motive action? Or of bringing a genuinely novel experimental dimension to the validation of the principle of conservation? The stakes are clear: criticism of consensus and the exposure of its illusory nature should not lead to an ultimatum such as 'sterile dissensus or compromise', but rather to the formation of an agonistic sphere that promotes inventiveness.

In order to contextualize the controversy, let us recall that, in 1728, Dortous de Mairan published his *Dissertation sur l'estimation et la mesure des forces motrices des corps* (Essay on the estimation and measurement of the motor forces of bodies). In the opening words, he indicates the aim of the text in no uncertain terms: to settle the quarrel of living forces.<sup>31</sup> This passage must be placed in the context that J. B. Shank has reconstructed so well<sup>32</sup> by showing how the introduction into France of Leibniz's position, through the quarrel of living forces, contributed both to disturbing the ongoing battle of words between Cartesians and Newtonians and to making the divisions in natural philosophy more complex. As strange as it may seem to us today, although Leibnizianism did find itself, *prima facie*, methodologically associated with Cartesianism within the framework of the anti-Newtonian war, as evidenced by the review<sup>33</sup> of *Institutions de Physique* (Foundations of physics) that appeared in the *Journal des Sçavans*, this interpretation must be balanced out by a strict contrast between the Cartesian and Leibnizian positions, which results from an interpretation of this same era through the lens of the quarrel of living forces.

It is therefore not surprising to read De Mairan writing the following in a letter addressed to the Marquise du Châtelet on 18 February 1741:

[Monsieur] Leibniz was a great man; most assuredly. But does Mr Newton grant him this? And in a wholly Mathematical or Physico-Mathematical examination, was he any less strong-headed to properly judge? Germany is a rich Nation in grand subjects. Shall we refuse the same preserve to England? As for the rest of Europe, I do not believe it would be doing a disservice to living forces to say that sentiments on the matter are divided.<sup>34</sup>

This statement, among others, confirms the idea of a kind of ‘objective alliance’, a consensus, between Cartesians and Newtonians, resisting the Leibnizian principle of conservation. On the basis of these two remarks, it seems to me that placing De Mairan’s texts within the framework of these quarrels (Cartesians against Newtonians, and the quarrel of living forces that pitted Cartesians against Leibnizians), in both cases under the banner of Cartesianism, produces an *opacifying* effect which, in a sense, distorts interpretations of both the 1728 *Dissertation* and the controversy between De Mairan and Emilie du Châtelet, and, as a result, somewhat reduces its significance. In a sense, De Mairan is both a good witness and a genuine actor in these seemingly paradoxical assemblies of historiographical movements, often considered as conflicting. Adopting a method of historical perspectivism, Mogens Laerke speaks of participating observers<sup>35</sup> to describe this ‘situation’.

Indeed, it is worth mentioning the ‘Cartonian’<sup>36</sup> category here, as recently elaborated by Ellen McNiven Hine in a bid to move beyond all typically accepted classifications and characterize the union of certain Newtonian and Cartesian elements in natural philosophy, demonstrating it through analysis of its argumentative procedure. What I would like to emphasize here is the complexity of the role played by Leibniz’s thinking within this objective union, the ‘Cartonian theory’. While at first sight the reference to Leibniz certainly works as a foil, it is also undoubtedly a useful tool for grasping the link De Mairan draws between physics and metaphysics, precisely because the latter, despite openly and firmly rejecting a metaphysical approach to the force of bodies, falls foul of the Marquise du Châtelet’s critique: the impossibility of conceiving of a principle of conservation without its accompanying, and often underlying, metaphysical device.

The essay is criticized and belittled in chapter 21 of the *Institutions de Physique*, ‘Of the Force of Bodies’. First, I wish to analyse the status of experimental proof in this text in order better to understand

how it was later discussed by Du Châtelet. De Mairan speaks in no uncertain terms when he refuses to treat force as a ‘metaphysician’. In fact, despite the initial warning from chapter 1, §1 of the *Dissertation*, he tells us: ‘I do not for a moment intend to approach the Force of bodies as a Metaphysician.’<sup>37</sup> In other words, despite the explicit refusal to discuss force ‘as a Metaphysician’, I would suggest, first, that this attempt to separate calculus from reflection on the nature of matter and its possible explanations regularly ends in failure, since all calculus implies a form of philosophy related to a metaphysical decision, and secondly, as is seen in paragraphs 52 to 54 of chapter 10, De Mairan discusses the *meaning* that, in his view, the notion of force should have. My hypothesis, here, is that in order to reject the metaphysical approach, he has to initiate a discussion about metaphysics and to state why he does not agree with Leibnizian metaphysics. But he is then led to a kind of ‘forced cooptation’. De Mairan is led to differentiate two meanings of the word ‘force’, to acknowledge the purpose of this differentiation, and therefore to discuss the ‘reality of force’, thereby preventing himself from remaining within a strictly geometric understanding of it. In this way, he finds himself somewhat arrested by the division he sees between the conviction that Cartesian calculus is acceptable and the conviction that the conceptual distinction between forces is both fruitful and pertinent. But is this truly what he does?

He, of course, declares his distrust of the Leibnizian vocabulary of force. Since De Mairan’s thought belongs first and foremost to an approach to the force of bodies whose interest is in the ‘perceptible effects attributed to it’, I would like to take a moment to look at the use he makes of the experiments he mentions in his demonstrative procedures. It would appear to me that this, in part, helps shore up the idea of a ‘Cartonian’ way of thinking. Yet, although Emilie du Châtelet criticizes him for not mentioning the experiments of ’s Gravesande (who, through his desire to familiarize himself with Newtonian philosophy, was led, firmly and by a profoundly empirical methodological conviction, to adhere to the Leibnizian principle of conservation of living forces), in fact De Mairan does, so it seems to me, mention both ’s Gravesande’s experiments and Poléni’s when he makes reference to experiments carried out on clay.

Thus, it appears that, here too, De Mairan’s position is less divided than has often been given to believe, and his argumentative procedures are actually quite astute. Indeed, the text opens with a discussion of

experiments that support living forces. In this respect, it may be useful to note several points:

- (1) The justification for having recourse to experiments in validating or invalidating living forces comes in the name of ‘considering nature as it is in reality or as it appears to us through its phenomena’ (ch. II, § 11). In other words, De Mairan’s intention is not so much to say that his *Dissertation* does not refer to the nature of things, but rather that it defines the latter as they are phenomenally, without presupposing that they may have had any other form of being.
- (2) The choice De Mairan makes between experiments that are significant and those that are not: for instance § 7 ‘the collision between infinitely hard and inflexible bodies involves no change for the evaluation of the motive forces produced by uniform movement’.
- (3) The refusal of experiments on phenomena that do not exist in nature, that is, thought experiments that involve ideal practical conditions for bodies, such as those favoured by Galileo or Leibniz.<sup>38</sup>
- (4) The use of the architectonic principle of full cause and entire effect at the heart of Leibnizian dynamics, employed by De Mairan for the precise purpose of invalidating the Leibnizian principle of conservation. In chapter III, § 14, De Mairan says of the same movement that the experiments conducted by ‘s Gravesande and Poleni are incontestable and that the problem lies with their interpretation in support of the Leibnizian principle of conservation. On this, De Mairan writes: ‘I conclude, from the very principle of the proportionality of effects to their causes, that motive Force is but double, and not quadruple, as unto simple speed and not the square of speeds.’ De Mairan thus introduces an interpretative proposition wherein it is the choice of unit measure that invalidates experiments that support Leibniz, complete with the blessing of his architectonic principle.

Ultimately, what De Mairan develops in his *Dissertation* is distinct and multiple answers to one question: how should experiments be interpreted? And how do interpretative choices produce a specific natural philosophy or flow from a natural philosophy which does not speak its name, but can nevertheless be reconstructed?

This first controversy is itself set within another: the controversy which, in the 1742 edition of *Institutions de Physique*, led Emilie du Châtelet to include the correspondence she had had with De Mairan.

Starting with chapter 21, which the Marquise opens on the principle of continuity and the distinction between dead force and living force, she shows the path that leads from ‘physical heresy’ to the idea that ‘all experiments since have confirmed that discovery for which we are obliged to M. Leibniz’ (§ 568). De Mairan’s position is also singled out, at first implicitly — when challenging discussions about accounting for time in estimations — and then explicitly, from § 574 onward, where De Mairan’s essay ‘most eloquently exposes (...) this famous process’.

She begins, in § 568, by indicating both that all experiments prove Leibnizian calculus, to such an extent that it has become ‘one of the most fruitful principles of Mechanics’, and that all philosophers are in agreement about ‘the experiments that prove this estimation of living forces’.<sup>39</sup> Thus, she leans on a double consensus: on experiments and on the community of philosophers in order to indicate that the dispute is nonsensical. And she adds: ‘It would therefore seem that there should be no dispute at all on this matter; for in the opinion of all, every force is equal to its wholly executed effect, and uncontested experiments prove that all the effects of bodies in motion are as the square of their velocities multiplied by their masses, so it seems inescapable to conclude that the forces of these bodies fall also into this same reasoning.’ But she then immediately adds that, despite this broad consensus, Cartesian objections make use of the standard criticism that time is not accounted for in calculus. In the same argumentative line, she rejects inclusion of the metaphysical dimension of force in § 570: ‘The question of the force of bodies must not turn on a metaphysical force that has neither utility nor resistance, for I do not know what is the force of that which resists not at all.’ Thus, she clings to an estimation of forces through effects only. A particularly eloquent passage from § 573 situates the debate with excellent precision: ‘living forces are perhaps the only point in Physics upon which there is still quarrel in agreeing on the experiments that prove it’. It is in this context that the reference to De Mairan’s work, following that of Johann Bernoulli,<sup>40</sup> is introduced. Since experiments are not sufficient for agreement to be reached (§ 577), Emilie points out the rational shortcomings present in De Mairan’s *Mémoire*.

To sum up the Marquise’s arguments, we can see that continuing to believe that it is motion and not force which is conserved comes, (1) from a problematic conception of the action of weight; (2) from a conception of an effect that is greater than its cause (when one imagines it possible to produce an effect greater than that which destroyed a force). Following this, she reviews a set of objections whose answers are found in a set of experiments (in particular, those carried

out by 's Gravesande). And she concludes from this in § 588: 'You have seen in this chapter that all the experiments conspire in order to prove living forces, but Metaphysics speaks almost as loudly as Physics in their favour.'

This conclusion is particularly interesting. The reason being that it uses a mixed method of validation. Furthermore, by doing so, the Marquise introduces a new regime of proof. Indeed, on the one hand, she uses the experiments conducted or described by Bernoulli, 's Gravesande or Hermann in order to show that the Cartesian principle of conservation is false. But these experiments are not sufficient to bring an end to the dispute. Emilie does not use the experiments *against* metaphysical arguments but rather *with* them. She combines metaphysical arguments with experimental results to create a solid grounding for the Leibnizian principle of conservation. In doing this, she executes a form of epistemic cooptation aimed at bringing the dispute to a close. But how would De Mairan react to this? It is widely known that, as an addendum to chapter 21 of the 1742 edition of her *Institutions de Physique*, Emilie du Châtelet included her correspondence with De Mairan. Initially, De Mairan lays out his critical approach, consisting in an evaluation of the logic behind the arguments employed: 'the public shall judge whether your criticism (...) is well or poorly founded and whether the paradoxical appearance of the Proposition which you have particularly attacked is an announcement of a paralogism or a solid reasoning'.<sup>41</sup> De Mairan's argumentation is no secret: in 1738, just as she was composing her *Dissertation sur la nature du feu*, the Marquise was a Cartesian, but, under a certain influence, Cirey was to become a 'Leibnizian haunt':

There was, however, a time where obscurity reigned over this dispute, as is always the case at the beginning of all disputes: but the light assuredly revealed itself on one side or the other, since several years past, or the light shall never be revealed, given the nature of the question and the knowledge upon which it depends. For what there is in it of Physics, or of Metaphysics, evaporates through mathematical abstraction and the precise and distinct idea of the purely calculable quantities therein considered and which are embraced only in so far as they are liable to be greater or lesser.<sup>42</sup>

There is a second dimension to the argument that should also be underlined. De Mairan argues that the Marquise presents his arguments in an abridged form. And he says that this is why his ideas, when she lays them out, appear both absurd and weak. Next, De Mairan casts aside the Marquise's 'proofs' in support of the Leibnizian principle of conservation. He does this by successively discussing the principles

which govern and underpin the descriptions of experiments. He then endeavours to build a convergence from these principles. For this, he calls on the Leibnizian principle of sufficient reason, the Galilean reduction of delayed motion into uniform motion, and the necessity of accounting for time in estimation. He uses this to re-evaluate the signification of the experiments Emilie du Châtelet had presented. The latter employed them in support of the Leibnizian principle of conservation, but De Mairan uses them to show that, on the contrary, they prove the relevance of the principle of conservation of the quantity of motion. He concludes by proposing a method for unpacking the disputes: mathematical abstraction. De Mairan employs an already familiar regime of proof. His assumption is that, if the public agrees on the theoretical principles to be used as well as on their meaning, then it should be possible to reinterpret the experiments Emilie had wielded against the Cartesian principle of conservation. Emilie responded to this with vicious sarcasm. She sets out a side-by-side comparison between De Mairan's text and her summary of it, as present in her *Institutions*, and whose honesty De Mairan had challenged. The idea of this was clearly to place the great similarity between the two texts in plain sight. She concludes with this flourish: 'Having compared these two texts, with all possible accuracy, in order to find my own faults, I find that, among other considerable omissions, I did forget to include after the words *never cease* these other words which are found in your text, *or last for ever*, and I must admit that this was of unforgivable unfaithfulness.'<sup>43</sup>

In turn, she levels the same criticism back at him regarding the reduction of delayed motion to uniform motion. She leans on De Mairan's own example to show that the reduction of the first type of motion to the second is not possible because the effect of uniform motion 'is only the space travelled without any disturbed obstacle in that space while the effect of the second consists in the displacement of these obstacles'.<sup>44</sup> This leads the Marquise to assert that the force of bodies must be evaluated by the obstacles they overcome and that the inclusion of time, as demonstrated by Hermann, has the result of validating the Leibnizian principle. In her response, Emilie du Châtelet chooses to believe that agreement regarding principles does not lead to a resolution of the differend, whether dealing with the reference to Galileo's law, with the inclusion of time, or with the mathematical dimension of the dispute. Indeed, she proposes a novel interpretation of the examples De Mairan had assembled in his attempt to disqualify the experimental evidence of the Leibnizian principle. In



this, she shows that agreement on principles in no way constitutes an argument in favour of consensus with respect to the interpretation of the experiments. She concludes with these words: 'Finally, I am still persuaded, like you, that someone here is mistaken, but I am quite sure, at least, that I am not mistaken in my awareness of your full merit.'<sup>45</sup>

Conceptualizing this quarrel at the point where agonistic horizon meets the idea of cooptation — at the heart of epistemic pluralism — is first and foremost a means of changing the interpretative framework for such quarrels. Emilie's aim was not so much to win over De Mairan to her side and resolve their mutual conflict. Rather, beyond the divergence in their positions relative to the principle of conservation, her aim was to unveil a divergence between two regimes of proof. This underlines the agonistic dimension of her approach, albeit with a certain amount of irony. But this divergence is also the occasion for her to work towards an epistemology which is inventive. In a way that I find quite subtle, she refuses the mould in which De Mairan attempts to squeeze her. For her, agreement on principles is in no way a guarantee that experiments will meet with unequivocal interpretation. And the truth of this stands regardless of whether the principles on which De Mairan seeks her agreement are Leibnizian or not. (Recall how De Mairan called upon the principle of sufficient reason.)

By refusing this hasty induction, Emilie sets out a different epistemology, one which, historically speaking, was an innovation for France. She connects metaphysical proof to experimental proof, something which, in this framework, may be seen as a form of cooptation. From the historical perspective of how Leibnizianism was received, this union was decisive, since it participated in a grander attempt to validate the Leibnizian principle of conservation experimentally. Her role in this supplements that of others whom she either quotes or mentions in chapter 21 of *Institutions*: 's Gravesande, Poleni, Bernouilli and so on. Thus, the dispute over living forces is not, for Emilie, a quarrel of words;<sup>46</sup> it is irreducible and it expresses a divergence in the regimes of proof that are put into action.

## NOTES

- 1 Hans Bots and Françoise Waquet, *La République des lettres* (Paris: Editions Belin–De Boeck, 1997), 31.
- 2 Antoine Lilti, 'Querelles et controverses: les formes du désaccord intellectuel à l'époque moderne', *Mil neuf cent* 25 (2007), 13–28 (17); our translations from the French throughout.



- 3 Christian Jouhaud, *Les Pouvoirs de la littérature. Histoire d'un paradoxe* (Paris: Gallimard, 2000) and Christian Jouhaud, *Mazarinades, la fronde des mots* (Paris: Aubier, 1985), quoted in Lilti, 'Querelles et controverses', 19.
- 4 This would require that another definition of politics be advanced in place of that which, constitutively, excludes violence and politics (or which, to be more precise, reduces the link between the two to the State's exclusive monopoly over legitimate violence, to use Weber's terms).
- 5 Lilti, 'Querelles et controverses', 22.
- 6 Stéphane Van Damme, *Descartes. Essai d'histoire culturelle d'une grandeur philosophique* (Paris: Presses de Sciences-Po, 2002), quoted by Lilti, 'Querelles et controverses', 24.
- 7 On the sociology of such trials: 'a process of dispute is always a trial, that is to say, a situation in which individuals shift and reform the social order that connects them' (Cyril Lemieux, 'A quoi sert l'analyse des controverses?', *Mil neuf cent* 25 (2007), 191–212 (193)).
- 8 Jean-Louis Fabiani, 'Discours, polémiques et controverses dans les mondes intellectuels', *Mil neuf cent* 25 (2007), 45–60 (53).
- 9 Fabiani, 'Discours, polémiques et controverses', 54.
- 10 Jürgen Habermas, 'Remarks on the Concept of Communicative Action', *Social Action* 43 (1982), 151–78 (176).
- 11 Jürgen Habermas, *Moral Consciousness and Communicative Action* (Cambridge, MA: MIT Press, 1990), 44.
- 12 Habermas, *Moral Consciousness*, 66–7.
- 13 Habermas, *Moral Consciousness*, 67.
- 14 A fuller version of this argument appears in my essay 'Agonisme et antagonisme', forthcoming in *Revue de synthèse* 137:3–4 (2016).
- 15 Jacques Rancière, *La Mésestente. Politique et philosophie* (Paris: Galilée, 1995), 12.
- 16 Chantal Mouffe, 'Qu'est-ce que la politique agonistique?' in *Agonistique. Penser politiquement le monde* (Paris: Beaux-Arts de Paris éditions, 2014), 25.
- 17 It is conceivable that this idea is intended as a response to Herbert Marcuse's *One-Dimensional Man* (Boston: Beacon Press, 1964).
- 18 Chantal Mouffe, *L'Illusion du consensus* (Paris: Albin Michel, 2016), 20–1.
- 19 Mouffe, *L'Illusion du consensus*, 24.
- 20 Mouffe, *L'Illusion du consensus*, 24.
- 21 'If we wish to recognize, on the one hand, the permanence of conflict's antagonistic dimension, while also maintaining, on the other hand, the possibility of its "subdual", then a third kind of relationship must be imagined. This is the kind of relationship I have proposed be called "agonism". Whereas antagonism represents an Us/Them relationship where the parties are enemies and share no common ground, agonism is an Us/Them relationship where the conflicting parties, although admitting that no rational solution to their

- disagreement exists, nevertheless recognize the legitimacy of their opponents. They are “adversaries” rather than “enemies”, meaning that, despite their conflict, the opponents see themselves as members of one and the same political association, sharing a common symbolic space constituting the arena of their conflict’ (Mouffe, *L’Illusion du consensus*, 35).
- 22 Mouffe, *L’Illusion du consensus*, 35.
  - 23 Mouffe, *Agnostique*, 28.
  - 24 See, for example, Anne-Lise Rey and Siegfried Bodenmann, ‘Introduction’ to ‘La guerre en lettres: la controverse scientifique dans les correspondances des Lumières’, *Revue d’histoire des sciences* 66:2 (2013), 233–48, and Anne-Lise Rey, ‘Agonisme et antagonisme’.
  - 25 Mouffe, *L’Illusion du consensus*, 15.
  - 26 Hasok Chang, *Is Water H<sub>2</sub>O? Evidence, Pluralism and Realism* (Dordrecht: Springer, 2012).
  - 27 See Stephen H. Kellert, Helen E. Longino and C. Kenneth Waters, ‘The Pluralist Stance’ in *Scientific Pluralism*, edited by Stephen H. Kellert, Helen E. Longino and C. Kenneth Waters (Minneapolis: University of Minnesota Press, 2006), vii–xxvii.
  - 28 Kellert et al., *Scientific Pluralism*, xiii.
  - 29 This aspect is another trait shared with the works of Kellert et al., xxiii.
  - 30 E. Brian Davies, ‘Epistemological Pluralism’: ‘When we use the word pluralism we intend it to be interpreted in a purely epistemological sense. The pluralism that we discuss pertains not to the world itself, but to our attempts to understand it in terms accessible to our limited mental powers. We accept that the world is a unity, in spite of the fact that we have no workable description of it in such terms.’ (Unpublished paper available online at <http://philsci-archive.pitt.edu/3083/>, consulted 29 January 2016, 7.00 p.m.)
  - 31 Dortous de Mairan, *Dissertation sur l’estimation et la mesure des forces motrices des corps* (Paris: chez Charles-Antoine Jombert, nouvelle édition, 1741), 5–6.
  - 32 J. B. Shank, *The Newton Wars and the Beginning of the French Enlightenment* (Chicago: The University of Chicago Press, 2008); see chapter 7, ‘Leibnizianism and the French Enlightenment,’ 403–79, particularly 425.
  - 33 The Marquise du Châtelet’s Leibnizianism is presented here as a kind of antidote against Newtonianism in France, to use Shank’s wording: *Newton Wars*, 440–1.
  - 34 Emilie du Châtelet, *Institutions de Physique* [1740] (Paris: chez Prault fils, 1742), 501.
  - 35 Mogens Laerke, *Les Lumières de Leibniz. Controverses avec Huet, Bayle, Regis et More* (Paris: Classiques Garnier, 2015).
  - 36 Ellen McNiven Hine, ‘Dortous de Mairan, the “Cartonian”’, *Studies on Voltaire and the Eighteenth Century* 266 (1989), 163–79.
  - 37 And, again, in § 2 of De Mairan’s *Dissertation*, 7–8.

60 *Paragraph*

38 See, for example, chapter II, § 8.

39 The paragraph continues: ‘and they are all of an accord that displaced matter, wound springs, flattened fibres, transmitted forces, etc., that really all the effects of bodies in motion are always as the square of their velocity multiplied by their mass’.

40 See § 574.

41 Du Châtelet, *Institutions*, 476.

42 Du Châtelet, *Institutions*, 500, ‘Lettre de De Mairan à Emilie du Châtelet du 18 février 1741’.

43 Du Châtelet, *Institutions*, 510, ‘Réponse d’Emilie du Châtelet à la lettre de M. de Mairan du 26 mars 1741’.

44 Du Châtelet, *Institutions*, 525.

45 Du Châtelet, *Institutions*, 541–2.

46 Du Châtelet, *Institutions*, 541, ‘But for me, persuaded as I am that the difference in question is to be found even more in things than in words . . .’.

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