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Local Qualities

Elizabeth Miller

Think of a pointillist painting: hundreds of tiny pixels depicting a leafy scene. Each leaf is a constellation of primary colors, some expertly proportioned and arranged dots of red, yellow, and blue paint. These pixels are mutually independent: the color at one does not depend on or constrain the decoration anywhere else. Collectively, though, they determine all the contents of our painting: duplicate the geometry of the canvas and the pointy distribution of pigments and we thereby duplicate the whole integrated scene.

For metaphysical atomists, the cosmos is a spatiotemporal array of collectively complete, mutually independent elements, much like dots on a canvas—or, as David Lewis prefers, like tiles in a mosaic. Lewis subsumes his own atomistic vision of cosmic structure within his broader doctrine of Humean supervenience. For Humean atomists, the contents of space-time supervene on a spatiotemporal "mosaic" of "local qualities": "perfectly natural intrinsic properties which need nothing bigger than a point at which to be instantiated" (1987, ix–x).

One *piecemeal* species of Humean atomism promises more than global supervenience—somehow or other—on a separable mosaic; it constrains *how* elemental inputs combine to yield other features of the cosmos and its parts. We expect the pixelated distribution of pigments within a pointillist painting to determine the total scene, but we also expect something more specific: the contents of any proper part of our painting should be fixed by the pointy distribution of pigments within that part alone. The blue and yellow dots within corner R, for instance, jointly

suffice for its complete character: anything with this same pixelated decoration should exhibit the same regional greenness, regardless of what might be happening elsewhere.

A thoroughly piecemeal species of Humean atomism likewise expects the distribution of basic elemental states within one part of space-time to suffice for the local "occurrent" character of that part (Maudlin 2007, 72). As a result, the physical state of any localized part of the cosmos is strictly intrinsic to it, in a sense that secures modal insulation from external happenings. In a non-piecemeal scenario, in contrast, even a pixel-for-pixel duplicate of R might have some different regional character thanks to a different global context. Perhaps, for instance, R* is part of another painting with another canvas-wide decoration: a sea of blue dots surrounds R*'s pixels, conferring an aqua cast on R* itself. Strictly speaking, global supervenience promises only that any pointwise duplicate of R *that is also* part of a broader canvas relevantly like R's own will share R's total state.

My aim is to move beyond this metaphor to propose a non-piecemeal reading of Humean doctrine. The result permits non-basic properties to be recognizably local to—"painted on" or manifest within—some proper part of space-time while supervening only on a more global elemental base. From one perspective, the task looks trivial: surely we can "localize"—at least nominally—anything we choose. My property of being Meredith's sister, for instance, is local to me in *some* sense, despite requiring crucial cooperation from elsewhere (Robinson 1989). So anyone who endorses Humean supervenience can, and maybe already does, deny the general thesis that the distribution of basic elemental states across one region suffices for its "local" contents. If non-piecemeal atomism is supposed to be distinct from some piecemeal counterpart, then the suggestion must be that some *interestingly* "local" character can be globally based. But now we run the risk of swapping triviality for impossibility: to deny that the basic states of

constituent parts suffice for something's interestingly local *intrinsic* character is to depart from Humean orthodoxy, threatening non-piecemeal "Humeanism" with incoherence.

Unsurprisingly, I think our task is neither trivial nor impossible. To succeed, though, we need a candidate demarcation of distinctively local features: something narrow enough to be philosophically interesting, but still broader than an orthodox circumscription of thoroughly insulated strictly intrinsic properties. One candidate draws inspiration from critics of Humean supervenience that include non-insulated, irreducibly modal, dispositions among the local states of concrete bearers. Perhaps Humeans can—or even already do, at least implicitly—include non-insulated, *reducibly* modal, globally supervenient dispositions within local physical states of their own. But a more revisionary proposal goes beyond the case of familiar dispositions to suggest another class of globally based yet locally manifest states, ones compatible with loneliness and accompaniment but still modally sensitive to the features of such accompaniment. The result separates global reductionism about modality—and "all else" besides—from a further, fully piecemeal association between spatiotemporal separation and metaphysical independence (Lewis 1987, x).

1. HUMEAN SUPERVENIENCE

Tim Maudlin divides Humean doctrine into two "logically independent" subtheses, one of which expresses an atomistic vision of cosmic contents: "the complete physical state of the world is determined by (supervenes on) the intrinsic physical state of each spacetime point (or each pointlike object) and the spatio-temporal relations between those points" (2007, 51). Elements of the Humean base, more specifically, are small parts of space-time itself or concrete occupants of

these. Either way the elements stand in external geometrical relations, endowing the cosmic whole with spatiotemporal structure.

Humeans explicate collective completeness in terms of supervenience, or necessary covariation: at least within our "inner sphere" of metaphysical possibility, two possible worlds disagreeing at all about cosmic contents also disagree about the geometry of or distribution of basic elemental states across space-time (Lewis 1987, x). As a result, Humeans distinguish their reductionism from eliminativism about non-basic cosmic contents. Just as some red and yellow pixels might collectively suffice for, without thereby exhausting, the distribution of orange patches across our canvas, decorated basic elements of the space-time mosaic might collectively suffice for, without thereby exhausting, broadly derivative states of affairs—mereological complexes of elements instantiating various non-basic properties and relations.

Basic states are "local" to their elemental bearers insofar as they "need nothing bigger" for instantiation (Lewis 1987, ix–x). Minimally, then, any basic state could just as well be borne by some lonely element, in a world devoid of distinct contingent occupants, as by some accompanied one (Langton and Lewis 1998). But Lewis secures a more robust form of independence by restricting his base to *purely* qualitative ingredients: the metaphysically possible distributions of basic states across any elemental array include all the combinatorial possibilities. Like pigments at distinct pixels, then, the basic decoration of one element in no way depends on, constrains, or otherwise necessarily covaries with that of any others.

The restriction to modally insulated basic states is one manifestation of a deeper Humean reductionism about modality, which Maudlin's second subthesis draws to the surface: "All facts about a world, including modal and nomological facts, are determined by its total physical state" (2007, 51). With this addition, Humeans pair an atomistic conception of actual cosmic contents

with the expectation that all facts about what—physically or metaphysically speaking—*could* be the case ultimately trace to these. Again, Humean reductionism is not eliminativism. When it comes to facts or features others consider irreducibly modal, the general Humean strategy is to "grant their existence . . . and show how they can, after all, supervene on the arrangement of qualities" (Lewis 1987, xi).

Broadly speaking, piecemeal and non-piecemeal Humeans disagree about the details of such supervenience, about exactly how some non-basic facts and features relate to the elemental base. In some cases, though, the story is straightforward. For example, let *intrinsic* properties be those common to perfect duplicates, where perfect duplicates have parts with all and only the same basic properties; an individual's non-basic intrinsic features, then, are ones for which the basic states of its own elemental parts suffice (Langton and Lewis 1998). It follows that any thing's intrinsic character is independent of external factors at least insofar as it is compatible with loneliness and accompaniment.

But the further Humean restriction to insulated, categorical basic states takes us beyond indifference to the existence or non-existence of some distinct accompaniment or other, adding indifference to the basic features of any such accompaniment as well. Since, for all Humeans, the distribution of basic states within some part of the cosmos suffices for that part's complete intrinsic character, it follows that the complete intrinsic characters of any spatiotemporally separated bearers are modally independent. Piecemeal Humeans extend this story to all saliently "local" properties: the complete local physical state of any proper part of the world is supposed to be strictly intrinsic to it. Any features of or facts intuitively "about" one part of the world that lack a fully insulated modal profile are not, in fact, genuinely local in the sense we are after—they are more like my nominally "local" property of being Meredith's sister.

On a non-piecemeal alternative, the situation is more complicated. Some metaphysically elite local properties—namely, the strictly intrinsic ones—are insulated. Even so, perfect elemental duplicates can share all these while diverging in other interestingly, genuinely local derivative properties. Crucially, even non-piecemeal Humeans preserve global supervenience between these features and the complete atomistic mosaic. Even so, we can draw inspiration from some *opponents* of Humean supervenience, anti-Humeans about nomological possibility, in distinguishing our more broadly locally manifest states from their narrowly insulated—strictly Humean intrinsic—counterparts.

2. ANTI-HUMEAN INSPIRATION: LOCALITY WITHOUT INSULATION

All critics of Humean doctrine think some facts about the world fail to supervene on the Humean mosaic. Anti-Humeans about nomological possibility, in particular, count facts about what could, physically speaking, be the case among these. For them, no univocal "total" or "complete" state of the world meets both of two conditions: (i) all modal (and other) facts about the world supervene on it; (ii) it supervenes on an array of collectively complete yet mutually independent elements (Maudlin 2007, 51). Anti-Humeans can disagree amongst themselves about exactly how irreducibly modal ingredients thwart Humean ambitions. Maudlin's division equips us to distinguish three options: anti-Humeans can claim that the total physical state of our concrete cosmos fails to meet condition (i) while still meeting (ii); they can claim that it fails to meet (ii) while still meeting (i); or they can claim that it leaves both conditions unmet. These options correspond to three conceptions of cosmic contents and their relationship to modal facts.

The first option—claiming that the total cosmic state fails to meet (i) while meeting (ii)—sacrifices Humean reductionism about modality: two worlds can agree about the actual

distribution of geometrical relations and basic intrinsic states across elements of space-time while still disagreeing about, for instance, what could happen given the physical laws. Since (ii) guarantees that any worlds agreeing at the basic level agree about *all* cosmic contents, it follows that two worlds can agree entirely about *all* actual happenings within or across space-time while diverging on some nomological facts. On the resulting picture, physical laws are "external" constraints on cosmic contents: a possible world joins the total physical state of a cosmic whole with additional nomological facts over and above this (Heil 2013, 168).

The division between actual cosmic contents and external modal supplements fits naturally with an exclusively categorical inventory of cosmic contents and, as a result, with a thoroughly piecemeal conception of cosmic structure—one on which happenings within a region of space-time simply sum together fully independent states of its own subregions. Such a piecemeal picture, though, conflates what Maudlin insists are two importantly different things we might have in mind when classifying some features as non-categorical (2007, 72). First, we might be suggesting that the features are less than *purely* qualitative: we might be attributing to them some potency that restricts their recombination, for example. Alternatively, we might be suggesting "mere" dispositionality in some more pejorative sense: we might be implying that the properties in question are either not real at all, or at least not genuinely "occurrent" to or manifest within some salient part of space-time. According to Maudlin, Humeans conflate these, but anti-Humeans about modality should know better: non-categoricity of the first sort does not entail non-occurrence of the second. That is, some state can be genuinely real, occurrent, and even locally manifest within one part of the world without being thoroughly modally insulated from external happenings.

Anti-Humeans who appreciate Maudlin's moral fold irreducibly modal ingredients into the internal decoration of the cosmos itself. Fans of powerful qualities, for instance, trade Humeanism's categorical mosaic for a "dispositional matrix" of modally potent elemental states, pairing local qualitative aspects with necessarily attendant causal powers (Heil 2013, 178). Like their Humean opponents, such anti-Humeans may opt to claim that our actual cosmic state meets (i), treating physical laws as supervenient generalizations over the basic features of localized bearers (Demarest 2017). Crucially, though, they disagree with Humeans about the metaphysical character of such features: in general, the distribution of powerful properties within one part of space-time is not wholly insulated from the broader context.

Contrary to the demands of (ii), then, basic elements are not mutually independent in the way our Humean atomists expect. Instead, the modally potent character of one element constrains what features its distinct accompaniment can have *if* any such accompaniment does exist (Wilson 2015, 141). Roughly put, the distribution of basic states across any such accompaniment must be consistent with modal facts already folded into our existing cosmic contents. Anything that might exist alongside this object T, for instance, must cohere with the fact that T's molecular parts are disposed to hold together in a solid table-y sort of way.

Anti-Humean fans of basic powerful properties, then, reject any limitation to exclusively categorical cosmic contents. More carefully, they may concede that no less than purely qualitative or insulated state qualifies as officially "intrinsic" or "Humean intrinsic" in some narrow sense, but even so they deny that such a sense captures all we have in mind when we set out to demarcate, for instance, the recognizably local physical state of this table: the various physical characteristics instantiated here before us. We can characterize some physical profile as

locally manifest without thereby affirming its complete modal indifference to all happenings extending beyond the bounds of this room.

The basic states of our table's elemental constituents are identifiably local in a familiar sense: they need nothing bigger for instantiation. The can be borne by lonely elements as well as accompanied ones. Similarly, with the right basic character, some lonely occupant of a sparse world, devoid of distinct contingent inhabitants, could bear T's same dispositional profile, and a lonely occupant with the wrong character could lack it. With the right basic character and the right global circumstances, an accompanied individual could bear T's same dispositional profile; without one or the other, it could lack it. But in general, there is no guarantee that properties localized in this broader sense are insulated in the way that Humeans expect their officially intrinsic ones to be.

Fans of powerful qualities deny that any array of purely qualitative basic states suffices for a thing's local occurrent character because they deny that there are any such purely qualitative basic states at all. Other anti-Humeans retain some inventory of purely qualitative ingredients but deny that these alone furnish a complete cosmic base. On one of Maudlin's own alternatives, for example, some added metaphysically contingent laws attach derivative dispositions to local qualitative bases (2007, 72). Again, condition (ii) goes unmet, since the complete physical state of the cosmos includes ingredients over and above the Humean mosaic: roughly, the more complete state is what results from decorating that mosaic with additional local features that derive from some fundamental laws.

Strictly speaking, this sort of picture is compatible with the thesis that our total cosmic state meets condition (i), but anti-Humeans who think of laws as prior constraints on cosmic contents likely will deny this as well. Either way, some supplementary laws, over and above even the total

mosaic, pair T's microphysical structure with some local disposition to, say, impenetrability (Maudlin 2007, 72). T's more complete physical state figures in explanations of and counterfactual and causal claims about it and its parts, wholly within this proper part of space-time. T's state needs nothing bigger for its instantiation in a familiar sense: while T is actually accompanied, a lonely individual in a world with relevantly similar laws could have the very same local character (Langton and Lewis 1998). Again, though, it does not follow that T's local profile is insulated in the way that Humeans expect their officially intrinsic properties to be. T's total physical state may constrain the features of its distinct contingent accompaniment. At the very least, T's local solidity constrains the possible evolutions of things causally interacting with it. More generally, the features and behaviors of everything throughout space-time must cohere with the laws that tie T's categorical core to its further physical character—thus restricting us to some proper subset of all combinatorial possibilities.

3. NON-PIECEMEAL HUMEANISM

Anti-Humeans can and do distinguish some more broadly local manifest states from strictly modally insulated ones, but they also deny Humean supervenience along the way. For them, the purely categorical decoration within one part of space-time does not suffice for its more complete contents precisely because those contents also include irreducibly modal ingredients—over and above even the global Humean mosaic. Non-piecemeal Humeans, however, consider such global supervenience failure incidental to the distinction between local manifestation and metaphysical insulation. The distribution of basic states across elements within one part of the cosmos need not suffice for all other features or happenings manifest within it, even though the global distribution of basic states across the complete Humean mosaic does.

A standard Humean treatment of dispositions already resembles one earlier anti-Humean proposal: physical laws pair localized categorical bases with some associated dispositional profiles (Langton and Lewis 1998). The basic categorical decoration of T's elemental parts does not already come with dispositional or modal aspects built in to it alone, but that categorical decoration *plus* some further general laws jointly suffice for T's more complete physical state: any world with sufficiently similar laws pairs this same categorical base with the same derivative dispositions. Anti-Humeans who favor this story already permit the complete local physical state of a subworldly bearer to include ingredients beyond a purely qualitative core, parasitic on general laws. So perhaps Humeans can just agree: T's local dispositional state is fixed by its own intrinsic categorical core plus the laws of nature—never mind that, for Humeans, these laws ultimately supervene on the more global mosaic.

The conception of laws as nothing over and above the global mosaic, though, leads to a potentially important difference between this Humean version and the anti-Humean original. For anti-Humeans, laws are over and above the mosaic in a strong sense: fixing even the complete distribution of basic categorical states across all of space-time may not suffice to pin down the laws. Crucially, we can go in the other direction as well: fixing the general laws fixes little about what the categorical decoration of space-time must be like. For sure, any candidate decoration must be consistent with the laws, but there are lots of ways the world could be that are consistent with the truth, and even the lawhood, of these general principles. While T's local categorical decoration plus some contingent laws jointly suffice for T's more complete physical state, they do so without *also* sufficing for too much more.

More specifically, and rather crucially, they do not necessitate the existence of any contingent concrete accompaniment to T. As a result, anti-Humeans can unpack in familiar terms

the sense in which T's dispositional profile is recognizably local to T: it is compatible with loneliness and accompaniment. Some sparse world has physical laws that endow some lonely occupant with T's same dispositional state. For Humeans, in contrast, laws simply are or express patterns in basic local qualities across the mosaic (Lewis 1983, 365ff.). So if we learn that T has some physical disposition, we learn something about what else exists: for there to be laws associating this disposition with T's basic categorical state, there must be some law-underwriting regularities, which means that there must be sufficiently many concrete things to display the regularities in question. If dispositions are parasitic on general laws in the way we are considering, then presumably no strictly lonely individual will share T's more complete physical state. Thus, that state does not qualify as local to T in a sense that involves compatibility with loneliness and accompaniment (Langton and Lewis 1998, 339; cf. Beebee 2000). Instead, there is an important sense in which dispositional facts intuitively about T depend on the collective character of the global mosaic, and so on relations among various denizens of space-time.

Now Humeans still might be able to describe some way in which dispositions are recognizably "local" to their bearers, perhaps in a sense that involves some limited modal independence from external factors. Anti-Humeans do not demand complete independence between T's dispositional profile and the properties of other things that do happen to exist alongside it: the decoration of T and its accompaniment must cohere with the actual physical laws. Apparently, though, this does not threaten the genuinely local character of T's dispositional profile even in cases of accompaniment. One reason, perhaps, is that there are many candidate external decorations compatible with these laws, rendering T's local state sufficiently independent from the basic properties of any particular distinct things.

We might draw some inspiration from uncontroversially relational properties that still seem more substantively local than my property of being Meredith's sister. Consider, for instance, the value of this piece of paper, which presumably depends on relations between agents and objects throughout space and over time. Plausibly, at least, any lonely piece of paper in an otherwise empty world has no value at all. Even so, this paper's actual value is insulated from the particular details of external happenings: this paper could have the same value even if the intrinsic features of and relations among other things were quite different, in all sorts of ways, than they actually are. Humeans might try developing a similar story for familiar physical dispositions, or even for other derivative properties or magnitudes, like mass, that do not wear ("mere") dispositionality on their sleeves (Hall 2012).

Alternatively, Humeans might be content to deem various relational properties and other familiar physical dispositions as nominally or minimally local by mere courtesy, thanks to their associations with categorical bases and effects. Humean dispositions are not external in some sense that accommodates global supervenience failure, but neither are they insulated from their broader cosmic context in the way that Humeans expect their officially intrinsic, and so strictly local, properties to be. In fact, T's disposition to act in accordance with some law L is not strictly intrinsic even to our actual *cosmic* whole C: after all, we could take a perfect intrinsic duplicate of C, add some suitably recalcitrant contingent accompaniment alongside it, and end up with very different nomological and dispositional facts. Of course, all such facts still would be globally supervenient: no equally *cosmic*, or unaccompanied, intrinsic duplicate of C would have different laws. But perhaps there is little philosophical substance to the claim that some object's "local" dispositional profile is *really here*, or even "within" space-time at all, rather than "spread

around" some subsuming possible world—along with the globally supervenient laws (Lewis 1983, 344ff.).

There is more we could say here, but for the sake of argument, suppose this sort of deflationary verdict is acceptable for the case of familiar physical dispositions. Even so, there remains room for a more robust, revisionary divergence from a thoroughly piecemeal picture. Set aside debates about whether ordinary dispositions are "merely" so, and start instead from an antecedent identification of some uncontroversially local occurrent—even qualitative, if not *purely* qualitative—derivative states. Consider, for instance, the macroscopic distribution of matter in this room. This table-y decoration before me is recognizably local to this region of space-time; certainly, we do not need to consult happenings outside this room to determine or verify this macroscopic material decoration.

If Maudlin and likeminded anti-Humeans are right, this local decoration need not be fully categorical: it need not have the insulated character that Humeans expect of strictly intrinsic properties—even if it proves recognizably local in a sense involving independence from loneliness and accompaniment. Non-piecemeal Humeans agree that a thoroughly insulated categorical core need not suffice for the complete local occurrent state of a region, but they deny that we need any ingredients over and above the mosaic to fix the more complete state. Instead, they point to a *globally* supervenient link between our insulated core and some derivative, locally manifest accompaniment: roughly, any sufficiently similar individual in a world with the right sort of global character will have the same local derivative state. Unlike with more familiar physical dispositions, though, in this sort of case both sparse and abundant worlds can have a global character of the requisite sort, even for Humeans. In other words, the local derivative states in question are multiply realizable: they are common to lonely objects with the right

categorical profiles in otherwise empty worlds, as well as to accompanied occupants of cosmic wholes whose members collectively manifest the requisite global character—one that metaphysically suffices to endow these occupants with further derivative properties while imposing sufficiently minimal constraints on the basic features of its accompaniment.

While these disjunctively realized properties are not officially intrinsic by Humean lights, non-piecemeal Humeans insist that they can count as recognizably local in whatever sense Maudlin's occurrent features do on his anti-Humean story. Anti-Humeans already count some less than freely recombinable states as local: their local dispositions, for instance, are compatible with loneliness and accompaniment, but these also can and do constrain the features of any accompaniment that does in fact exist—minimally, such features must cohere with the physical laws. Likewise, Humeans' derivative, non-insulated local states are compatible with loneliness and accompaniment: they can be realized by some lonely configuration of elemental parts as well as by some accompanied one in the right sort of global context—but this global condition still can restrict the basic features of any accompaniment that does in fact exist.

Suppose this room contains some table-shaped arrangement of particles or, if we prefer, some table-shaped pattern of basic microscopic occupation states, P. On a thoroughly piecemeal story, the presence of P metaphysically suffices for the macroscopic table-y decoration here in this room. Any duplicate with this microscopic decoration has the same macroscopic material character, regardless of broader circumstances. On a non-piecemeal alternative, the story is more complicated: the macroscopic character is genuinely local but not locally based. The room has this macroscopic state thanks, in part, to the presence of P but also to some further globally supervenient facts about the mosaic: perhaps—on one possible candidate physical story—these

include the fact that there is no denser table-shaped distribution of occupation states within five meters of P (Lewis 2006, 230–2).

The macroscopic decoration here is compatible with loneliness and accompaniment, since our globally supervenient link is: a lonely world can also exhibit a five-meter absence of any denser table-shaped configuration. Even so, it is not fully insulated in the way that strictly intrinsic properties are for Humeans, since the presence of this macroscopic state limits the more global character of the cosmos and so the properties of P's neighbors outside of this room: specifically, there cannot be any denser table-shaped configuration nearby. Even so, there are many particular decorations of space-time compatible with this constraint. In such a case, we have a failure of local sufficient elemental basing without any failure of global Humean supervenience. The global character of the cosmos supplies a supervenient link between our insulated categorical core and some derivative local state.

Compare this case to our earlier example: R and R* bear the very same interior pixelated distribution of pigments, but only R exhibits a derivative regional greenness. Humean doctrine assures us that any pixelated duplicate of R within a painting sufficiently like R's own will be green, but it does not follow that every pixelwise basic duplicate of R must share R's more complete local physical state. Perhaps a similarly arrayed lonely region would indeed share R's greenness: any lonely region with a roughly equal mix of yellow and blue pixels would have this same regional character, as would an accompanied duplicate in sufficiently variegated surroundings. Even so, R's local pixilation does not suffice for its more complete contents without cooperation from elsewhere. After all, the pixels in R* bear the same distribution of primary pigments, yet R* is aqua, not green. We can trace this divergence to a difference in some more global basis: a sea of uniformly blue pixels envelops those within R*.

R*'s own aqua state is also relevantly local to it: again, a sufficiently similar lonely region would bear the same derivative decoration. A lonely basic *intrinsic* duplicate of R* need not do so: after all, we just said that a lonely pixelwise duplicate of R—and so of R*—might well be green instead. This follows from extending our notion of local manifestation: there is no guarantee of free recombination among all broadly local properties, across or within individual bearers. Even so, we retain recognizable compatibility with loneliness and accompaniment: metaphysically speaking, we could start with some lonely duplicate of R* and adjust the distribution of basic pigments across its pixelated elements, arriving at some aqua whole state without the addition of any distinct contingent objects along the way.

4. CONSEQUENCES: NON-LOCAL BASING

Non-piecemeal Humeanism accommodates instances of non-local basing: some derivative macroscopic decoration of this room, for instance, may reflect a distribution of basic elemental states extending beyond its bounds. Even though such decoration is not strictly intrinsic in a sense demanding free recombination, it may be recognizably occurrent or locally manifest even so. Humeans can draw on an anti-Humean insight to explicate the sense of locality at issue: this derivative decoration is recognizably "here" at least insofar as it could just as well be realized by some lonely elemental base, but it still may exhibit some modal sensitivity to the features of any accompaniment within a larger global mosaic.

We might be interested in the non-piecemeal option because of some antecedent interest in non-local basing—even apart from any loyalty to or antipathy towards Humean supervenience. Certain interpretations of elementary quantum theory, for example, may inspire us to entertain the hypothesis that our data about localized configurations of macroscopic objects can have

surprisingly global grounds.[1] But even the minimal possibility of deviation from a piecemeal extreme may have consequences for our understanding of Humeanism—and of reductive metaphysical outlooks more generally.

Maudlin warns fellow anti-Humeans about conflating local occurrence and modal insulation: some state may be locally manifest or occurrent within some proper part of the world without being among its purely categorical, freely recombinable contents. Apparently, though, he takes something like this conflation to come part and parcel with Humean commitments. On his telling, Humeans think we can "chop up space-time into arbitrarily small bits, each of which has its own physical state, much as we can chop up a newspaper photograph . . ." into separate parts (Maudlin 2007, 51). We can cut out any part we choose, even pasting it alongside some new accompaniment, while leaving its original interior decoration intact. As a result, Maudlin ties Humean supervenience to Einstein's "reductive" expectation that all objects "lay claim, at a certain time, to an existence independent of one another, provided . . . [they] 'are situated in different parts of space' . . ." (Maudlin 2007, 53–4; cf. Einstein 1948). Roughly, then, states genuinely localized to separate regions of space-time are freely recombinable.

All Humeans agree that basic intrinsic states localized to separate elements are freely recombinable. They also agree that at least some other (non-basic) states localized to other separate (non-elemental) regions are likewise independent: the distribution of basic states across

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[1] In particular, I have in mind "massy" GRWm, according to which—on one reading, at least—the presence of a macroscopic table within here requires some sufficiently "thick" table-shaped configuration of fundamental mass density within this region of space-time. On one interpretation, sufficient thickness is a comparative notion: the mass density in our region must be thicker than counterparts elsewhere in space-time (Lewis 2006, 230–2).

its elemental parts suffices for the *intrinsic* character of any whole, regardless of external happenings. One way to secure a general link between spatiotemporal separation and metaphysical independence is to assume that all genuinely local states are Humean intrinsic. If Humeans were eliminativists about non-basic facts and features, then such an assumption would be unproblematic. But while Humeans deny that the basic states of individual elements have any interesting modal import, they clearly think some *collections* of such states do. After all, a strictly global elemental array fixes the actual modal facts by exhibiting patterns underwriting Humean laws; thus Humean reductionists claim that their rejection of "fundamental" modality does not require rejection of genuinely real modal facts or features.

Non-piecemeal Humeans take this familiar point a step further: rejection of fundamental modality does not require rejection of genuinely *local* modally potent states either. Modally loaded ingredients can show up "within" space-time, endowing proper parts of the cosmos with non-intrinsic but genuinely localized derivative features. By denying that all locally manifest states must be thoroughly modally insulated, non-piecemeal Humeans block off one straightforward path to Maudlin's interpretation of Einstein's link between separation and independence.

Even so, it does not follow that non-piecemeal Humeans must sever that link itself, at least on one understanding of what Einstein's expectation comes to. To see this, distinguish two varieties of non-local basing within an atomistic framework. In cases of one sort, the distribution of basic states across elements in R does not suffice for its complete local character, but the distribution of basic states across elements in some larger whole, R*, does: every perfect elemental duplicate of R* has a part with R's same local character. While the locally manifest character of R does not count as intrinsic to R by Humean lights, it does count as intrinsic to

R*—it is freely recombinable with any basic decoration outside of this larger whole. In cases of a second sort, in contrast, the local decoration of R does not count as strictly intrinsic to any larger whole at all: no spatiotemporal distribution of basic elemental states alone suffices for the local contents of R without concern with external circumstances. Instead, some elemental base suffices *only* given some added assurance that this base is cosmically exhaustive—the mereological sum of all its members is an unaccompanied whole counting all actual concrete objects among its parts.

Cases of the first sort straightforwardly sever any link between separation and independence. The complete local physical state of R is not freely recombinable with the local state of its complement in R*—a part of R defined so that each element in R* is also part of exactly one of R and this complement in R*. The distribution of basic states across elements in R*—that is, the conjunction of basic elemental distributions across R and its in-R* complement—suffices for all locally manifest contents in R. Any region bearing R*'s same distribution of yellow and blue dots includes a mostly blue-dotted part with R's same green tinge. As a result, we cannot hold fixed both the actual basic elemental decoration of R and the actual basic elemental decoration of its complement while altering some non-basic local contents of R. We cannot swap R's derivative decoration from green to aqua without changing the distribution of pigments somewhere within R*.

Cases of the second sort are more complicated. Of primary importance in these cases are not the basic decorations of any particular elements but rather the collective characters of strictly global arrays. Compare: any region with R's same, mostly blue, pointy decoration that is *also* within a canvas containing twice as many blue as yellow dots shares R's same green state. But even the complete distribution of dots across our actual canvas does not alone suffice for that

green state: a pointy duplicate of our array paired with some yellow accompaniment in some larger, extended canvas might be aqua instead of green.

Again we have non-piecemeal divergence between some complete locally manifest contents and some locally insulated core—that internal pixelated decoration of R for which a local base, featuring only R's elemental parts, already suffices. Even so, this time we also can preserve a sort of restricted recombination across the complete local states of separated subworldly entities, *if* we are free to make requisite adjustments elsewhere. Perhaps, given the distribution of pigments within R, our canvas must be mostly blue if R is to have some local greenness. This global constraint has some actual local consequences: the actual remainder of our canvas must have enough blue dots to secure the requisite global base. Even so, there are lots of ways to instantiate the right global character across some cosmic whole or other, and so lots of ways to decorate one localized part of canvas without disturbing R's derivative regional state. Interestingly, Einstein's own explicit concern seems to be with independence between localized objects separated in space *at* a time—perhaps leaving room for some restricted recombination that requires compensating adjustments elsewhere in space-time (Einstein 1948).

In the end, of course, whether a proposal that incorporates non-local basing should count as "Humean" or even more broadly "reductive" by the standards of some framework will depend on the motivations for adopting that framework to begin with. At the very least, though, the non-piecemeal possibility shows that the philosophical landscape is more complex than it might at first appear. Maudlin already equips us to distinguish two ways of denying Humean supervenience: we can reject Humeanism's atomistic inventory of cosmic contents, or we can deny that all facts about the world reduce to these—introducing some further "external" constraints on the actual decoration of space-time. We also can distinguish further some more

specific anti-Humean rejections of atomism: some anti-Humeans deny mutual independence by introducing irreducibly modal basic states or powers; others deny collective completeness by supplementing purely qualitative states with properties parasitic on general laws. But corresponding to each of these more specific stories, it turns out, is also a way of departing from a thoroughly piecemeal atomism while respecting the letter of supervenience between all else and the Humean mosaic.

Both of these corresponding options link the local state of some part of the world to a more global elemental base, so the distribution of basic states across elements in one part of space-time need not suffice for the complete local character of that part. Even so, we can preserve the letter of collective completeness. As a result, the local character of some part may covary with its more global context, even restricting free recombination with the local character of some separated complement. But this need not undermine Humeans' commitment to mutual independence among their basic elements. Even non-piecemeal Humeans can preserve a tight link between spatiotemporal localization and metaphysical insulation at the elemental limit—tying any further extension of this link to the contingent character of our global mosaic.

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