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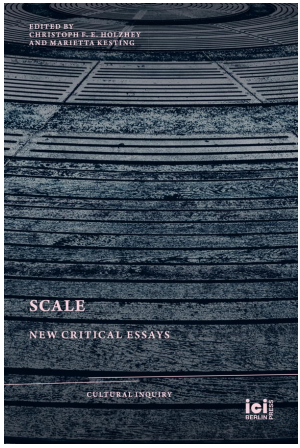

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Contemplating Scale

An Interview with Joshua DiCaglio

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ABSTRACT: The interview reflects on how DiCaglio's framing of scale as 'situated dislocation' can help reorient preconceived notions of 'agency', 'the political', or 'the human'. Highlighting the limits of the descriptive authority of scientific epistemologies, and the illusions of individual control underpinning widespread notions of political action, DiCaglio points to the practice of contemplation as a way of embracing uncertainty and making space for alternative conceptions of agency.

KEYWORDS: scale theory; mysticism; contemplation; rhetoric of science; science studies; cybernetics

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Contemplating Scale
An Interview with Joshua DiCaglio

Joshua DiCaglio's monograph *Scale Theory: A Nondisciplinary Inquiry* (2021) took on the ambitious task of theorizing 'scale itself'; in other words, rather than simply examining how the notion of scale operates within a particular discipline, register, or discourse, DiCaglio proposes a broader exploration of the transformative role of scale for both knowledge and experience.[1] As such, *Scale Theory* offers a wide-ranging discussion of scale's various affordances and misuses — including the philosophical status of scale, the rhetorical operations and assumptions underpinning the use of scale in scientific discourses, and the numerous scalar conflations and distortions prevalent in both popular and scholarly discourse around science and politics — and ultimately arrives at a fascinating and in many ways unexpected discussion of mysticism and contemplative practices. Both *Scale Theory* and DiCaglio's article 'Scale Tricks and God Tricks, or The Power of Scale in *Powers of Ten*' have crucially informed the research and discussions of this cohort of ICI Fellows, as we have tried to grapple with the complexities of scale in our respective lines of inquiry.[2] The below interview, which

1 Joshua DiCaglio, *Scale Theory: A Nondisciplinary Inquiry* (University of Minnesota Press, 2021).

2 Joshua DiCaglio, 'Scale Tricks and God Tricks, or The Power of Scale in *Powers of Ten*', *Configurations*, 28.4 (2020), pp. 459–90 <https://doi.org/10.1353/con.2020.0021>.

has been edited for clarity, is an attempt to reflect on some of the insights from *Scale Theory*, and on how DiCaglio's framing of scale as a 'situated dislocation' can help reorient our preconceived notions of 'agency', 'the political', and 'the human'.

ICI Berlin Fellows: Your book ends on a provocative note, making a gesture that is at once speculative and exhortative. You call for 'a new kind of faith, one that peers into the infinite variety of existence and does not reel in horror or jump forth in conquest or get lost in the reconfiguration but learns to dwell with this cosmic vision'.[3] Equipped with this faith, the subject can bypass the all-too-common risk of merely 'intellectually knowing that I belong to this larger structure without losing myself in it'. This loss of a personal reference point will not be permanent or irreversible but will last for 'one moment, and then another, and then another', with the hoped-for end result of a species that grasps itself as acting as and within the Whole. Yet this mystic moment-to-moment approach seems to rely on its own scalar specificity: the moment itself. How do you explain this? And how would you suggest expanding the field and implications of this approach?

Joshua DiCaglio: Scale arises in part from the problem of being able to extend beyond the immediacy of the place and time at which a perception occurs. In spatial scales this occurs in the comparison between a perspective at one resolution and a perspective at another. Markers of spatial scale permit the two to be brought into relation, to say that what appears as a body at a metre scale is discerned as cells at the microscale or as parts of an ecology at the planetary scale. Doing so also creates the need to reiterate the scale at which any given entity is able to act. In *Scale Theory*, this is distilled in the phrase, 'One can only act at the scale at which one exists.'[4] The point of this statement is threefold: first, it marks the way that we're always getting beyond ourselves, trying to imagine that because we can observe and talk about the world at larger and smaller scales, we are directly acting at those scales. Second,

3 DiCaglio, *Scale Theory*, p. 264.
4 Ibid., p. 48.

it marks the way that within any action are other actions that are not tied to the same agent. Within the movements of your body are also the movements of a billion cells. Third, the point applies generally to any actor at any scale; that is, the capacity to act and relate are scale-specific. Those cells are also only acting at the micrometre scale in response to relations only discernible at that scale.

The point is that we're often going more or less out of focus in our way of conceptualizing action. The term 'focus' here is less metaphorical when thinking in terms of scale; in a scientific mentality or vocabulary we're able to speak of a given entity in terms of another scale, which is a kind of being out of focus. Thus, we find the need to reassert the scale at which action occurs.

I'm responding here in terms of spatial scale first because temporal scale is harder in many ways, as the incremental marking of time doesn't permit the same clear parsing into units as objects. However, the same issues do occur in relation to the problem of our ability to act. This moment (now) is the temporal equivalent of the metre scale for the human body. This thought allows us to rearticulate a classic problem of temporality in terms of scale: the capacity to operate in memory or planning for the future can be thought of as a dislocation from the temporal scale of the present. I'm always thinking of this in terms of contemplative philosophies that emphasize the now as the kind of zero point of conscious attention. Just like with spatial scales, we're also always getting pulled away from the immediacy of the now. The more information that crowds in, the more we get pulled away. Spatial and temporal scaling exacerbate this crowding in to a whole new degree. This crowding creates the need to relocate in both space and time; the calibration to the scalar cosmos is possible only via the connection to the here and now.

Such calibration is both inherently slippery and in need of iteration. The problem exists from two directions. An overemphasis on the scale of experience is what is usually described as ego or *ahamkara* (the 'I-doer'). But the same also happens in the dislocation from the here and now. Many contemplative philosophies have already developed vocabularies for the need to resist the way we are pulled in both directions (the unfortunately obscure American philosopher Franklin Merrell-Wolff has an excellent version in Chapter 79 of his *Experi-*

ence and Philosophy).[5] The technoscientific conception of scale only compounds the problem as it builds out a more elaborate vocabulary and knowledge set for us to dislocate ourselves from the present. The result is an increasing distraction, with attention being overtaken and absorbed by these other scales of action, such that it becomes just as hard to keep the here and now in view as it is to keep in mind the scalar cosmos.

The final part of your question seems to operate from the widespread yet usually implicit assumption that we should want to 'expand' the field and implication. Why do we want to expand the field and implication? This is a version of scalar dislocation, whether in time or space. It is easy to assume that a bigger, longer-lasting impact is better. This usually obscures the way that any impact is made in conjunction with or alongside actions at other scales; those can't be skipped over, even if you don't see them because you aren't (viewing) at that scale. I always want to resist that temptation as it is often a way of getting ahead of ourselves or dislocating the scale at which action occurs and matters.

ICI: Relatedly: 'Contemplation', a term you use to apply insights from various mystic traditions, is, crucially, a *practice*. In that way it seems to chart a path between the perhaps exorbitant forms of revelation brought on by awareness of scale and the rigorous limits of everyday human activity. But how does this contemplation correspond to the demands of *political* practice, especially in the face of climate change — an example you often invoke? What would mass or even species-wide contemplation look like? Or would the insights of contemplation form a new moment within extant social forms: of science, ideology, interpersonal relations, and the like?

JD: At the end of Chapter 9 of *Scale Theory*, I indicate briefly that there might be something wrong or at least odd about the term 'political' when used in this way. What is that term attempting to point us to? We ought to tread carefully here as this pull to the political expressed

5 Franklin Merrell-Wolff, *Experience and Philosophy: A Personal Record of Transformation and a Discussion of Transcendental Consciousness* (State University of New York Press, 1994).

in the form of this question contains within it some scalar assumptions that must be examined. To talk about a 'political' practice could imply a question about the scalar movement whereby human activity becomes coordinated into larger-scale action. But 'political' can bundle up within it a set of assumptions about the points of reference and modes of action for that aggregation: ties to legal structures, questions of regulation and power, human-based concerns and values, and so on. To highlight the contrast, we might note that even to say 'social practice' does not quite carry the same assumptions or implications as 'political practice' even if they are both about human aggregate behaviour. Yet we need to go even further and note that aggregated metre-scale behaviour is not totally encompassed by either the social or the political. Of course, social and political practices are essential for human organization, but I think we should be wary of the way these come to occupy an outsize or even total conception of the scalar relationship between individual *Homo sapiens* action and larger-scale structures.

Consider the scalar analogue between a human body and its cells. Widespread assumptions about the humanist subject operate from the same assumptions about cells as this question does about practice: that in order for aggregate behaviour to be coordinated, adjusted, responsive, or to function, one requires a process that is intentional, planned, regulated, managed, controlled. These terms point to assumptions about scalar relations that attempt to constrain and direct the smaller-scale in relation to the larger-scale. Yet, to make your body move, do you directly control and manipulate these cells? For the cells to get what they need, do they rally together and make demands in a political sense? Perhaps. We might wonder, for instance, if hunger is the way a billion cells make their needs known to the body, and thus navigate us to food at the metre scale. But we should also not move too quickly; a careful examination of cross-scalar relations makes it quite clear that there are other modes of feedback and regulation that exist in quite different forms than what the political assumes about action.

This doesn't mean that there can't be political implications to this line of thought. It seems to me that part of the significance of many ideas of democracy is that they push against many assumptions about control in operation with prior political structures. Walt Whitman's

Democratic Vistas, for instance, speaks of the horizon of democracy as a politics that works from the assumption and trust that human behaviour and coordination might happen meteorologically or geologically. Similarly, the twentieth-century excitement about emergent behaviour runs into similar alternative possible understandings of the relationship between two scales of behaviour. However, the framing and response to systems theory and cybernetics only highlights the persistence or intensification of the problems brought by this insistence on the political as it becomes the stand-in for our scalar aggregation. Concurrent with the articulation of the emergent comes the alluring possibility that we could thereby control the emergence. This creates a new form of a classic assumption about control: that the identification of an emergent property gives one the means to control it. This trope is most clear in a figure like Norbert Wiener, but it recurs throughout systems theory and cybernetics and has become a default assumption within much of our discourse about governance. In this way, we preserve certain ideas of control at the very moment that our glimpse of the scalar complexities might allow us to forge a new attitude towards the aggregation — and, yes, even regulation — of human behaviour.

I've taken to calling this a 'managerial consciousness', which assumes that to respond to or solve a problem is to manage it directly and deliberately. The response to climate change is one of the most potent sites for this question today. A common assumption throughout the climate conversation is that the response to climate change requires immediate, widespread, global regulation on the part of political, legal, and economic structures. The escalating tensions around whether or not our efforts are enough emerges from the managerial assumption. To be clear, we can accept that anthropogenic climate change is real and a problem; that responding to it requires technical, political, and economic adjustments on a large scale; and that both personal (metre-scale) and aggregate (larger-scale) actions are needed. Yet, at the same time, we can push against the assumptions of a managerial consciousness that would posit that the need for a planetary-scale adjustment requires unification as unilateral management of the planet's populations through large-scale regulation and deliberately coordinated collective actions directly in response to the problem. If we examine the last thirty years of climate change rhetoric, what is often articulated

as a tension between climate denial and climate action also contains a resistance to using the need for a realignment of planetary-scale behaviours as the impetus to expand a managerial structure (this tension comes to a new clarity by the 2010s, as can be seen in a text like Naomi Klein's *This Changes Everything*).[6] Again, we can agree that some action is needed — by diplomatic entities such as the United Nations, by large fossil fuel-dependent countries, by multinational corporations, by billions of individuals — while also acknowledging that these things don't necessarily need to be managed in a focused and unilateral way in order for planetary-scale change to emerge. So, in relation to climate change, we might also note that the adjustments can and might be made without everyone being forced to agree to the same concerns and assumptions about climate action. In fact, the attempt to force the issue — to get everyone to agree or be on the same page — seems only to proliferate the opposite and build a suspicion towards action.

The problem is that managerial consciousness will claim any change while also claiming that we're never doing enough. The reason for this is built into the approach that management takes to scale: those operating under this assumption will never actually control the entire field of things within the planet. Already decades past the heralded points of no return, this is where we sit: very many things have been done, adjustments and responses are widespread, and yet for those who imagine that the only way to respond is to directly manage, they both claim the adjustments as a result of their efforts and also insist that we do not have the solution and have not done enough. The reality is: there are literally too many things going on, and the effects and forms of those adjustments must be worked out at those scales.

To assist us in highlighting this change of thinking, we might experiment with an alternative articulation: the adjustment of the planet to these billions of *Homo sapiens* it has produced is the planet's affair. Part of its adjustment involves planetary management by some groups of humans, to be sure, but there is an incredible variety of things that can and are going on. This is not a blind optimism or a shutting of one's eyes to what must happen, but a more honest recognition of the limits

6 Naomi Klein, *This Changes Everything: Capitalism vs the Climate* (Simon & Schuster, 2014).

and dangers of managerial thinking. To say that the opposite of global management (for example, via formal political interventions such as treaties or agreements) is doing nothing assumes that action must start from and operate through these formalized human organizations, that political bodies are the equivalent of the scale of the planet. Note that this is also a dystopic premise in which the large creates absolute demands on the small. In any case, this attitude amplifies the scalar synecdoche that is forged and held in place by the managerial assumption as well as the idea of making a difference as being tied to a larger and longer effect.

In response, we need to examine alternatives to these bundled assumptions. To start in this direction, we can note that any switch between scale domains — in this case, between the metre and the planet — will always create problems of information density and the distribution of entities. There are simply too many things going on at any given scale. These things are operating in a way that, for them to serve as coherent information and to prompt a response at another scale, they would have to be aggregated. Doing so would lose the specific instantiation of them. Managerial consciousness jumps too persistently and quickly between the two scales, yet the information about what is happening at the smaller scale will never be fully available for larger-scale regulation, nor will larger-scale action ever apply in the same way to all entities at a smaller scale.

The issue, in our leaping between or conflating the two scales together, is that too strong a managerial consciousness always leaves out too much of reality. Contemplation is a method of attuning to the unknown as the excess of what you do and can know, looking at and accepting — integrating into your calibration — what you are leaving out as the recognition of the limit of managerial direction. This is not positive knowledge ('I know what I don't know') but rather a cloud of unknowing that one feels positive knowledge and action acting within — like knowing how to type this while also feeling how much is not known about how the cells are operating, where these words will go, what effect they will have. Thus, I am resisting the turn to the political specifically for the way it indulges and generalizes a managerial

consciousness, which is really an extension of what I call in *Scale Theory* an ego-structure problem.[7]

Having followed this line of thought, we might then ask what contemplation could look like at a larger scale. First, we should note that a single metre-scale *Homo sapiens*'s contemplation will never be that. Yet, it seems clear that insufficient contemplation by individual humans permits us to replicate these assumptions in our work with other scales; in fact, we seem to be caught in this loop in which we distract ourselves from contemplation in order to attempt to get more people to buy into the managerial assumption so that management might appear more unilateral.

Contemplation as practice would have to be about letting go of the managerial assumption, of allowing the larger reality to enter, to yield to the higher power (which is not a political structure) beyond human control. I do think that the planet is trying to figure out how to do that, but what it feels like for you or me will also have this scalar disjunction. How could we know what this alternative would feel or look like at a larger scale if we don't undertake the practice at the scale at which our experience is produced?

ICI: You discuss mysticism and its scalar stakes at length in your book. Is it possible to think of (broadly related) practices of divination or possession in scalar terms as well? Do you think they can be understood as cross-scalar encounters in some way, or even 'as a function of the cosmos's ability to parse itself'?[8] For instance: the possessed are seen as acting here and now (at the human/metre scale), yet simultaneously channelling more-than-human scales or forces. Somewhat similarly, divination can consist in a reading of events or signs on or from a different scale domain — from the geocosmic scale of the stars or seismic tremors or atmospheric events to minor, seemingly insignificant overheard phrases or occurrences (as outlined by Daniel Heller-Roazen in his recent book *Far Calls* about such 'minor' divinatory signs)[9] — that are 'humanly' translated, invested with meaning, or embedded in the everyday temporality and structure of sense.

7 DiCaglio, *Scale Theory*, p. 35.

8 DiCaglio, 'Scale Tricks and God Tricks', p. 489.

9 Daniel Heller-Roazen, *Far Calls: On Omens, Slips, and Epiphanies* (Zone Books, 2025).

JD: In response to this question, I want to rearticulate some of what I discuss in Chapter 10 of *Scale Theory* from a different angle. Let's accept for a moment that the scalar schematic of what is now grouped together as mainstream science is accurate. There are all kinds of things at different scales, from subatomic particles emitting radiation from within any atom to ribosomes processing proteins through instructions encoded by DNA, to tectonic shifts slowly crushing entire continents together over the course of millions of years, to the collisions of galaxies unfolding over hundreds of millions of years. These large-scale entities and actions are enormous and we're part of them; the small-scale entities are not lesser but are also everywhere and more numerous, and therefore in certain senses even more in play. Science didn't discover these phenomena in some separate way or bring these things into being. The philosophical assumption of scientific knowledge is that these things are and have been there, regardless of whether or not they have been 'discovered', which largely means differentiated, defined, and described.

By this same assumption, then, we could certainly accept that the same 'things' — atomic radiation, cellular activity, tectonic movements, gravitational influences — were parts of existence before and are parts of existence beyond whatever scientists have had the capacity, time, and effort to discern and define. Does that mean we had no encounter with them outside of or before the methods of science mapped them in this way? Of course not. We must also assume these entities are and were part of existence. If so, then these entities and actions are and have been in operation. It is therefore also a reasonable thing to say that there are other descriptions of these same entities that are cross-scalar encounters. It is also fair to say that there are likely other things science has not yet come to parse which are still in operation and that might, at this point, be better described by terms and ideas not currently accepted by science.

A certain rhetorical framework of science makes this argument in a historical and exclusionary sense, suggesting that things like bacteria were understood as demons, for example, but now we understand that they are *actually* bacteria. This argument is an artefact of the manoeuvre by which science has gained authority through a denigration or dismissal of the descriptions that it comes to replace, even as it

might be describing some of the same phenomena in a new way. For example, while the concepts of the ether and dark matter are not the same in their descriptive form, they could be two attempts to direct us to the same aspects of reality. One could at least be open about the possibility that other descriptions also operate within this same kind of shift, without inherently dismissing what science adds in its particular way of narrowing the range of appropriate description. This is where I return to the point that the epistemic processes of science are always inherently limited in how they describe things; their certainty is also their specificity. There is still a lot of room for describing other forms of relating to and understanding reality.

In this line of argument, I don't want or need to reduce alternative epistemologies to a scientific epistemology by assuming that all these other descriptions of the beyond-the-human are actually just the entities described by science. I'm not saying, for instance, that ideas of the world spirit are *actually* planetary biofeedback mechanisms. Rather, I am only trying to highlight that the epistemic authority of science is also a descriptive authority that doesn't foreclose alternatives as completely as is usually imagined, especially within scientific practice.

Now we can turn to the kind of phenomena that this question is trying to highlight to push against a misplaced descriptive authority. The attitude often taken to the descriptions of science seems to operate under a philosophy of language that makes it impossible to recognize that its highly regulated descriptions are simply one limited and specific way of understanding and describing reality. It's as if I were standing in my driveway and said to a friend, 'Behold, the hunk of a hundred metals and crushed bones sucked into a planetary supply chain and folded by machines and hands into a beast whereby the remains of a billion years of life are combusted for the express purpose of moving our little bodies to work', and they responded, 'Dude, it's just a car.' Except the descriptive arrogance of many scientific attitudes would say something more: either that's wrong or that description is unnecessary — it's just extra, flowery, aesthetic, and so on. What this is — actually is — is a car. There are a host of assumptions in this response, the least of which is that it mixes together questions of epistemology (what we are knowing) with a question of language, regulating the latter as if it were the former. But varieties in language

are also varieties in attitudes towards the same entities; they are not in this instance as much a matter of veracity (both descriptions given are true) as to do with the way the language prompts us to relate to and understand these entities.

Because science translates this epistemological carefulness into descriptive precision, science is not built for the broader task of examining and working with alternative modes of description concerned with broader human experiences and relations with the cosmos. The methods of science are designed to delimit what can be said according to very specific terms; it will consider anything outside of this unnecessary, misleading, or incorrect. However, the problem here is not science, but the widespread dismissal of attitudes towards reality that would warrant other less scientific modes of description. This is what I would encourage us to experiment with, particularly as we think about alternative epistemologies that will engage with the cosmos through different forms of relation that are also different terms, myths, and arguments. So, yes, that can and probably should include different attitudes towards these other phenomena that people find meaningful and that recur as attempts to describe our more-than-human relations.

ICI: You borrow the phrase 'differences that make a difference' from Gregory Bateson, the anthropologist and cyberneticist. Do you see scale, as you define it, as being a way of figuring cybernetics as an approach? Can you speak a bit more about how cybernetics has informed your work, and how its very specific lineage relates to the question of scale?

JD: Cybernetics has always been an essential component of my thinking and my approach to scale. As I worked on the project, I spent a lot of time reading and thinking about Gregory Bateson, including spending some time in the Bateson archives. However, I don't think of cybernetics as an 'approach' as much as a moment when the discourses around science transformed, allowing certain questions to be opened and articulations examined. I like to speak of these moments as 'science eating itself' — moments in the history of science when, using certain assumptions about what is true and appropriate, scientists are forced to revise or question those same assumptions.

There are three such assumptions of interest in the cybernetic moment. First, basic premises of mechanistic philosophy are questioned in a new way. In cybernetics, at least as it is recognized by Bateson and others (especially Heinz von Foerster), causality is no longer a straightforward cause and effect; rather, most action becomes a loop within a complex system. Second, this fits within and provides new importance to a certain notion of information, both in the sense of action as an in-formation and in the sense of the action of matter becoming, at least in part, not a reaction between a set of inert entities but rather a set of exchanges that is structured more like communication than a clockwork system. Third, in this looped form, especially for Bateson but also for systems theorists such as Ludwig von Bertalanffy, these first two assumptions also reposition causality, action, and observation at multiple simultaneously existing levels — what I then describe in relation to scale.

The problem is that mechanistic assumptions are very powerful, and following the cybernetic moment of the 1950s and 1960s the unravelling of these assumptions becomes more-or-less forgotten or covered over. A parallel is the way that Bertrand Russell's and Alfred North Whitehead's struggle with their crisis of mathematics was more-or-less shrugged off after Kurt Gödel (but not for Bateson, who was obsessed with their problem of logical types; he is one source of my interest in this concept). Just as mathematics remained a powerful system for mapping reality despite the impossibility of proving itself, the descriptive power of a multi-scale, informatic, looped system for understanding action and intervening in these systems allows or even encourages us to pretend as if mechanistic assumptions have continued untouched. The more we build (or, more appropriately, we should say 'enable') complex cybernetic systems across scales, the more we become taken with the same hubris at the core of the mechanistic strategy of stringing along a simple system.

So, I don't want to think of cybernetics as an approach but as a moment in the history of thought and science for us to return to in order to rediscover open questions that continue to be passed over. We have and will continue to have our manifestations of these problems, not only through new manifestations such as the problem of planetary biofeedback but also because our planetary systems were in

fact not built on mechanistic assumptions but on looped, informatic, scalar understandings. It therefore becomes a particularly important moment to return to for tracing out how we manage to ignore the implications and transformations brought by new developments in a technoscientific capacity to describe and intervene in the world.

ICI: Towards the beginning of your book, you describe scale as producing a 'situated dislocation'. That is, scale cannot be stably or definitively attributed to a single perspective, since it 'dislocates the perspective from the delimited structure of the body even as it accounts for this dislocation'. You call your approach 'nondisciplinary' as a way of marking your study off from scientific approaches to scale that presume an impossible stability of their preferred perspectives. In light of your intervention, how can specific disciplines — physics, biology — manifest a sensitivity to 'situated dislocation'?

JD: The short answer is this: through marking their specificity. In science, expertise is in part the ability to parse the world at a particular scale, with particular methods for differentiating at that scale, and particular terminology for tracking the entities discernible through this differentiation. By becoming an expert, one learns to see the world in this particular way. The expertise would be incoherent if it was not already a situated dislocation. What the biologist is able to say with confidence about the way that ribosomes take code from RNA in order to facilitate the folding of proteins requires that we have delimited the perspective of the cell according to those objects, which require the biologist to focus on particular aspects of the world at a particular scale. No mutual comprehension between the biologist and the atomic-scale physicist, for instance, would be possible if the two ways of being dislocated were not situated in relation to each other. The organic chemist already examines the situated relationship between the two scales.

To some extent, when the organic chemist is working through methods and appropriate data, they are already sorting through the specific parameters of their way of parsing the world at that scale. The problems arise when one thinks this is the only way of viewing the world or when one doesn't work with the specificity that this expertise

creates. The physicist's reductionist assumption has long been the epitome of this problem, as the assumption that to explain the smaller is to explain the larger (think, especially, of the recurrent idea of a theory of everything) often gets in the way of needing to note the specificity of the way that mode of knowledge is looking at the world.

The hubris of the reductionist physicist is only a simpler version of two general problems that the idea of 'situated dislocation' is meant to remedy: first, that in parsing the world outside of the scales of human experience, science will always produce a situated dislocation; second, that these changes between sciences are creating multiple overlaid situated perspectives that require a multilayered yet not always straightforward alignment of ways of parsing the world.

The first problem is one primary target that Donna Haraway was pointing to in resituating knowledge. The easiest way to do this is to mark the relationship between the perspective that makes the knowledge possible and the perspective of the human. The critique of the 'view from above' rendered this in physical terms; to convert it into more general scalar terms, we would say that to produce knowledge about planetary phenomena (for example, plate tectonics, climate change) is already a 'view from above' that views the Earth from this larger perspective. To situate this dislocation is to mark the transformation in perspective in relation to the metre-scale perspective where humans sit. The second problem then extends the first problem into many layers of objects and processes that relate to each other in much the same way. The confusing array of descriptions of science has to be placed together as many simultaneous perspectives.

Both of these create issues that are conceptual and communicative. Within scientific practice, scientists have addressed them by tracking the perspectives and terms used at any given scale. Again, this is primarily a methodological question, and most sciences have some means of addressing these problems. But all scientists, like all humans, still need to deal with the ways in which knowledge derived from any other scale domain produces a situated dislocation. We feel this need to situate the dislocation most in our attempt to understand the implication of scientific knowledge outside of the strictly limited contexts in which that knowledge is produced, whether in the communication about it,

the attempt to respond to it either personally or politically, or in the way it changes our understanding of ourselves in the cosmos.

The most potent way to remedy the problems generated by situated dislocation is via a marking of what one doesn't know or see when taking a particular perspective. This acknowledges the other perspective that may be brought into relation with this perspective. Scientists do this implicitly when they switch scales seamlessly between sciences. In doing so, they don't always notice the situated relocation, except as a method problem or in explicit conversations about scale (this is the original problem of scale as articulated by the ecologist Simon Levin). As a method problem, the not-knowing usually appears as an irrelevance — something that doesn't, or doesn't need to, register at that level — or as degrees of certainty within a complex system.

However, in the broader contexts in which scientific knowledge traffics, it becomes more important to acknowledge this unknowing in the gaps between the specific certainties of science. To unpack what this means in practice, we can highlight three ways these problems manifest in the relationship between scientific practice and their 'lay' contexts:

1. When one discipline thinks they have the answer that another also says it has the answer for. For instance, a disagreement between the cause of a disease that would tie it to environmental questions versus a genetic one.
2. When a scientific fact relevant at one scale does not provide a clear template for another scale. For instance, DNA codes do not provide a straightforward explanation of metre-scale bodily features except in limited cases. More knowledge must be produced about how DNA translates to proteins, which translate to cells, which translate to bodies. These perspectives have to be aligned.
3. When a scientific fact relevant at one scale does not provide a clear template for a particular intervention. From a smaller scale to a larger scale, the understanding that cancers are caused by uncontrolled replication doesn't provide a clear template for intervention in the way that understanding a disease is caused by a

> bacteria might. From a larger scale to a smaller scale, facts about climate change don't provide a clear template for understanding what changes are needed to collective human behaviour or how to produce that change.

In each case, there are science questions that are about differentiating what is happening and what can be said about the particular scales at which the matters of concern emerge. But in each case, there are also broader contexts and questions — other scales of relevance — that require us to acknowledge the gaps and changes being brought together in the matter. Doing so requires some practice of noticing the difference in understanding, including the varying terminologies, forms of knowledge, and ways of conceptualizing the points of concern, whether this is between scientists (a biologist working with a climate scientist to determine the relationship between carbon cycles and forests), or scientists working with the implications for collective action (climate scientists working with a policy expert).

ICI: Your critique of posthumanism in large part involves describing what you call its 'scalism', its privileging of certain scales over others, the better to displace humanist notions of agency. Your concept of situated dislocation, however, allows us to glimpse the 'human' or the 'subject' at a variety of scales, depending on what questions we hope to answer in a given inquiry. What are the implications of this for our understanding of agency?

JD: Most threads of posthumanism are about the insufficiency of a certain idea of human agency. In response, many scholars have spoken about non-human agency, whether that's the actants in Latourian approaches, Karen Barad's conception of agential realism, or otherwise. It is easy, as this conversation continues, to assume something about what we mean by 'human' and 'agency', as we speak of some action (agency) in relation to a contrasting entity: the non-human. A key point of Chapter 8 of *Scale Theory* was to not move too quickly past the confusion brought by these two terms: 'human agency'. In a scalar schematic, humans can be a lot of things and lots of things can be human, depending on what is being invoked by the term 'human'. Cells, when

coordinated in the right way, are humans; humans become understood as cells when viewed at the microscale. However, in many posthumanist lines of thought, the critique of the human is less targeted at some *Homo sapiens* body (which the last sentence assumed was indicated by 'human') than the idea of action, thought, reason, communication, awareness, and so on as being localizable in a contained and definitive way. Again, the core argumentative strategy for disrupting these terms is to say: Could reason exist without the oxygen and carbon dioxide pumping through these neurons? Could action be produced without the properties of molecules in conjunction with each other?

That doesn't mean that action, thought, reason, communication, and awareness don't exist or ought to be scrubbed from our language and thought. Still, the way this last sentence was phrased doesn't quite capture the problem and the method I'd like to adopt in relation to it. Here we can invoke a classic trope in Indian philosophy that becomes important with these matters: in response to some philosophical question, the Buddhist sage might respond simply, 'Don't think that way' (for an illustration, see the Diamond Sutra). 'Does action still exist without the humanist subject?' Don't think that way. Instead, I'd convert this question into: 'What might the term "action" indicate once action has been reconfigured in a scalar schematic?'

One can arrive at this approach from a number of directions, but *Scale Theory* arrives at it through noticing that most of these terms are usually conceptualized in a nonscalar way; that is, one conceptualization of agency (often said to be 'humanist') can be created only through a nonscalar view, where there is a clear human agent walking around picking things up, doing things, having conversations, and so on. This clear agent is then undermined or reconfigured by what scalar knowledge brings into view, but in a confusing relationship to that entity: What has this human become when they become an agent of the Earth or walking, talking microbes (to repeat Lynn Margulis's lovely phrase)? In this change, the idea of the human as agent has become displaced, but the appearance of the human at the metre scale remains. At these other scales, it's as if we have a term ('human' or 'agent') but we're not sure what to pin it on. Where has the clear subject called 'human' gone? Is human perception in the photons streaming through the cells of the cornea? But then, looking away from the microscope

(either literally or just in the sense of setting aside these terminologies and perspectives), there are still these people walking around, who appear to be agents.

All these terms, but especially 'human' and 'agency', become confused when moving between these scales. Now, when I return to reading the conversation around posthumanism, I am still astonished by how many thinkers can use these terms with so much certainty, even in critique. One response to confusion is to try to fight the ambiguity and variety of uses via definition, but this misses the point: the confusion about what we mean by these terms is itself the openness to the way these terms might function differently in different contexts. This openness can't be avoided: these terms have been transformed in multiple ways depending on the scale in question.

The term 'agency' is more troublesome in this regard than 'human', as agency implies a certain schematic form for understanding interaction in relation to an entity — the agent — to which action can be ascribed — especially action as the form of a response to a stimulus — or some version of this, depending on the thinker. At the heart of this attempt to preserve or reassert agency is, I think, an attempt to rebut the mechanistic assumption that action should not and cannot be ascribed to any entity at all, but rather is to be cordoned off into 'motions' that are governed by rules or laws of something called 'forces'. Yet, these are really just two ways of diagramming the movements and orders of the process of the world (we might return to Whitehead's *Science and the Modern World* for a version of this line of thought). If we consider these diagrams in relation to the long history of the assumption that the non-human equals inertness equals the right to be manipulated, then yes, one strategy is to try to double down on agency, and sometimes, as the recent work on the inhuman in Black studies does, to reassert both the human and agency despite these displacements.

Still, I wonder what language game is being played within these theoretical conversations and why, especially as they persistently mix up various scales, points of concern, and languages that we might have about them. In certain cases, depending on the way the matter is laid out, it makes a difference what you consider to be human and what you consider to have agency — but not always and not in the

same way. In short, the approach I try to take does not give up the human or agency but tries to understand the way those terms have functioned and continue to function. I don't see this as new, although perhaps it always remains a radical and difficult approach, but this is my understanding of the way critical theory has been trying to approach these questions at least since Michel Foucault. If I am adding anything to this method, it is to insist on the uncertainty and openness that too often becomes foreclosed in practice.

In addition, I also insistently push against the way 'agency' seems to be the only alternative to mechanistic conceptions of motion in many of these critical threads. The idea of agency shares many of the same concerns as are discussed in relation to the politics above, particularly as the attempt to reassert agency often comes out of struggles over who gets to have a say in human structures and who doesn't. Expanding conceptions of agency to new levels of the cosmos (say, talking about planetary agency in the Anthropocene conversation, or molecular agency in Karen Barad, or electrical agency in Jane Bennett, or cellular agency in Samantha Frost) is never a straightforward and generally applicable context and extension. I do see great value in the act of re-diagramming these conceptions of action to acknowledge that material is not inert; doing so is perhaps a necessary step for new conceptions of interaction and coordination. However, these manoeuvres are often built from an extension of a language and concepts of human political and social relations in which agency is ascribed to a specific entity and tied to certain ideas of responsibility, intention, and so on. As I indicated above, we need to make space for an alternative — the alternative that is always the contemplative manoeuvre of *voiding* agency by yielding up the assumption of oneself as agent: not my will, but the will of the cosmos. This is an alternative way of voiding the toxic forms of a certain mechanistic technocratic thinking. It also generalizes something like agency and can be an animism, but not one that assumes what many conceptions of 'agency' tend to assume: that the action is replicated in other entities in the way that humans often reserve for themselves. A scalar conception also needs some conception of a surrender to these higher powers, recognition of the various powers within us, and a yielding to the fractal unfolding that any given point is inevitably and beautifully wedged within. In a political context, this

release feels dangerous in part because others have inserted themselves as the higher power, and systems of exclusion and exploitation have necessitated a fight for agency and power. In that context, we become suspicious of surrender and release and forget them as alternatives, despite the fact that such cosmic recognitions recur as both personal and political premises in many times and places. It is easy to cite, for instance, the Bhagavad Gita, which is about these recognitions operating within and despite political action, or the defiant answer Jesus gives to Pontius Pilate: 'You have no power over me if it were not given to you from above' (John 19:11). This is why I insist in Chapter 8 of *Scale Theory* that the cosmos is the agent; we can provide a more animistic or agency-laden metaphysics without claiming that action or motion needs to be inherently and totally localizable into entities that we assume are the origin and authority for the action in question.

We can't skip by this recognition, or else we will always forget that action always has more within it than what might be diagrammed within any particular interaction. This is the risk of many ways of generalizing agency, especially those that extend the political and social conception into a broader metaphysical conception, as many versions of actor-network theory, assemblage theory, and agential realism may do. These describe everything as a play of forces, but this play of forces seems to replicate at every scale the struggles and fights we associate with human sociality. In contrast, the contemplative conception of agency as both within and beyond any given thing that can be designated as an 'agent' is a way of marking the not-knowing and the excess of action within any given instantiation of interaction.

Only then can we come to a practical inquiry into agency or a similar term that your question poses. With that openness in mind, I will say that your question hits directly at the next step when it states 'depending on what questions we hope to answer'. A matter of concern, desired intervention, or point of knowledge brings into view a particular configuration of reality that one is attempting to interact with. Doing so creates the possibility of diagramming for a particular end what is acting and how. If you want to create a cell from another cell, there needs to be particular things acting in particular ways. Likewise, if you want to figure out how to adjust human behaviour in response to

climate change, mitigate a spreading pandemic, or determine that lead is in fact the toxic molecule causing certain conditions.

In these examples, it is important to keep in mind that humans as metre-scale entities are the ones making the inquiries. Or we might say that humans are the metre-scale appendages of the cosmos who have become adept at making such inquiries and enabling new modes of involution and information for the planet and the cosmos. In which case, if the 'human' here is the capacity for tracing these flows of interaction across multiple scales, then that is certainly extended in our inquiries and interventions. Yet we don't want to forget the primary concern: that the action and knowledge is not unilaterally focused on what *Homo sapiens* can do at the metre scale. Yielding this action and knowledge to the cosmos as agent opens us up to track which parts of the cosmos (here a virus, here a metre-scale human agent, here a planetary transportation network) contribute to a phenomenon (a viral infection, an illness, a pandemic).

Is it valuable to speak of agency at each of these levels? Perhaps, insofar as we need to mark the actions as emergent in particular aspects of the cosmos and functionally tie the force of their presence to the particularity of the scale and form able to operate at a given level.

Is it valuable to notice the human at each of these levels? Perhaps, insofar as we need to mark how actions and understandings at the metre scale by *Homo sapiens* relate to these objects and processes at other scales.

Still, as we struggle with the fallout of the efficiency and variety of interventions enabled by these humans the Earth has sprouted, one can't help but wonder if we need to experiment more thoroughly with alternative modes of diagramming and describing these interactions that are less tied to the human and their hubristic notion of the agent.

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