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2 **A comprehensive guide to the New Mechanistic**  
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6 **Dingmar van Eck<sup>1</sup>**

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9  
10 Stuart Glennan's *The New Mechanical Philosophy* is an impressive, first-rate  
11 achievement and a very welcome addition to the literature on what has come to be  
12 called the *New Mechanical Philosophy* (NMP). Glennan summarizes his view on  
13 NMP as follows: "the New Mechanical Philosophy is both a philosophy of nature  
14 and a philosophy of science. It tells us something about how the world is, as well as  
15 something about how we, particularly through the methods and institutions of  
16 science, may come to know that world" (59). In *The New Mechanical Philosophy*,  
17 Glennan thus attempts to clarify relationships between mind-independent reality and  
18 our representations of reality—and he does so in admirable fashion. The *New*  
19 *Mechanical Philosophy* offers an elaborate account of what mechanisms are as  
20 things in the world, of kinds and types of mechanisms, and it details a mechanistic  
21 account of causation. Furthermore, it offers an informative account of what  
22 mechanistic models are, how we may come to explain the workings of mechanisms  
23 through models, and how we may classify particular mechanisms into kinds and  
24 types through the use of models. On top of that, the book investigates how  
25 mechanistic explanations relate to and differ from other types of (non-mechanistic  
26 and non-causal) explanations.

27 There are several important features that set *The New Mechanical Philosophy*  
28 apart from other literature on NMP, first of all its focus and scope. Whereas most of  
29 the NMP literature is primarily focused on semantic, epistemological, and  
30 methodological issues as regards mechanistic explanation and mechanism discovery  
31 in specific scientific domains, Glennan also assigns center stage to ontological  
32 questions (e.g., "what mechanisms are as things in the world" (10); what "a  
33 mechanistic account of the nature of causality" (145) looks like). Glennan sets out

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34 to explore how answers to these questions partly inform our answers to semantic  
 35 and epistemological questions. Equally important, *The New Mechanical Philosophy*  
 36 stresses the importance of modeling practices—a set of related issues that has not  
 37 received the sustained analysis that it deserves in the NMP literature—in procuring  
 38 answers to ontological questions. For instance, how modeling impacts the  
 39 classification of mechanisms into kinds and types. The pivotal motivation for  
 40 tackling such ontological and epistemic issues in tandem, and attempting to connect  
 41 them, is the very sensible idea that while mechanisms exist as particulars in the  
 42 world, the sciences are driven by a quest for generality—to say general things about  
 43 kinds of things (mechanisms) in the world. It is this search for generality, where the  
 44 importance of modeling comes to the fore. The elaborate analysis of models and  
 45 modeling techniques as a toolkit for general explanation and classification is a key  
 46 strength of the book.

47 *The New Mechanical Philosophy* is very rich in content and I cannot do justice to  
 48 all the issues that it addresses. So, although definitely worthy of attention and apt to  
 49 elicit dispute and further analysis, I leave aside the mechanistic theory of causation  
 50 that is elaborated and defended against regularity and difference-making approaches  
 51 to causation. I rather choose to focus on the modeling parts of the book and the  
 52 proposed account of “minimal mechanisms” with which the books starts and which  
 53 provides the conceptual backdrop of the ontological and epistemological issues that  
 54 are addressed in *The New Mechanical Philosophy*.

55 Chapter 2 elaborates an account of what mechanisms are as things in the world,  
 56 which Glennan characterizes as “minimal mechanisms”: “A mechanism for a  
 57 phenomenon consists of entities (or parts) whose activities and interactions are  
 58 organized so as to be responsible for the phenomenon” (17). This characterization is  
 59 minimal in the sense that it conceives of virtually all causal processes as  
 60 mechanisms and is intended to serve descriptive and ontological goals: the  
 61 characterization is intended to be minimal or broad enough such that it captures  
 62 most of the items that scientists label “mechanisms.” And it is intended to enable us  
 63 to pose general questions about the causal structure of the world, viz. the nature of  
 64 causal and constitutive relationships in the world. Glennan elaborates this  
 65 characterization by detailing the key concepts involved—entities, activities,  
 66 organization, etc.—but also situates the “New Mechanical Ontology” more broadly  
 67 in metaphysics. This latter excursion is quite nice for it clarifies points of contact  
 68 between the metaphysics of mechanism and neighboring metaphysical debates such  
 69 as the relationships between simples and composites and the relationships between  
 70 sets of properties. Chapter 2 leaves something to be desired though. The  
 71 chapter addresses quite extensively the issue of how to draw the boundaries of  
 72 mechanisms but does not engage with some recent influential theories on evidence  
 73 for constitutive relevance, notably regularity and no-decoupling accounts of  
 74 evidence for constitutive relevance. I feel that more could have been said here.

75 Chapters 3–5 are very relevant contributions to the underdeveloped literature on  
 76 mechanistic modeling. Glennan defends the view that models are our source of  
 77 generality. Models can function as generalized representations of classes of similar  
 78 targets and support the making of generalizations about those targets. Abstraction  
 79 and idealization loom large in this endeavor, for “the inevitable abstractions and

80 idealizations ... help us find generality in a world of mechanisms that are ultimately  
 81 particular, localized, and heterogeneous” (83). *The New Mechanical Philosophy*  
 82 sets out to clarify how we may come to explain the workings of mechanisms  
 83 through models, and how we may classify particular mechanisms into kinds and  
 84 types through the usage of models. All this is very much to be applauded since,  
 85 although the term MECHANISTIC MODEL is frequently used in analyses of  
 86 mechanistic explanation, there are little in-depth analyses of mechanistic modeling  
 87 practices—in particular when it comes to matters of idealization. Chapter 3, for  
 88 instance, offers a welcome discussion on different ways to understand how-possibly  
 89 models, viz. as conjectures about actual mechanisms or as models of mechanistic  
 90 possibilities. And Chapter 4 gives an insightful account of the classification of  
 91 mechanisms into kinds through models—in brief, to the extent that particular  
 92 mechanisms can be adequately represented by the same model, they count as  
 93 instances of the same mechanism kind. That said, as in the NMP literature in  
 94 general, more attention could have, and should have, been paid to the precise  
 95 functions or roles that idealizations may serve in mechanistic modeling. Idealiza-  
 96 tion, quite rightly, is taken to be in the service of generality, but it is not spelled out  
 97 in detail how this works. Chapter 4 suggests briefly that idealizations are justified as  
 98 long as they do not distort important difference makers which, in turn, suggests that  
 99 one role idealizations may serve is to highlight what is not explanatorily important,  
 100 by distorting features that do not make a difference or only make a negligible  
 101 difference. However, given the quite extensive modeling literature on the different  
 102 functions that idealizations can serve, I would have liked to see more engagement  
 103 with this literature for this would clarify the ways in which we precisely attain  
 104 generality through the use of idealizations.

105 Chapter 8 specifies a model-based account of scientific explanation. This account  
 106 is put to use to spell out commonalities and differences between mechanistic  
 107 explanation and other types of explanation, viz. bare causal explanations and types  
 108 of non-causal explanations, and to recast the debate over ontic and epistemic  
 109 conceptions of scientific explanation, a debate that has generated a lot of attention  
 110 and confusion recently. Chapter 8 does a wonderful job in positioning mechanistic  
 111 explanation in the explanatory zoo, alongside non-causal explanations, such as  
 112 design and optimality explanations. Unfortunately, this chapter also perpetuates the  
 113 common misconception in the NMP literature that the ontic conception of  
 114 explanation can be salvaged by appealing to ontic constraints on or ontic aspects of  
 115 explanatory representations. Glennan aims to account for “different aspects of  
 116 successful scientific representation” (222), inter alia epistemic and ontic ones. In  
 117 expounding his multi-aspect approach to explanation, he writes that “to recognize  
 118 the epistemic aspect of explanation is to recognize that explanation always requires  
 119 representation ... to recognize the ontic aspect of explanation is to recognize that  
 120 whether a proffered explanation makes the grade will depend on what actually  
 121 occurs in the world” (222). Yet, by stressing that explanation always involves  
 122 representation, this position is inconsistent with the ontic conception, which is non-  
 123 representational. Interestingly, since the epistemic conception readily accommo-  
 124 dates the constraint that the goodness of explanatory representations is constrained  
 125 by what is being described—indeed, one would be hard-pressed to disagree with this

126 thought—*The New Mechanical Philosophy* in fact advertises an epistemic  
127 conception of explanation.

128 Let me close by saying that important works deserve some critical remarks.  
129 Glennan's *The New Mechanical Philosophy* is essential reading for anyone wanting  
130 to know what NMP is all about.  
131

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