

Humeanism and the pragmatic turn

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A central question in the philosophy of science is: *What is a law of nature?* Different answers to this question define an important schism: Humeans, in the wake of David Hume, hold that the laws of nature are nothing over and above what actually happens and reject irreducible facts about natural modality (Lewis, 1983, 1994; cf. Miller, 2015). According to Non-Humeans, by contrast, the laws are metaphysically fundamental (Maudlin, 2007) or grounded in primitive modal structures, such as dispositional essences of powerful properties (Bird, 2007), necessitation relations (Armstrong, 1983), or primitive subjunctive facts (Lange, 2009).

This volume focuses on recent developments in the discussion of Humeanism, specifically on pragmatic versions of the view that put the needs of limited agents like us front and center. These views are perhaps best understood in contrast to their immediate ancestor, the Humean view defended in the work of David Lewis. Lewis provided a set of instructions for obtaining laws of nature from entirely non-modal ingredients. The ingredients are specified by Lewis's thesis of *Humean Supervenience* (HS). According to HS, the world fundamentally is nothing over and above the total pattern of instantiations of perfectly natural intrinsic properties at space-time points (or their point sized occupants) and all other facts supervene on this global pattern (see Lewis, 1986, p. ix). This pattern is usually called the 'Humean Mosaic'. HS is Humean since natural properties are freely recombinable: no property instantiation has any modal implications for the instantiation of any other property.

Lewis's *Best Systems Account of Laws* (BSA), inspired by earlier work of Mill (1843/1967) and Ramsey (1928/1990), specifies the instructions for obtaining laws from these non-modal ingredients. The BSA is a variant of the regularity theory of laws. But unlike earlier versions, the lawhood of a generalization is not determined in isolation. Instead a generalization is a law only if it is a theorem or axiom in an axiomatic systematization of the Humean mosaic that strikes the best balance between simplicity and informativeness. Some systems will be very informative about the Humean mosaic but contain many or long axioms; others will be simple but less informative. We are instructed to choose the system which best balances the two, and the laws of nature are generalizations in this system.

Note that for the Lewisian BSA to work as advertised, it is crucial to place restrictions on eligible predicates. If any predicate is allowed into a best system, we can easily make any systematization extremely simple: “Given system S , let F be a predicate that applies to all and only things at worlds where S holds. Take F as primitive, and axiomatise S (or an equivalent thereof) by the single axiom $\forall xFx$ ” (Lewis, 1983, p. 367). This problem, among others, prompted Lewis to include perfectly natural properties in his formulations of HS and the BSA. Predicates in a best system must then refer to perfectly natural properties, an elite class of properties that he thought physics was in the business of discovering. This restriction rules out constructs such as the predicate F in the above example (see Lewis, 1983; and the contributions of Bhogal (ch. 7), Callender (ch. 1), Loewer (ch. 6), and Schrenk (ch. 8) to this volume).

Lewis’s BSA deservedly had a major influence. It promises to furnish Humeans with a reductive account of all natural modalities. Chances come in a single package with the laws because their inclusion can make axiomatic systems simpler by condensing information about frequencies (Lewis, 1980, 1994; Schwarz, 2014, 2015). Facts about chances, then, reduce to facts about how we can best systematize the world’s events, including the frequency of different sorts of events. And Lewis then argued that all other natural modalities, including counterfactuals, causation, and dispositions, can be accounted for in a reductive hierarchy with laws of nature at the bottom (see Lewis, 1986).

Moreover, the BSA draws a principled distinction between laws and non-laws that is designed to mesh well with scientific practice. Lewis maintained that strength and simplicity are the very standards that physics itself uses in discovering laws (see Lewis, 1983, p. 367 and 1986, p. 123; cf. Earman, 1986, p. 88; and Loewer, 2007, p. 320). Of course, he might be wrong about this, but the BSA can be flexibly adapted to whatever standards physics actually uses (see Loewer, 2007, forthcoming, this volume, ch. 6). And while Lewis thought that only the generalizations can be laws, even this restriction can be lifted (see Albert, 2000, 2015; Loewer, 2012). With these amendments, the BSA outputs as laws those claims which science in fact chooses (cf. Roberts, 2008, p. 331). We then seem to get a realist account of laws, where laws are objective and mind-independent, from only minimal metaphysical ingredients.

But there are also problems with Lewis’s account. Many recent developments of Humeanism about laws have originated from two worries about Lewis’s BSA. First, some philosophers have objected to positing perfectly natural properties. By requiring that predicates in successful scientific theories refer to natural properties, Lewis’s BSA puts *a priori* restrictions on science, tying the BSA to a metaphysical posit that empiricist minded philosophers worry is undetectable. There, the thought goes, is no reason to expect that actual scientific laws will conform to this restriction (see van Fraassen, 1989; Loewer, 2007; Cohen and Callender, 2009; Demarest, 2017), and some reason to think that a satisfying Humean account of quantum mechanics might relax it (see Miller, 2014; Bhogal and Perry, 2017).

Second, a theory of laws of nature should explain why discovering the laws is such an important goal of scientific inquiry. Non-Humeans appear to have an answer to

this question by making nomic facts metaphysically distinguished from other facts. It is less clear that Lewis's BSA offers a good answer: Why should it be such an important goal of science to discover generalizations that maximize virtues like strength and simplicity? It is not enough to say that these are the virtues that science in fact values. We would like to know *why* it makes sense to care about them in the first place (see Hall, 2015, p. 268).

The two worries seem to pull in opposite directions: The first worry, about natural properties, is that the Lewisian BSA posits too much metaphysical structure, thus creating a chasm between science and metaphysics. The second worry is that it posits too little metaphysical structure and so cannot explain why science makes certain crucial distinctions. Despite this tension, many Humeans have recently argued that these and other difficulties can be addressed in a unified way by introducing pragmatic elements into our recipe for laws (see Callender, 2017; Hall, 2015; Dorst, 2018; Hicks, 2018; Jaag and Loew, 2020; and Loewer, 2007, forthcoming).

Pragmatic Humeans dispense with some metaphysical posits of the BSA. As mentioned above, Lewis posits natural properties to provide a distinguished vocabulary for best systems. Pragmatic Humeans, instead, argue that the language a best system is framed in is determined by its practical usefulness (Loewer, 2007, forthcoming, this volume, ch. 6; Cohen and Callender, 2009; Ismael, 2015; Jaag and Loew, 2020). One way of making this change has the further benefit that it naturally extends the BSA to provide the laws of the special sciences (see the Better Best System Account of Schrenk, 2007, this volume, ch. 8; and Cohen and Callender, 2009, 2010). Similarly, Loewer's 'Package Deal Account' (2007, forthcoming, this volume, ch. 6; see also Bhogal, this volume, ch. 7) defers to scientific practice for delineating the properties going into the best system and lifts Lewis's requirement that these properties must be intrinsic.

Moreover, pragmatic considerations can be used to motivate why laws are crucial to scientific practice. The question 'why do scientists aim to discover laws' for best systems theorists becomes the question 'why do scientists care about discovering facts that jointly maximize certain virtues.' Pragmatic Humeans answer this question in two parts: First, they argue that the features that best systems maximize are not strength and simplicity, but more fine-grained features that make for useful laws (Dorst, 2018; Earman, 1986; Hall, 2015, Hicks, 2018; Jaag and Loew, 2020; Loewer, 2007, forthcoming). Second, pragmatic Humeans motivate these features by showing how they make the resulting laws useful for 'getting around in the world' (see Albert, 2015, p. 23; Beebe, 2000, p. 547). In fact, Humeans may be able to explain why the laws have the characteristic features they do in fact have (Callender, 2017, this volume, ch.1; Dorst, 2018, this volume, ch. 9; Hicks, 2018; Jaag and Loew, 2020).

Lewis (1994) himself resisted incorporating pragmatic considerations into his BSA. Positing perfectly natural properties and maintaining that simplicity and strength are completely objective was meant to assure that the resulting laws are also objective. Many pragmatic Humeans, however, see this insistence on objectivity as a missed opportunity. To their eyes it seems entirely natural, given a Humean metaphysics, that what distinguishes laws from non-laws has something to do with us. In this vein, Hall

(2015, p. 268) asks: if the distinction between laws and non-laws is not part of the world's fundamental structure, then '[h]ow could the details of our peculiar human situation *not* be relevant to this matter [i.e., how we ought to draw the distinction]?'

The current volume provides a venue for: (i) developing and critically examining pragmatic Humean accounts of laws; (ii) addressing fundamental and long-standing problems for Humeanism from the pragmatic perspective; and (iii) exploring alternatives to Humeanism that, while deviating from its metaphysics, maintain some of its spirit and incorporate pragmatic elements.

Craig Callender's opening chapter views Humeanism's pragmatic turn in a larger context. According to Callender, pragmatic best systems theories signal the 'end of the good old days' of meta-metaphysical naivety for Humeans. Callender argues that pragmatic best systems theories are best understood as 'ideal advisor' rather than 'ideal observer' accounts. The goal of best systems is no longer to systematize the Humean mosaic in accordance with certain detached, objective virtues (as Lewis may have thought) but to condense information in a way that makes it useful for limited, embedded creatures like us.

This pragmatic reorientation makes best systems theories rather similar to anti-realist, projectivist Humean theories according to which law statements express, e.g. intentions to make certain inferences. The only remaining difference between pragmatic, ideal advisor best systems theories and projectivist theories then seems to be that the former maintain that law statements are truth-apt by expressing generalizations. But Callender points out that an analogous discussion in meta-ethics has taught us that this distinction is fickle and may even vanish if one adopts a minimalist theory of truth (this is the 'Problem of Creeping Minimalism' in meta-ethics). What reasons then do we have for choosing one version of Humeanism over the other?

At this point, Callender has good news and bad news: The good news is that rather than having to work out the different Humean positions from scratch, we can 'leap frog' much discussion by drawing from the rich analogy with meta-ethics. The bad news is that the result is somewhat unsatisfying as the meta-ethical discussion is complex and controversial. Callender's final advice for Humeans is to largely set aside questions about realism. Humeans should focus on the motivations for being Humean rather than on working out the appropriate semantics of law-talk. And here, he thinks, systems theorists and projectivists have been driven by different guiding ideas, which, however, may nicely complement each other. It is here where Callender sees potential for fruitful future work.

In the following chapter, **Jenann Ismael** also foresees an end of the good old days for Humeanism. But while Callender views this development with optimism, Ismael attests disillusion. She argues that a Humean metaphysics, as standardly understood, is fatally unable to explain how nomic facts, such as laws and chances, can guide credences about the future for limited agents. This failure would, obviously, be especially problematic for pragmatic Humeans, who put the practical relevance of knowledge of natural modalities at the center of their project.

Humeans maintain free recombination: no property instantiation has any implications for what properties are instantiated elsewhere. Moreover, it is plausible (both on Humean and general grounds) that our universe is indefinitely extendible: it has no intrinsic maxima or border. Ismael argues that these posits entail that an agent who observes only a finite region of the universe cannot confirm hypotheses about laws and chances. After all, laws and chances supervene on the global pattern of property instantiation; but any merely finite region could be embedded in *any* global, infinite pattern. Humeanism's core commitment—no necessary connections between distinct existences—then puts facts about natural modality beyond the epistemic grasp of finite agents. Ismael argues that any kind of epistemic principle that might make nomic facts discoverable by limited agents—such as that unobserved regions resemble observed regions—would be at odds with a Humean metaphysics.

Ismael's response is to give up the free recombination of properties. This move, since it admits necessary connections between distinct existences, puts her into the anti-Humean camp. Nonetheless, Ismael's view maintains the central motivation of pragmatic Humean positions, viz., that a theory of laws and chances ought to explain their role in helping limited agents getting around in the world. In addition, Ismael also has reservations about most anti-Humean positions that tend to reify possibilities by positing primitive entities. She, instead, advocates a position (for which she considers the labels 'neo-anti-Humean' and 'anti-neo-Humean') that takes scientific practice at face value by taking restrictions on what possibilities there are as built into the very structure of reality.

Wolfgang Schwarz's contribution turns the tables and argues that it is non-Humean accounts that confront a deep problem about our knowledge of natural modalities. Schwarz agrees with Lewis that it is not enough to posit 'unHumean whatnots' (Lewis, 1994, p. 239)—such as irreducible laws, powers, potentialities or chances—to explain modal facts; in addition a plausible story is needed about how such unHumean posits could play the familiar roles of laws, powers, potentialities, or propensities. And an integral part of that role concerns the methods by which these natural modalities can be discovered. Focusing on dispositions and chance, Schwarz argues that non-Humeans lack a plausible epistemology of natural modalities. He calls the epistemological worry he raises the *access problem*.

In a nutshell, the access problem is that observation and experiment only tell us what does happen, but they do not directly reveal what might, must, or would happen in non-actual circumstances. If modal phenomena are reducible to facts about occurrent non-modal events, as Humeans claim, then it is no surprise that observing occurrent events provides information about modality. By contrast, if modal facts are primitives that do not supervene on occurrent facts, as non-Humeans have it, then knowledge of modal facts would seem to require an inexplicable leap from observations of one kind of fact (occurrent facts) to conclusions about an entirely different kind of fact (modal facts). Schwarz shows that if the world has primitive modal elements this gap creates sceptical scenarios: There are different a priori conceivable ways in which these modal elements might be arranged, many of which are perceptually indistinguishable.

Schwarz examines three attempts of solving the access problem: (i) Appealing to a 'thin' conception of knowledge; (ii) claiming that epistemic norms, such as the Principle Principal (which links chance to credence), are primitive; and (iii) reframing the anti-Humean position as a doctrine about ideology rather than ontology. He argues that none of these proposals is ultimately satisfactory, and therefore, Humean pragmatic accounts of natural modality, and in particular about chance, are to be preferred.

The next chapter, by **Alison Fernandes**, further builds on the themes introduced in the contributions by Ismael (ch. 2) and Schwarz (ch. 3). Like Ismael, Fernandes is concerned with a naturalistic, science friendly account of natural modalities. And like Ismael, Fernandes argues that—despite what many Humeans believe—such an account will not be Humean. But while Ismael is concerned with the epistemology of chance, Fernandes argues that Humeanism falls short when it comes to the explanatory role of chance.

Humean accounts of chance are often presented as being in a unique position to explain why agents should align their credence that an outcome will occur with what they believe its chance to be. According to Fernandes, this is false advertisement. First, she argues that Humean accounts of chance rely on *a priori* reasoning in the form of indifference principles. This reliance on *a priori* principles, according to Fernandes, is in tension with the naturalistic ambitions of Humean accounts. And, second, by reducing chances to relative frequencies, Humean accounts provide a metaphysical guarantee that chances align with facts about relative frequencies. But this alignment creates a mismatch with scientific practice: when scientists reason about chances, they take seriously the possibility that chances and relative frequencies can come apart radically.

Fernandes concludes that philosophers who want a science-friendly account of chance need to look beyond Humean accounts. She thinks that it is a mistake to think that a scientifically respectable account of chance-reasoning needs to provide a non-circular analysis of chance. Instead, she argues that agents should align their credences with what they believe the chances to be because doing so guarantees a high chance of success; Fernandes argues that, though circular, this sort of reasoning is virtuous.

Heather Demarest and **Elizabeth Miller** continue to build on this theme. They extend some of the worries addressed in this volume by Ismael (ch. 2), Schwarz (ch. 3), and Fernandes (ch. 4) to causal and dispositional modalities we find in the special sciences. Like Ismael, their concerns arise from the fact that for Humeans, modal facts depend on the global distribution of occurrent properties. This feature generates various 'undermining problems'. One well-known sort of undermining problem, discussed by Ismael and Fernandes, concerns chances: since the chances, for a Humean, are determined by the world's frequencies, there are no worlds in which the total sequence of events is unlikely. But such worlds are apparently compatible with the chances. This creates an unpalatable mismatch between what the chances allow and what the Humean takes to be possible; though apparently compatible with the chances, unlikely events 'undermine' their status as the chances. Demarest and Miller take this issue beyond its usual setting by showing that analogous worries arise for Humean

accounts of counterfactuals. They start by showing that an influential proposal due to David Albert (2000) and Barry Loewer (2012) (called the 'Mentaculus') can dodge some undermining worries regarding chance: Since the mentaculus takes chances to be a measure of sets of possibilities, rather than statements about the frequencies within a world, they have more tools to make sense of nested claims like 'even if there were a long string of heads, the chance of the next flip would still be 0.5.'

But Demarest and Miller argue that there are serious complications when it comes to extending this account to other modalities, including causal and dispositional modality. These complications generate puzzles for Humean accounts in the special sciences. For Humeans hold that ascriptions of dispositional properties are partially made true by the laws, and that some physically possible worlds have different physical laws. So, at such worlds with different laws, these properties don't exist, or at least aren't had by the same things. This means that, at many physically possible worlds, there are no predators, giraffes, or soluble molecules, even if there are things that are qualitatively identical to our predators, giraffes, and soluble molecules (cf. Schrenk, this volume, ch. 8). If we ask what prey animals would do if there were no predators, we may have no worlds to look at.

Demarest and Miller argue that the Humean can make use of King's (2007) distinction between truth in a world and truth at a world, where the former tells us what is true according to the world, and the latter uses our laws and higher-level kinds to determine which of our sentences the world makes true. This provides at least one avenue out of these undermining problems for Humeans.

After this series of Humean critical papers, **Barry Loewer**, in his contribution, defends Humeanism by arguing that it can overcome some of the most entrenched criticisms. Loewer's preferred kind of Humeanism also falls into the class of pragmatic views. He builds on his earlier 'Package Deal Account' (PDA), in which the laws and the fundamental properties are determined jointly: for Loewer, whatever package of laws and properties best meets scientific criteria of theory choice delivers both the laws and fundamental properties of the world.

Loewer argues that this joint package can provide novel responses to two extant criticisms of Humeanism. First, Humeans are accused of explanatory circularity. The laws, for Humeans, are determined by, and so metaphysically explained by, the Humean Mosaic. But the laws in turn explain parts of the mosaic: their instances. To many, this looks like a tight explanatory circle. Loewer argues that the PDA gives us a neat way to sever the circle: since the laws and properties are determined together, we need not accept that the laws are explained by their instances. Both where the borders of the mosaic's tiles are and which patterns of tiles count as laws are a result of the systematizing procedure.

Second, many authors have argued that, if Humeanism is true, it is astoundingly unlikely for the world to have any order at all. Recently, a number of authors have further argued that Humeanism is self-undermining: since there are many more disordered worlds than ordered ones, they claim, Humeans should expect our world to soon descend into chaos. This sort of reasoning occupies a few of our other authors,

including Ismael (this volume, ch. 2) and Schwarz (this volume, ch. 3). Loewer points out that the PDA gives us an avenue to reject a key premise of this argument: since, on his view, worlds do not come equipped with a preferred property structure, there is no reason to accept that every combination of properties is possible. The combinatorial reasoning which underlies the objection rests on the idea that the properties are prior to the laws, a claim that Loewer rejects. Like Ismael and Fernandes, Loewer's view flirts with anti-Humeanism: if the systematizing procedure determines the world's property structure, it might well turn out that some properties are necessarily connected to others.

The next two entries present challenges for developing the BSA in a pragmatic way that arise from doing away with Lewis's ingredients, i.e. an antecedently given structure of perfectly natural non-modal properties.

Harjit Bhogal elaborates on Loewer's PDA. He interprets the PDA not just as a reductive theory of laws but also a reductive theory of natural properties. His central aim is to explore whether this account provides a notion of naturalness that can play the various roles Lewis and others have intended it to play. He focuses on three roles of natural properties: their metaphysical role in characterizing the Humean mosaic, their role in identifying what the relevant data is that theories need to be informative about, and their role in fixing the language that the axioms need to be formulated in.

In the course of examining to what extent the PDA can account for these roles, he maps out the connections between naturalness and laws on the traditional BSA and examines how those connections have to be adjusted in order to develop various versions of the PDA. He argues that the PDA can only be developed by letting pragmatic considerations take centre stage. The PDA is classified as an instance of a broader and recently popular approach to Humeanism that focuses on the role of 'ideal observers' or 'ideal scientists' (cf. Callender, this volume, ch. 1). But viewing the PDA as an ideal-scientist view makes it hard to answer the question of why we should care about what the ideal scientist says (any more than we should care about, say, an ideal astrologer), and consequently, why we should care about the laws and natural properties on the PDA approach.

Furthermore, Bhogal argues that while some other versions of the PDA might be feasible, they don't provide as much as its proponents might hope for. In particular, according to Bhogal, such a version of the PDA needs to be agnostic about the underlying metaphysical structure of the world and thus fails with respect to their central metaphysical role, i.e. specifying reality's fundamental nature in an entirely non-modal Humean way.

Like Loewer (ch. 6) and Bhogal (ch. 7), **Markus Schrenk** also takes up the theme of employing pragmatic considerations in determining the predicates going into the BSA. But his focus is on the Better Best System Account (BBSA) of laws and in particular on applying it to the laws in the special sciences (see Cohen and Callender, 2009, 2010; and Schrenk, 2008, 2014). Like proponents of the PDA, defenders of the BBSA deny that a best system is confined to the Lewisian ingredients, i.e. a privileged set of natural properties; instead, they hold that systematizations can be executed for any pragmatically chosen set of properties. Unlike Loewer, however, Schrenk and other proponents of the BBSA think that each science can appeal to its own division of properties, rather than reducing these properties to a privileged set determined by

physics. So, instead of only providing fundamental physical laws the BBSA is supposed to be able to deliver also the laws for the various special sciences such as chemistry and biology.

Schrenk provides a new way of articulating best systems accounts as a function of a chosen set of predicates, a corresponding property distribution and set of theoretical virtues. The main aim of his entry is addressing several challenges and worries of the BBSA thus construed: A first concerns the extent of the anthropocentricity of laws resulting from the pragmatic choice of predicates. A second results from the observation that the predicates figuring in the theories of the special sciences might be dispositional, i.e., already equipped with a nomological profile. However, this seems to be in conflict with the idea that nomological facts are determined by the systematization procedure. A third class of challenges arises with respect to the boundaries between the different sets of properties that demarcate the sciences. A fourth worry is that the BBSA thus construed might depict the whole of science as a patchwork of unrelated, maybe even contradictory theories instead of a hierarchical unified system. Fifth and finally, there is a related issue concerning scientific progress: as a scientific discipline develops it might host different sets of properties. Systems analyses for different property sets, however, might well be incommensurable.

Like Schrenk (ch. 8), **Chris Dorst** responds to a series of objections to pragmatic regularity theories of laws. First, Dorst illustrates the neo-Humean view as a sort of ideal-advisor view (see Callender, this volume, ch. 1): imagine there were a hotline for dealing with novel physical systems. What sort of information would the hotline request before dispensing advice? And what sort of advice would we want the hotline to dispense? Dorst's framing builds on Callender's discussion of the importance of idealized agents to Humean views. But Dorst presents a novel challenge for them: if the utility of laws is evidence for an ideal-agent view, are the ways in which laws fail to be useful to us evidence against them? Dorst considers four apparent problems: first, quantum indeterminacy yields laws that are less informative than we might like. Second, quantum nonlocality means that, to generate ideally strong predictions, we need distant information we don't have access to. Third, as Ismael (2019) has argued, special relativity implies that the total causal history of an event is not accessible at any point before the event happens. So we cannot gain the information necessary to predict an event before it happens. And finally, the exceptionlessness of the laws might seem surprising from the perspective of a limited agent that would do just as well with laws that work most of the time, around here.

Dorst provides four strategies in responding to these challenges. Two involve accommodating them within the neo-Humean framework: Dorst points out that features that make laws useful trade off, and argues that some of these constraints involve tradeoffs in the face of an unkind world. He further argues that the apparent non-optimality can have surprising benefits. But Dorst's other two strategies are interestingly related. Dorst claims that some of the desiderata for laws might be historical accidents, driven by the philosophical or theological biases of scientists who

look for laws. This process of conceptual development may continue: as we use the laws to gain information about the world, we gain new epistemic handles, and shed the constraints that we—and consequently the laws—were previously subject to. Dorst calls this ‘the instability of predictive optimality’, and addresses it with a mixed strategy, aiming to both mitigate some of its counterintuitive consequences and exploit those implications which make the laws more useful for us, or agents like us.

Thomas Blanchard considers a similar worry to Dorst’s, but comes to a different conclusion. Like Dorst (this volume, ch. 9), Blanchard worries that some features of physical theorizing cannot be accounted for merely in terms of their predictive utility. Physicists look for exceptionless, comprehensive laws: laws which subsume or explain everything. Like Dorst, Blanchard sees this as a problem for the pragmatic Humean: why should we look for totally comprehensive laws if restricted ones will serve us just as well? Rather than attempting to accommodate this practice within the pragmatic framework as it stands, Blanchard argues that we should alter the framework. He proposes an account of laws---or fundamental laws anyway---which takes them to be maximally explanatory principles.

Blanchard then develops a Humean-friendly account of explanation along the lines of Friedman’s (1974) unificationist proposal. He shows how unificationism can explain the physicists’ yearning for a maximally comprehensive theory of everything. Blanchard’s development of the proposal will be a boon to Humeans, who frequently appeal to unification as a goal of explanation, but less frequently show how a specific unificationist proposal ties in to the Humean account of laws.

Pragmatic considerations are not entirely absent: first, Blanchard argues that striving for maximal unification is a goal of physics, but not every science. By appealing to distinct and often predictively-directed goals, Blanchard argues, we can explain the less programmatic structure of the special sciences. By suggesting that the special sciences and physics might have different goals, and so different criteria for lawhood, Blanchard’s view dovetails with the BBSA which argues that the special sciences build their laws out of different ingredients, but use the same procedure (see Schrenk, this volume, ch. 8). If Blanchard is right, the recipe of physics might not be the same as that of chemistry. The chapter concludes by arguing that a unificationist goal in physics yields more than just useful laws at the end of inquiry: it motivates an approach to theory building which tends to uncover novel truths about the world in addition to useful laws.

John Roberts’s contribution lays a comprehensive groundwork for a novel Humean theory of laws, counterfactuals, and causation that, like Blanchard’s (ch. 10), is an alternative to best systems theories. Roberts’s theory is unabashedly pragmatist, but the pragmatism is different from the one we have encountered so far in this volume. Dorst (ch. 9), Callender (ch. 1), and Loewer (ch. 6) consider versions of Humeanism that are pragmatic in that they are partly appealing to limited agents. Robert’s pragmatism traces directly back to Peirce’s pragmatic theory of truth. Peirce thought that truth pertains to those statements that we arrive at the limit of scientific inquiry.

Roberts's key primitive is that of an effective method. A method consists of a means, enabling conditions, and an end. In Peircean fashion, Roberts defines a method as effective 'just in case it is one of the methods we would classify as effective, in the limit of scientific inquiry, assuming that conditions are optimal' (p. XX) More precisely, they are the methods we get when we take our initial opinions about effective methods and update them, taking the entire Humean mosaic as our evidence. This account is Humean because effective methods are solely determined by the Humean mosaic plus the standards ideal science uses for discovering effective methods.

With a Humean account of effective methods in hand, Roberts sets out to define all other natural modalities in terms of effective methods. In his paper, he shows how this can be done for counterfactuals and laws. Very roughly, he shows that the truth conditions for an important subclass of counterfactuals—viz. semifactuals, which have a true consequent—can be defined in terms of effective methods. And he then shows that all other counterfactuals are equivalent to semifactuals. Robert's account of laws is inspired by Lange's (2009) counterfactual stability account of laws. But rather than appealing to counterfactuals, he defines laws as those propositions that form an 'unviolatable set', that is, a set that is such that no effective method can render one of them false.

Ned Hall develops a Humean reductionist account of essence that in important aspects resembles Humean reductionism about laws of nature. He invites us to contemplate the differences between truths like the particular existential claim 'There are exactly 17 black holes within 20 light years of our solar system' and generalizations like 'Every black hole at equilibrium is completely physically characterized by just three parameters: its mass, its angular momentum, and its charge.' Assuming that both claims are true (although the former is not), the latter is significantly more important than the former. The question now is what explains this difference in importance.

Hall presents two fundamentally different approaches to explaining this, a *metaphysical account* and an *epistemic-utility account*. According to the metaphysical approach, the generalization is more important because it reveals something about the *essence* of the kind *black hole* whereas the particular fact does not. According to the epistemic approach, the reason why the generalization is more significant is that knowing it *facilitates inquiry* to a vastly greater extent than does knowing the particular claim. In the case of black holes, the generalization helps us to make various novel predictions and give various explanations about black holes in a way the particular claim does not.

Hall then works towards an epistemic account of essence by drawing inspiration from the debate between Humeans and non-Humeans about laws of nature. He thinks the core question in this debate is whether one should give a *metaphysical* or an *epistemic* account of what laws are. In a parallel way, he argues that a key question we face about essences is whether to give a metaphysical or rather an epistemic account of them. A benefit of connecting laws and essences according to Hall is that enough progress has been made on the former to provide valuable guidance for investigating the latter.

Finally, he outlines the contours of a Humean reductionist account of essence where the epistemic notion of ‘inquiry about *Xs*’ (where *X* is some kind) takes center stage. Hall then presents important consequences that naturally fall out of his approach. Here is a little selection: First, the *importance* of the concept of ‘essence’ can be reductively explained without leading into a Humean eliminativism about essence. Second, essences turn out to be interest-dependent and capable of vagueness. Third, it helps clarify the distinction between essences of *kinds* and essences of *individuals*. Fourth, it naturally motivates a strikingly deflationary treatment of essentiality about origins. And finally, fifth, the view neatly solves a puzzle about the essences of arbitrary fusions.

Taken together, these papers provide a roadmap for developing pragmatic Humeanism further. As the contributions to this volume show, there is not just one path, but a series of divergences. Humeans can seek to strengthen their account of laws by adding pragmatic considerations, as Callender (ch. 1), Schwarz (ch. 3), and Dorst (ch. 9) suggest; but doing so may have far-reaching ramifications. First, their pragmatic motivations might drive them away from the austere Humean metaphysics, as they have Loewer (ch. 6), Ismael (ch. 2), and Fernandes (ch. 4). This may create problems of the sort Bhogal (ch. 7), and Demarest and Miller (ch. 5) point to, or of the variety that Schrenk (ch. 8) and Dorst (ch. 9) raise in order to allay. These considerations may require Humeans to move even further from the Lewisian orthodoxy and to replace the BSA entirely with something more focused on the needs of agents or scientists, as in the new positive accounts of laws and chances developed by Blanchard (ch. 10), Fernandes (ch. 4), and Roberts (ch. 11). And finally, it may provide the resources for Humeans to give new positive accounts of those things non-Humeans take to be basic, as Hall (ch. 12) argues. Opportunities abound, and the way before us is full of potential for interesting and novel work.

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