

## BOOK REVIEWS

Max Kistler, *L'esprit matériel. Réduction et émergence*, Paris: Ithaque, 2016, 304 pp., €25 (paperback), ISBN 978-2-916120-51-5.

The principal aim of Kistler's book, *L'esprit matériel. Réduction et émergence*, is an original justification of a very intuitive conviction – that our mind is real in the sense of playing a proper causal role for the way in which we influence the world. To achieve that aim, Kistler digs deep into complicated metaphysical debates and challenges important figures and mainstream positions. The result is puzzle-like, a complex conceptual framework containing, among many others, the following pieces.

A mental property  $M$  is a first order macroscopic property, *ontologically determined* by a complex configuration  $P$  of composing physical micro-properties. This determination is stronger than supervenience since  $P$  *nomologically determines*  $M$  by means of a so-called 'composition law', which can be characterised as, among other things, *non-causal*, containing the set of *interaction laws* in which the physical micro-properties of  $P$  are involved when giving rise to  $M$ , in-principle *deducible* from general physical laws, and having necessarily *a posteriori* epistemic status. By means of the composition law  $M$  is thus *reducible to/deducible from*, but, importantly, *not identical* to  $P$ . Given that laws determine the identity of a property, an ontological identity of  $M$  and  $P$  would require that both figure in the very same set of laws, which is not the case if there is a causal law connecting  $M$  to some physical effect  $P^*$ , whereas no such causal law exists between  $P$  and  $P^*$ . According to Kistler, the truth of that conceptual possibility is an empirical question and is compatible with physicalism and the causal closure of the physical domain in the sense of  $P$  still remaining the ultimate determination origin: even if  $P$  does not *causally* determine  $P^*$ , it non-causally determines  $M$  (*qua* composition law), which *causally* determines  $P^*$ .

Having this central puzzle structure in mind, let me add further pieces of the five connected chapters of the book. Chapter one is about the unity of science and inter-theoretic reduction. Since notions like 'property' or 'law' play a key role, Kistler naturally starts by making several clarifications. He carefully discusses major attempts at unification and reduction, and thus comes across important contributions by, among others, Hempel, Oppenheim, Nagel, Fodor,

Schaffner, Hooker, Churchland and Bickle. One crucial upshot is Kistler's own resulting 'synthetic model' of reduction, where bridge laws (played by his 'composition laws') are necessary for reduction and necessarily *a posteriori*, and where the reduction of a higher-level theory generally goes through a corrected version. Importantly, given the *a posteriori* epistemic character of the composition laws, whose formulations are influenced by the original higher-level theory and their causal laws, one may read Kistler as implying an enrichment of the reducing theory, which is fundamental physics in the last resort. Put differently, the discovery, formulation and integration of composition laws into the set of physical laws are what guarantee – to be seen later on – the compatibility of his ontological notion of emergence with physicalism and the completeness of physics.

Chapter two is about arguments against *a priori* reductive explanations. Once again Kistler starts the chapter by outlining important clarifications and insights on crucial notions, such as the weakness of supervenience as concerns identifying the determination origin of the related set of super- and subvenient properties (which his notion of emergence aims to overcome later in the book), or his understanding of 'physicalism' and 'reductive explanation' in contrast to that of Jackson, Chalmers or Kim. While the first chapter also contained a section on cognitive science, chapter two focuses mostly on physical examples such as water or temperature 'seen' from the micro-physical perspective. An important element for the overall argumentation of the book is clearly Kistler's careful analysis of the construction of macroscopic concepts such as 'temperature', which seems to require the input of new conceptual tools from higher-level sciences that have no equivalent in microphysics, and that thus cannot be constructed solely with the concepts appropriate for microphysical entities. This matters for at least two reasons: it develops further his idea of the necessarily *a posteriori* epistemic character of composition laws when it comes to reductive explanations of macroscopic properties, and if this is defensible at a macro-*physical* level (as exemplified with water or temperature), then one has an 'already' working conceptual scheme that can simply be adopted later on with respect to *mental* properties. After all, as will become clear in chapter four, the emergence of mental properties is of the *same type* as the emergence of chemical properties of molecules on the basis of the physical properties of the composing atoms.

Chapter three is about cognitive capacities conceived as macroscopic dispositional properties. Kistler aims to show how dispositional properties can be causally efficient, thereby arguing against, among others, Prior, Pargetter and Jackson, without ending up, as for instance Armstrong does, identifying macroscopic dispositional properties with *microscopic* categorical bases. One important claim in Kistler's analysis is that a cognitive macroscopic dispositional property does not have to be identical to a microscopic base even if it is dependent on or reducible to it. Among the various objections against the causal efficiency of

dispositional properties, his extensive discussion of Molière's *virtus dormitiva* of opium (its sleep-inducing disposition) is very illuminative. While for Molière dispositions cannot cause their manifestations since they are linked *analytically* to them, Kistler argues that this is true only if a *ceteris paribus* clause is added, that opium by itself is not necessarily sufficient to make you fall asleep. Furthermore, science generally aims at spelling out what is covered by a *ceteris paribus* clause such that the implied danger of analyticity is ultimately a somewhat *epistemic* problem that can be overcome through scientific investigation. Once that has been carefully undertaken, dispositional properties can even be conceived as *powers* determining their effects with metaphysical necessity, such that smoking opium may *cause* you to fall asleep. In sum, there are only two *epistemically* different conceptions of properties: a general, unspecified, dispositional predicate containing Molière's analytic link between disposition and manifestation, and an elaborated, scientific one, enabling one to conceive the *same* property in question as categorical and thus as real and causally efficient. Kistler then argues that both conceptions can *coexist* and that when it comes to the reduction of a dispositional property to its categorical base, the latter is not necessarily a micro- but can actually be a *macroscopic* one, for instance a 'systemic' property of a complex whole, as the next chapter explains.

Chapter four is about the guiding idea of emergent properties being properties of a complex system that are *qualitatively different* from the properties of the system's parts. For Kistler, they thus have to be 'new' in the sense of new causal powers and laws. However, given its compatibility with reduction and deduction, the intuitively mysterious character of emergent properties boils down to that of composition laws being *a posteriori* and somewhat unexplainable due to the lack of final explanations of fundamental natural laws from which composition laws derive. Contrary to Cummins, Kistler conceives composition laws as 'bottom-up' – they determine the whole on the basis of its parts – and in a *realist* fashion: laws provide the ontological foundation of the determination relation independent of the direction of our epistemic investigation. For the purpose of distinguishing his concept of emergence from dualism, the notion of 'weak' emergence is introduced: there is an exclusive *physical* constitution of systems that have emergent properties; emergent properties are, following Stephan, 'systemic' ones in the sense of belonging only to the system and not to the system's parts; emergent properties are, formally like mereological supervenience, *synchronically* determined by the properties of the system's parts and their organisation and thus, contrary to Searle and others, *not* causally determined. Kistler goes on to contrast carefully his notion of emergence with that of important figures of British emergentism. For instance, contrary to Broad, the possibility of explanation is not what distinguishes 'resulting' from emerging properties; this allows Kistler to avoid a theory-dependent notion of emergence. Furthermore, his realism about laws and properties

allows one to conceive composition laws as about necessary relations, and not as conventions or metalinguistic propositions. When analysing the traditional conception of emergence – that of the impossibility of deduction – Kistler nicely points out that roughly everything hangs on the notion of ‘complete information’ about the properties of the parts of a system. If it means knowledge of all the laws that determine the evolution of the parts when taken in *isolation*, then the stability of the simplest bonding in a H<sub>2</sub> molecule would already be an emergent property, undeducible from quantum physics. By contrast, if it means knowledge of all the laws that determine the evolution of the parts when taking them in all possible interactions with any other possible entity or entities, then no emergent properties can possibly exist. By going through important contributions by authors such as Mill, Wimsatt, Holland, Rueger or Bunge, Kistler finally ends up with the following definition, aiming at a middle ground between the two mentioned extremes:

A global property G of complex object O is (strongly) emergent if and only if (it is weakly emergent and if) (1) the fact that O has G is determined by the fact that O has parts a<sub>1</sub>, ..., a<sub>n</sub>, having the properties P<sub>11</sub>, ..., P<sub>nm</sub>, as well as by a non-linear composition law, where this law is not a logical consequence of the laws governing properties P<sub>11</sub>, ..., P<sub>nm</sub> of the parts in isolation, and (2) property G is qualitatively different from properties P in the sense of topological equivalence (p. 197; my translation).

Chapter five is about whether emergent properties can have a *proper* causal efficiency. In that classical debate, Kistler argues against the idea of there being only *two* possibilities for mental properties once dualism is rejected: either to have *no* proper causal powers or to have causal powers only in a *derived* sense by being *identical* to the physical basis. The major context of analysis is Kim’s famous problematisation, in short as follows: if one claims that mental properties differ ontologically from their physical supervenience basis, if one accepts the causal closure of the physical domain, and if physical changes are not causally overdetermined in a systematic way, then mental properties are either causally *inert* or at least causally-explanatorily *irrelevant* for physical change. In order to arrive at another outcome – a *physicalist* position according to which *M* is emergent in the sense of being *necessary* for a physical effect *P\** – much hangs on Kistler’s distinction between a *non-causal* determination (that from *P* to *M*), and a *causal* determination (that from *M* to *P\**). On the one hand, Kistler understands physicalism roughly as sufficient physical determination, where that does not necessarily mean *causal* determination, while, on the other hand, when it comes to the principle of ‘no systematic overdetermination’, he only accepts it in the sense of no *causal* overdetermination. Consequently, completeness of the physical domain only requires that physics determines everything, but possibly through non-causally determining emergent properties such that *P* determines *M*, which causes *P\**,

whereas  $P$  does not cause  $P^*$ . According to Kistler, such a conceptual possibility should not be excluded on *a priori* grounds, and furthermore its truth is highly suggested in complex systems showing non-linearity. Roughly, non-linearity seems to play a double role in Kistler: it is both a crucial reason why a complex system has emergent properties, and it is an empirically possible reason why there is no direct causal law from  $P$  to  $P^*$ . That can also be understood as follows: for nomologically connecting  $P$  to  $P^*$ , one necessarily has to go through the composition law, and thus  $M$ , in order to get a causal, *ceteris paribus* law from there to  $P^*$ . Similarly, the microscopic and macroscopic levels may also play complementary roles for a system's causal evolution:

The determination imposed on a complex system qua microscopic laws governing the components goes through macroscopic laws. [...] the systemic law implies a global frame that constitutes a limiting constraint for the possibilities of the evolution of the components. Their evolution inside that frame is determined by microscopic laws (p. 275; my translation).

Against the background of my selective summary, let me raise several issues for a constructive critical reading of Kistler's book. Suppose, as he does, that there exists empirical evidence for a causal *ceteris paribus* law from  $M$  to  $P^*$ . If  $M$  is an emergent mental property in his sense, it is in principle explainable by and reducible to  $P$  by means of a composition law that is deducible from general physical laws. Given that rather strong kind of connection of  $M$  to  $P$ , one may wonder what prevents, *in principle*, a causal-nomological linking of  $P$  directly to  $P^*$ . As said, some passages mention complexity or complex chaotic systems (see pp. 253–254, footnote 1 or p. 259, for instance), which might indeed imply many problems. By contrast, at the level of  $M$  one gets some kind of “regular evolution” (p. 271) that does not exist on the chaotic level of  $P$ , and Kistler indicates some possible reasons for that. Still, the point is that the composition law is supposed to bridge the chaotic level of  $P$  with the regular level of  $M$ , and it is supposed to be deducible from general physical laws. It is therefore not entirely clear how Kistler can insist on the impossibility of causal-nomologically linking  $P$  directly to  $P^*$ . Of course, the linking might somehow contain what *is spelt out* by the composition law in the reduction of  $M$ , but since that seems to be allowed for macroscopic systems *without* emergent properties, why exclude it in the case of *emergent* properties? Put differently, an undiscussed tension in the book is that the stronger one makes the nomological connection between  $P$  and  $M$ , the more difficult it becomes to argue against a possibly *direct* nomological connection between  $P$  and  $P^*$ .

Closely connected to these issues, let me once again first follow Kistler in conceiving two properties, such as  $M$  and  $P$ , as identical properties if and only if they share all their relations of nomological dependency with respect to other

properties, if they enter in the same relations of causal responsibility (see p. 196, footnote 1 or pp. 234–235). “According to that criterion, mental and physical properties are different: they are involved in different laws” (p. 235; my translation). However, given Kistler’s own notion of composition laws as ‘bottom-up’ and as interpreted in a realist fashion, providing a reductive, constitutive explanation of  $M$ , it is not clear how  $M$  and  $P$  can differ causal-nomologically (as claimed by Kistler – that  $P$  is not sufficient for  $P^*$  while  $M$  is necessary) unless  $M$  has causal powers that are actually not ontologically determined by  $P$  and that are not in principle reductively explainable by  $P$ . In other words, even if *in scientific practice* the causal law between  $M$  and  $P^*$  might be discovered before or independently of the composition law (since the composition law provides, according to Kistler, a metaphysical, constitutive explanation of  $M$ ), it seems to be a necessary part of how  $M$  actually is disposed to cause  $P^*$ . And if so, one may wonder why some kind of conjunction of  $P$  and the composition law will not suffice for causal-nomologically connecting  $P$  to  $P^*$  (unless using *non-causal* composition laws in *causal* explanations actually means for Kistler to adopt his emergentist position).

Despite these questions<sup>1</sup> related to certain puzzle pieces of Kistler’s complex conceptual framework, his book is definitely a true treasure chest for anyone interested in putting interconnected metaphysical variables to good use in view of a refreshing perspective on emergence and physicalism.

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Karen Bennett, *Making Things Up*, Oxford: Oxford University Press, 2017, ix + 260 pp., £45 (hardback), ISBN: 9780199682683.

The topic of Bennett’s book is the class of relations that are pointed to in the writings of metaphysicians (but not only there) by such locutions as ‘generates’ or ‘gives rise to’ (as applied to “phenomena”), by “talk of one phenomenon being *based in or constructed from* another”, as well as by “talk of *getting* some thing, or property, or state of affairs, *out of* another” (p. 2). Bennett takes this class to be “unified” by resemblance, in the sense of being “a reasonably natural resemblance class” (p. 20), and she refers to its members as *building relations*.

<sup>1</sup> Many thanks also to my students at the 2018 spring seminar on Kistler’s book.