AFTERWORD

LIMINALITY

Contemplating the Hypothetically Potent Conjunction of the Social and the Physical

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> [We are] stuck at the threshold of one of the most stubborn of all dualisms – the animate/inanimate dualism.
>
> —Karen Barad, *Intra-active Entanglements*

In a late, brief essay, Roy Wagner (2018: 85) refers to liminality as perhaps the most significant of Victor Turner's discoveries. Wagner compares liminality to energy, stating that, 'liminality and energy share the same description and can be used interchangeably for that reason. Both are invisible to the unpracticed eye and must be inferred from their effect on other things, like quantum singularities [are]'. Calling liminality a discovery is especially provocative, because in anthropology we usually reserve discovery for ethnographic facts that we uncover through the grounds of living of actual peoples. We discover the factual that we can substantiate, at least partially, through ethnography. We are rarely said to discover a concept or a theory, as these are most often given the status of meta-propositions and/or epistemologies emerging from research results that are highly conditional on a host of changing factors. By referring to liminality as a discovery, Wagner gives to liminality a factual status, even if, as he maintains, this can only be identified after it is gone (like a spark of energy or a bolt of lightning).

Nonetheless, by implying factuality to liminality, the inference is that liminality exists. Put more directly, liminality is a phenomenon without phenomenality, paradoxical through and through, existing through traces, like the shadows it casts or the light it projects. Yet if liminality may exist

then we are enjoined to ask just what this may be. I am not concerned here with a definition of liminality, as definitions exist to obviate themselves (and so are often called 'working definitions', as if this excuses their vulnerability). Nor do the descriptive particulars of what human beings do with and through liminality occupy me here, this has been discussed endlessly ever since Turner (1967) published his seminal article, 'Betwixt and Between: The Liminal Period in Rites de Passage', half a century ago.

Through liminality human beings meet qualities or forces that deny the stability of worlds being made and shaped as human. More than this, these forces or qualities destroy the regularizing, stabilizing qualities of the human. Perhaps we can say that liminality is substantial in what it does to the substantiality of the phenomenal. I previously argued that the medium of liminality is densely fluid, a corrosive solvent that is inherently non-stable, or, as stability is irrelevant to liminality, a-stable (Handelman 1985: 353).[1] At that time, I thought that the force of liminality dissolves the phenomenal. Considered this way, liminality is less anti-phenomenal than it is a-phenomenal. That is, liminality seems to exist apart from the phenomenal (aside from those moments during which it penetrates and concentrates within the phenomenal). I no longer fully accept this formulation, for the liminal may be present continuously within the phenomenal, but less intensely and densely. Nonetheless the qualities or forces of liminality are – yet are not quite – a human formation in any total and direct sense, even though the occasioning of liminality is likely to be just this.

One way of thinking about qualities of liminality is through the biosocial and human capacities to activate energies of the somatic mind-body (and body-mind), sometimes in particular settings and contexts, and sometimes not. Anthropologists have documented and analysed a multitude of sociocultural phenomena that intimate or hint at the generation and transmission of energetic qualities that, in somatic concert, aid in or enable the accomplishment of unusual activities (see, for example, Katz 1982; Handelman 1984; Greenfield 2005; Bar-on Cohen 2009).[2] So, too, theorists have argued for relationships between the somatic body and the life-giving energetic qualities of the biosphere (cf. Sato 2012, on photosynthetic processes). Less considered are the possible connections between energy in a more cosmic sense and liminality, and, thus, the hypothetical conjunction of somatic and cosmic energies within liminality.

Liminality: In the Weak Sense, In the Strong Sense

In describing liminality as a human yet not quite human formation, I am referring only to one sort of the liminal. Since Turner published his ideas on

the liminal, two elementary senses of liminality have emerged: let me call them the weak sense and the strong sense. The weak sense is entirely social in its grounding and composition. The weak sense derives from Turner's positing of the liminal as the duration betwixt and between one social condition of being and the becoming of another. This is the period during which the social being of a person is taken apart and swept away, and that person is initiated to take on and to enter into a new condition of being. Turner used this formulation to discuss the changes in personhood (and/or identity) undergone during *rites de passage*, on the premise that in so many of these rituals the liminal phase is one of high uncertainty, when the person is neither one kind of being nor another; or is perhaps even a being without social grounding, though not without an existential one. In saying that this is a time of uncertainty, I emphasize that for the individuals undergoing change the directional option is often known – but not the way or ways of getting there. The choice of the direction of personhood's movement is known to the candidates, yet not what will occur along the way that may well transform them into another kind (generally speaking) of being.

Yet liminality as a duration that is fraught with uncertainty, because it is betwixt one kind of organization of human beings and another, is also so easy to apply to a multitude of personal crises, social situations and historical conditions, from the micro- to the macro-social, or indeed to any social formations that seem to be going through changes in which the outcomes are unclear, even though these outcomes – as possibilities of the situation – can be more or less spelled out, and guessed at to some extent. As one example, the anthropologist Susan Sered describes the Jewish 'community' in Palestine during the 1940s as being in a condition of 'cultural upheaval', which she refers to as one of 'societal liminality' (Sered 1989: 27). During this period, Sered argues, when old symbols fell into desuetude and new ones had yet to crystallize, there was an increase in pilgrimage visits to shrines of the saints. In this way pilgrims tried to make sense of their current realities by linking these to sacred foundations. Sered states further: 'It seems to me that the notion of liminality can also apply to a society – to people who, for political or other reasons, are in between two states or statuses' (ibid.: 39).

By calling this liminality's weak sense I am not saying that this application is irrelevant; not at all. I am arguing, however, that this usage tends strongly to the *passive*, of liminality treated analytically as an indefinite context within which a variety of social forces are freed in some sense from institutional constraints, and so are enabled to struggle for primacy in the forming of what may be different, even very different, social orderings. In referring to an 'indefinite context', I mean one that is more oceanic in its possibility, or, in Turner's terms, that is subjunctive in tense (and in tenseness). Here liminality makes possible, or perhaps attracts, a multiplicity of relatively un-

constrained social forces. As an indefinite context, liminality may entertain unusual confluences of and conflicts among social forces, yet it does not contribute actively to their interplays. In its weak sense, liminality is more of the possible and less of the potential, and it is hardly potent.

By contrast, Wagner compares liminality to energy, saying that they are both described as invisible, and so can only be known by their effects. The two can therefore be used interchangeably. Wagner indeed intimates that liminality *is* energy. And energy, I would think, is *active*, not passive. Energy is energetic. Following this line of flight, one may well ask what this energy might be and from whence it might come or derive. One could well ask, yet without expecting any clear-cut answer, as the trajectory of the question likely skirts the interface of the human and the a-human, and the resonances amongst these. This positioning is not so far from that of Turner: 'In Turner's conceptualization, the liminal is a chaotic vortex of counteracting forces, a singularity, perhaps outside space and time, a re-originating point, a wellspring of potential that moreover is not necessarily committed in any particular direction . . . that is, until it is realized into existence' (Kapferer 2019: 2).

Personally, I think the issue is worth entering into, and in the sections that follow I will suggest one way of thinking about this problematic, while acknowledging there are many others. The connections I will suggest are indeed speculative, even wildly so. Here I can only offer an outline, and my discussion closes without any climactic formulation. Nevertheless, addressing the issue may point in directions that should likely be thought on, even if their purview is outside the usual perspectives of sociocultural anthropology – and, too, the abductive imagination might even come to the fore.

I have previously intimated that liminality cannot be comprehended through the social *qua* social alone (Handelman 1985).[3] The potency of liminality in its strong sense is not mystical, at least not in the sense of being anti-rational or un-rational, though it may be a-rational, thereby denying the dualism of rationality and its converse. Yet neither is this potency material. Here I am addressing a position that has been a linchpin of modern sociocultural anthropology, to wit that cultural phenomena in all their complexities are always formed and shaped by human beings through their own practices and through their own making of worlds of existence: that the human is responsible for the human and that this is the domain of study of the anthropologist; and that we study the human forming of social ordering (a phrasing demanding that the social always be understood in the active tense). I will not depart from this, yet neither will I accept it fully, as I think that liminality in its strong sense points to other kinds of confluence of the social and the supra-social (and of the infra-human).

Existing as we do during our recognition of the Anthropocene, scholars of social orderings are comprehending more acutely that the social is not sim-

ply the linear outcome of and product of the actions of human beings; and, moreover, that the sociocultural does not only depend for its survival on the sociocultural itself. We are coming to comprehend (or at least to intuit) the complex interdependencies of the social, the biological (the somatic and the infra-human), and the physical (supra-social) worlds of our existence.[4] This likely indicates that the physical world (indeed, forces and dynamics at play in the universe) and the biological body (at the molecular level) are relevant to how the social can and cannot organize and comport itself, as it were; and, in turn, that we, as agents who are shaped and produced by the social, ignore these factors at our own risk. The sociocultural does not exist straightforwardly through its own exceptionalism. Thus, in my understanding, liminality in its strong sense may need to be addressed in and through various conjunctures of the physical, the social and the biological, though as stated I do not address the latter here. I emphasize that in the sections that follow I am not concerned with the (multiple) sciences and their validities as such, but rather with the ways in which the ideas involved may give us an inkling into relationships between the physical cosmos and organic life, including the human.

The rest of this chapter will be divided into five sections. The first will bring in Ilya Prigogine's theorizing that the increasing entropic complexity of the universe created emergent conditions of far-from-equilibrium, and that these indeterminate conditions enabled fluctuations and variations in the continuing emergence of the cosmos. For Prigogine, increasing entropy is associated with the development of increasing cosmic complexity rather than with the heat death of the universe. Prigogine argues further that organic life could only come into existence through conditions that are far-from-equilibrium. Prigogine's theorizing aligns the evolution of the universe with that of organic life, with entropy as, if not renewable, then in a way returnable.

The second section will suggest that the occupancy of certain sociocultural niches in traditional social orders are limited temporally, and that through time the occupants of these niches undergo a kind of dissipation in their occupancy that, if not checked, will produce increasing fluctuations in the ordering of the social that will disrupt its stability. Rites of passage solve this dilemma by transforming the occupants of such a niche and thereby moving these transformed beings into another. So, too, sociocultural orderings, when thought to reach such increasing dissipative fluctuations in their ordering that they threaten their capacity to sustain themselves, are then made to undergo rituals that transform them anew. These rituals are infused with the strong sense of liminality, and in the main their transformations are accomplished through the liminal.

The third section will argue that indeterminacy (including non-equilibrium) underlies all sociocultural ordering. Human beings must work constantly to prevent themselves and others from tumbling, as it were, into indeterminate conditions that threaten understandings and social relations. I suggest that indeterminacy is equivalent to liminality in its strong sense, and that the two can be used interchangeably. As indeterminacy, liminality thus becomes a profoundly widespread a-phenomenon in ongoing, human sociocultural ordering, yet one that can also be concentrated and focused in certain zones of transformation, like the liminal phase in ritual.

Prigogine's theory of far-from-equilibrium conditions and the creation of organic life is often identified with chaos theory (Hayles 1990: 91–114). It thus differs from quantum physics, yet also overlaps with this in its emphasis on the potentiality of the increasing complexity of the evolving cosmos.

In the fourth section I will bring in Karen Barad's interpretation of quantum physicist Niels Bohr's indeterminacy ontology, which argues that quantum indeterminacy is profoundly energetic, precedes determinacy, and constitutes a radical opening to the potentiality that is critical to the forming of all form. This helps to distinguish, relatively speaking, indeterminacy from uncertainty, though understanding that they flow into one another. Indeterminacy is given powerful positioning in the forming of human social ordering and its struggles to order entropic fluctuations. Given that I identify indeterminacy with the strong sense of liminality, this also gives a foundational (and paradoxical) status to liminality in human social ordering.

The final section will find a philosophical continuation of quantum field theory through Deleuze and Guattari's theorizing of the relationship between a virtual cosmos, the plane of immanence and, I add, the forming of the social. Deleuze appears to have been powerfully influenced in his thinking on the virtual by quantum physics. In his conception the virtual is chaotic and energetic, and is sheer potentiality – in other words, it is indeterminate. In relation to the human, the plane of immanence continues the virtual, but is less chaotic and more consistent, and serves to enable human beings to turn potentiality into social relatedness. Thus liminality in its strong sense – identified with indeterminacy and with the potent power to dissolve phenomenal reality – is given a kind of entrée into the social through the virtual and its planes of immanence.

Cosmic Conditions of Far-From-Equilibrium and Organic Life

Ilya Prigogine – a Nobel laureate for his research on non-equilibrium thermodynamics and conditions far-from-equilibrium – links the evolution of

the physical universe to the emergence of organic life.[5] In Prigogine's theory there was no singularity like the Big Bang that created the universe. Instead, there was an empty (quantum), unstable universe that perhaps was pure potentiality, the potential existence of matter, yet without matter. This unstable void broke down, and substance, matter, came into existence; and with matter, so too entropy. Matter moved within itself and within the universe as the bearer of entropy (Magnani 2016: 250). Time actualized with the entropic movement of matter, and time moved like an arrow, linearly and irreversibly (Prigogine and Stengers 1984). As Magnani comments: 'The meaning of irreversibility [in physics] undergoes a radical change since irreversibility should no longer be linked to an evolution that leads inexorably toward an inert state of the universe (thermic death), but to its birth, or perhaps to an eternal succession of universes that are born everywhere and that head toward the infinite' (Magnani 2016: 250). In other words, the universe moves towards increasing complexity and its concomitant issues of organization.

It is precisely the irreversibility of the arrow of time that makes futurity open-ended and unknown. Irreversible time gives the universe a changing, historical existence. As the sociologist Barbara Adam (1998: 214) states succinctly, Prigogine established this temporal movement of the universe 'as a law of nature; and with it he changed the very meaning of the nature of a scientific law . . . laws themselves come to be understood as developing; and reversibility, far from being the most fundamental aspect of nature, comes to be recognized as a product of the consciousness of the human observer'.[6]

The evolving complexity of the universe through lengthy durations of increasing entropy produces what Prigogine terms 'conditions-far-from-equilibrium', through which increasingly entropic fluctuations or dissipations come into existence. Through these conditions the universe is in continuous emergence, the dynamics of which amplify these fluctuations while ordering their disorder, but at higher levels of organization (Mosko 2005: 33). The irreversible, directional movement of the entropic universe produces higher levels of organization through the elaboration of its fluctuations. It is important to emphasize that with Prigogine's arrow of time the multiplicities that emerge from the indeterminacy of conditions-far-from-equilibrium are not undone. Prigogine states this as follows: 'Irreversible processes [associated with the arrow of time] are as real as reversible processes described by the fundamental laws of physics; they do not correspond to approximations added to the basic laws. Irreversible processes play a fundamental constructive role in nature' (Prigogine 1997: 27).

Organic life emerged in conditions-far-from-equilibrium. As Prigogine puts this: 'Life is possible only in a non-equilibrium universe' (ibid.: 26–27). Prigogine's theorizing aligns the time of the evolving universe with the time

through which the organic evolves. Perhaps we can say that all forms in the universe are time-full, yet are indeterministic. Nonetheless there remains the profound problematic 'of the emergence of biotic organization from inorganic sources' (Wicken 1981: 132).

Liminality and Entropy

Organic life, emerging through conditions far-from-equilibrium, is permeated by entropic fluctuation. Yet these inevitable movements of instability are countered through the thrust of life – of existence of every kind – towards regeneration. Edmund Leach (1962) excoriated James Frazer for dabbling in 'butterfly collecting' in his classic, *The Golden Bough*. For Frazer – indeed a compiler of secondary and literary anecdotal descriptions rather than an analytical ethnographer thinking through self-collected and often self-experienced ethnographic details – death and rebirth together constitute the elementary rhythm of life, human and natural, and, no less, their interconnectedness. Yet Frazer reminds us over and again of the significance of the human dynamics of entropy.

The second law of thermodynamics in classical physics demands that physical systems of the universe expend energy and degrade complexity until a state of inert equilibrium is reached, at which point the universe enters either 'heat death' or 'heat sleep'.[7] Even if, heretically, one questions the second law (as did Prigogine), yet accepts it, there then are caveats. One of these is that of negative entropy or negentropy. This refers to the tendency of certain forms of organization, including those of life forms, to form plateaus of increasing order and complexity 'in apparent contradiction to the mandate of entropy . . . [nonetheless] the concept of negative entropy does not violate the second law of thermodynamics; the gain in organization for isolated "islands" [of organic life forms] is balanced by a corresponding loss in the environment of the [open] system' (Ross 2019: 25).[8]

Wicken gives a different conceptual twist to the second law, which, he argues,

> is a principle of *potency by which the possible is made actual*. Indeed, in its statistical formulation the second law is not really a law of nature at all, but one of mathematical necessity to which nature, to the extent that its processes are governed by corpuscular events lacking in material orientation, must be bound . . . The reason that irreversible processes exist in nature is in a very general sense for the end [that is, the 'goal'] of entropy production, for increasing the spread-outness [in Prigogine's sense of dissipation and fluctuation] of the universe's matter-energy among available quantum states. (Wicken 1981: 133–34, my emphasis)

As Majumdar and Josephson (2020) put this, 'In general, dissipation of energy is seen to be the basis of pattern formation in nature. Energy gradients are what makes things happen' (on energy gradients and organic life, see ibid., Note 18). This entropic spread-outness of fluctuation and accompanying potency may also be relevant to the human world and to rites of passage and transformation.

The idea of potency – of the potency of potentiality, raised by Wicken – is critical to comprehending liminality in its strong sense. As we well know, Arnold van Gennep, in *Les Rites de Passage*, pinpointed a prime location of liminality in human worlds. Van Gennep discerned three phases in the organization of rituals of passage, mainly in tribal social orderings. The middle phase, *la periode de marge*, is constituted so as to accomplish the passage, that is, the transition, from one sort of social ordering to another. The middle phase is the *limen*, the threshold that must be crossed in the process of transition from one condition of existence or being into another. During this middle period of *marge* the usual norms of the sociocultural are suspended, are held in abeyance, in order that the changes necessary for passage (which often contravene the usual norms) be introduced. Yet van Gennep went beyond the social in comprehending rites of passage. As Rothem and Fischer (2018: 257) comment, 'Van Gennep concludes his book by indicating a cosmic conception that relates the stages of human existence to those of plant and animal life and, by a sort of pre-scientific divination, joins them to the great rhythms of the universe . . . His book thus relates the organic, the social, and the cosmic'. Van Gennep appears to intimate that during the period of marge the cosmic and the social somehow resonate and are joined.

Nicole Hochner emphasizes that for van Gennep the period of *marge* is one of *pivotement*, a period of movement, yet one that changes direction through a point of inertia, the *point mort* or dead point (Hochner 2018: 305–7). Van Gennep understood this movement as one that reverses itself, and that this recursiveness constitutes the rhythm whereby the movement of the social towards increasing 'entropic' potency (in my terms) is turned into fruitful reordering. Seen in this way, the movement from, say, one cultural status to another through a rite of passage may not be quite the linear progression through the liminal phase of radical change, as Turner portrays this (cf. Handelman 1998: 31–38).

Movement within the liminal phase is into a condition that accentuates and increases variability and fluctuation, one that dissolves phenomenal reality into the profound potency of potentiality, including of course the potentiality for radical change. This released potency, which one can call energy, is used to shape and to give direction to the forming of person and social reordering. The pivoting through the dead point is critical, as this gives the right direction to the energizing of the potency of the liminal through

the inchoate dissolution of the social person and/or social ordering. The inchoate and perhaps chaotic undoing of the social is concentrated and focused through the pivoting choice of the direction of radical change and its forming.

From this perspective, for example, turning an immature girl into a mature young woman suggests that her occupancy of the cultural status of immature girl is becoming increasingly fluctuating, opening towards over-variation in its practice in the everyday world. Given this, she should vacate this status before it destroys her capacity to exist as a full member of the social ordering, with all of the consequences of this for the social. In social terms, the increase in fluctuating practice is dangerous, when what is wanted is social reproduction that is within normative bounds.[9]

The liminal phase plunges the immature girl into increasing and accelerating fluctuation until the condition of being that the candidate is leaving is dissolved, and she opens to the potentiality of the new condition of being that she will become. There are also ethnographic instances in which the movement towards the dead point is deliberately quickened, increasing the intensity of fluctuating being that is turning into potentiality (see, for example, Hori 1962 and Blacker 1975 on self-mummification and transformation into Buddha-hood in Japan). Viewed from the perspective of a (strange) dynamic, one that pivots the potency of potentiality into transformation, movement through rites of passage (and through other rituals of transformation) may be more recursive than linear.[10]

As depicted here, rites of transformation involve pivoting through the liminal potentiation of 'entropic' fluctuation (a kind of animate energizing) that activates human being(s) into a new, powerful condition of becoming. In social terms, the 'entropic' is anti-phenomenal and anti-existential, given that it dissolves existence into fluctuating, unknown potentiality. Thus liminality in its strong sense roils dynamically as this sense of potent potentiality approaches the indeterminate (I will return to indeterminacy in a moment). This sense of liminality is especially important, because rituals of transformation do through their own workings that which Deleuze called 'difference-in-itself' (Clisby 2017: 241). These rituals make difference happen within and through their own organization (see Handelman and Lindquist 2005 on ritual in its own right). In Gregory Bateson's terms, this is difference that makes a difference – in other words, real difference. And all of this is made to emerge and to become articulated through liminality.

Without introducing a conception of 'energy', however simplistic and rudimentary, this pivoting of transformation through the liminal remains mysterious (though 'energy' as such may also be understood as an overdetermined generality that serves as a cover for much more complex dynamics that include some sense of the energetic). Such transformation is not

simply a matter of redefinition and resocialization, both social and cultural – of shifting a person, a group, a social ordering, from one category into another. Neither is it wholly a matter of symbolic manipulation, as symbol is necessarily representation and thus is at a remove from somatic being and becoming. Nor is it a natural kind of *physis* in the rhythms of living systems, biological and social (Hochner 2018: 306), though it may be related to what Henri Bergson in his *Creative Evolution* called *elan vital*.[11]

Turner himself veered towards transformation through liminality in ways that skirt the human and the supra-human, as Kapferer (2019: 2) has recently recounted: 'In Turner's conceptualization, the liminal is a chaotic vortex of counteracting forces, a singularity perhaps, outside space and time, a re-originating point, a wellspring of potential that moreover is not necessarily committed in any particular direction . . . that is, until it is realized into existence'. Writing of traditional cultural orderings, Turner (1992: 153) refers to liminality as 'pure potency' infused with the subjunctive mood of 'as if'. The subjunctive immediately opens the way into potentiality. I think that Turner recognized the very potency of potentiality.[12] Certainly for him, transformation was neither an automatic nor a mechanical action. It always is a dynamic one. Thus this movement into transformation itself hints at some conception of the energetic (as Wagner implies) that roils through the strong sense of the liminal, or that is introduced into this milieu as sociocultural ordering becomes strange to itself.

Indeterminacy and the In/stability of the Everyday

The anthropologist Sally Falk Moore once suggested that 'the underlying quality of social life should be considered to be one of theoretically absolute indeterminacy ... which is only partially done away with by culture and organized social life, the patterned aspects of which are temporary, incomplete, and contain elements of inconsistency, ambiguity, discontinuity . . . [thus] even within the social and cultural order there is a pervasive quality of partial indeterminacy' (Moore 1975: 232). This introduction of indeterminacy into anthropology is important, though it strikes me as overly neat. To modify Moore's formulation, I add that indeterminacy in sociocultural ordering is never done away with, remaining a potentiality that underlies all such ordering. Indeterminacy opens within the in-betweenness, as it were, of all human attempts to do ordering. The indeterminate is ever present in the cracks and crevices of social ordering that may open suddenly (or slowly). Moreover, indeterminacy invites 'entropic', energetic fluctuation whenever and wherever the indeterminate appears, potentially deepening and speeding the disintegrating of social ordering.

In this regard, the original ethnomethodology of Harold Garfinkel continues to be illuminating.[13] In thinking about how social life holds together, Garfinkel found its lineaments by asking his students to upset the commonplace patterns of their daily interactions, whether with family, friends, salespersons or bus drivers, and afterwards to record what ensued. As he wrote, 'Procedurally it is my preference to start with familiar scenes and ask what can be done to make trouble ... to produce disorganized interaction ... through which the strangeness of an obstinately familiar world can be detected' (Garfinkel 1967: 37–38). This proved remarkably easy to accomplish. Consider one of the simple exercises done in the spirit of Garfinkel in order to expose that which underlies the apparent coherence of social ordering. A meets B on a street corner; they are deciding where to go for dinner. A asks B what he means by 'dinner'. When B responds with something of an explanation, A chooses another term in B's exposition to ask what B means by this, and, so on, ad infinitum, into a descending spiral towards the indeterminate.[14] These people neither talk past nor misunderstand one another. Beneath the surface stability of common-sense understandings that enable the ongoing practices of quotidian social ordering – like the practice of the 'et cetera' clause (Garfinkel 1967: 74) among other devices – there is inchoateness, the crevices of instability beginning to deepen towards the abyss.

Tumbling into indeterminacy invites the fluctuating, unstable potentiality of unknown or relatively unknown outcome. Indeterminacy is chaotic, and, in a more cosmic sense, is energetic as it brims with the potency of potentiality. However, even as indeterminacy wells within every possible crevice of social ordering, we bridge and ignore this through the epistemology of common-sense understandings. Thus, social ordering continually yaws roughly and unevenly between tumblings into entropic indeterminacy and resurgences of renewed re-orderings. In these precarities there are no rhythms or cadences, but only contingencies. The rhythms are found in the conservation and use of indeterminacy in transformative ritual and the like. There, I think, indeterminacy is the liminal in its strong sense of potent potentiality.

Indeterminacy and Uncertainty

So far I have used indeterminacy without distinguishing it from uncertainty. However, I was intrigued by Karen Barad's interpretation of Niels Bohr's indeterminacy ontology in quantum physics (Barad 2007). I borrow loosely from Barad as a key to understanding liminality as acquiring shifting qualities of indeterminacy and uncertainty. One outcome of Bohr's quantum field theory is that indeterminacy precedes determinacy.[15] Indeterminacy is 'an unending dynamism' (Barad 2012a: 8) that 'is responsible not only for the

[quantum] void not being nothing (while not being something), but it may in fact be the source of all that is, a womb that births existence' (ibid.: 8–9).[16] Thus the quantum vacuum, the void, in its 'energetic' dynamism (that itself is the void) is neither present nor absent, neither empty nor full. The indeterminacy of the void 'is key not only to the existence of matter, but also to its non-existence, or rather it is the key to the play of non/existence' (ibid.: 13). In Barad's terms the quantum void through its dynamic non/existence is virtual, 'the indeterminacy of being/nonbeing, a ghostly non/existence . . . virtual particles do not exist in space and time. They are ghostly non/existences that teeter on the edge of the infinitely thin blade between being and nonbeing. They speak of indeterminacy' (ibid.: 12).[17]

Barad emphasizes that '[o]ntological indeterminacy, a radical openness, an infinity of possibilities, is at the core of mattering', of the dynamism of matter. She continues: 'How strange that indeterminacy, in its infinite openness, is the condition for the possibility of all structures in their dynamically reconfiguring in/stabilities' (Barad 2012a: 16). Ontological indeterminacy is indeed one way, perhaps foundational, of alluding to the indeterminacy that I think opens and moves through the betweenness of cracks and crevices in all social organizing and social ordering; and that emerges as the dissipating, dissolving fluidity of liminality in its strong sense in transformative ritual. In other words, indeterminacy is every-when and every-where, even as it is conserved (as I think it is) and somehow concentrated as liminality in its strong sense under special conditions. Despite the enormous logical gaps and incommensurateness between a quantum physics of the universe and the doings of social existence, I think nonetheless that there are resonances. Animate bodies and their somatic energies are not divorced from the physical makings and dynamics of their environments, in all directions, scales and intensities, one may say.[18] Hence, too, the relevance of epigenetics (Jablonka, Lamb, and Zeligowski 2014: 314–46; Lock 2015).

Yet what of uncertainty? Through the dynamics of indeterminacy there is perhaps only undecidability. However, uncertainty exists when is-ness, thingness, social ordering, exist and offer options of choice, though those options and their consequences are shifting, unclear, and at least partially unknown. Uncertainty exists when there is decidability, though this is conditional on changing and unknown circumstances. These are the conditions that, for example, characterize the 'risk society' in the social science literature. Yet indeterminacy and uncertainty are not a dualism. Neither is their relatedness that of a continuum of potential ordering and its variations. In human worlds, given our capacities for adaptability and (at least the desire for) relative control, one would be hard put to think of conditions of absolute or total indeterminacy – of the utter abyss – that last for more than relatively brief durations (say, in the immediacy of a natural disaster or a catastrophic

singularity). Nor is it easy to think of any social situations in which there is the complete absence of uncertainty, given social ordering's ongoing emergence through which every repetition creates potential differences (Deleuze 1994; Handelman 2021).

Social ordering may be thought of as a field that is constituted through time through locations of greater and lesser intensities and densities of indeterminacy and uncertainty, and in which the 'boundaries' of the field either are, or may become, unknowns. Movement within this field depends on increases and decreases of fluctuation. Increases in fluctuation shift movement towards greater indeterminacy. With decreases, movement shifts towards greater uncertainty. In liminal phases of rituals of transformation, pivoting through the point mort shifts increasing indeterminacy and variable potentiality into a trajectory of increasing uncertainty and more consistent possibility, culminating with the thrust towards the greater certainty of outcome.

Human beings are entangled with both indeterminacy and uncertainty.[19] Thus indeterminacy, as it is given here, should not be thought of as out there, way out there in an abstract cosmic scheme. Rather it is right here, right now, no less than is uncertainty, on the tips of our noses and in the next crevice that opens within our phenomenal cosmoses, as everything human and all the rest only exist through such an ontology or ontologies. Now, indeed, if every-when and every-where exist on the edge of precarious indeterminacy then they exist also on the edge of whatever moves with and through indeterminacy. This perspective is given resonance through Deleuzian virtuality.

Deleuzian Virtuality

Deleuze's thinking offers an opening between quantum cosmology and the social. In *What Is Philosophy?*, Deleuze and Guattari (1994) continue to develop Deleuze's idea of the virtual, now influenced by quantum field theory.[20] In quantum field theory (as Barad noted) the idea of the virtual 'relates to the so-called virtual birth and disappearance, or creation and annihilation, of particles from the so-called false vacuum, a kind of sea of energy, thus suggesting the image of chaos invoked by Deleuze and Guattari' (Plotnitsky 2006: 41). In quantum field theory '[i]t is as if, instead of an identifiable moving object of the type studied in classical physics, we encounter a continuous emergence and disappearance, creation and annihilation, of particles from point to point, the so-called *virtual* particle formation' (ibid.: 48).

By introducing ideas of quantum theorizing, however loosely, into the humanities, Deleuze has enabled scholars in other disciplines, including anthropology, to recognize the value of this kind of thinking for their own conceptual problematics (cf. Kapferer 1997; Handelman 2013). Deleuzian

thinking on virtuality is especially relevant for the problematic of liminality understood as indeterminacy, and, so, indeterminate liminality understood as energetic. Deleuze and Guattari relate virtuality to chaos. Perhaps their clearest (at least a most quoted) statement on chaos is the following:

> Chaos is defined not so much by its disorder as by the infinite speed with which every form taking shape within it vanishes. It is a void that is not a nothingness but a *virtual*, containing all possible particles and drawing out all possible forms which spring up only to disappear immediately, without consistency or reference, without consequence. Chaos is an infinite speed of birth and disappearance. (Deleuze and Guattari 1994: 118, emphasis in original)

And, this within what might be called 'a kind of sea of energy'.[21] The implication is that in this perspective the virtual is energetic (Villani 2007: 50), hence the movement of infinite speed through which particles appear and disappear.[22]

Deleuzian virtuality is cosmic in its formulation.[23] Moreover, this conception has a strong drive towards cosmogenesis, towards the potential emergence of form. A proposal of sheer cosmic potentiality, the non-existence of everything, the potential existence of anything. In my terms, the virtual's potential exists within the cosmic conditions of far-from-equilibrium proposed by Prigogine, as discussed earlier. The cosmic in the Deleuze and Guattari conception of virtuality moves in close proximity to conditions of everyday existence (which they call a 'state of affairs'). For that matter, the infinite movement of the 'particles' that potentially could form the everyday are infinitely close to this – indeed one can say that these 'particles' are within the everyday, though, as in quantum field theory, they neither exist nor do not exist, for their speed is infinite.

Conditions of everyday existence relate to the chaotic virtual by taking from it potential elements (or 'particles') that they actualize. With actualization, this virtual potential is no longer chaotic, but exists through relatedness and consistency – perhaps entanglement, one may say – through the constituting everyday. The speed of the virtual potential is no longer infinite; speed slows in keeping with the relative consistency of actuality. Yet this virtual potential *qua* potential nonetheless always exceeds that which is actualized and emerges as form in the everyday. Thus the excessive potentialities of the virtual are themselves what Deleuze calls a plane of immanence, or, a plane of consistency – one that is fully real in its closeness to the actual yet that is not actual. The plane of immanence is of course immanent and so is connected to the actual, which continues to draw from this potential in its ongoing actualization that constitutes phenomenal existence (Colebrook 2005: 10).

One may argue that the plane of immanence is the potentiality of chaos, of indeterminacy and its potency, slowing and becoming finite (i.e. 'real')

without being actualized, yet also not losing fully the fluid, potent energetics of indeterminacy. Planes of immanence are 'cultural sieves' that cut through the infinite speed of birth and disappearance of the virtual to turn the potentialities of the virtual into the consistencies of the more selective and limited possible (see Deleuze and Guattari 1994: 118). Limited, in that possibility might become actualized in reality. Planes of immanence are how human cognition and agency meet the potentialities of the virtual, yet now conditioned selectively by the horizons of the possible. From planes of immanence the actual continuously takes that which is formable and, so, that may become actual. Writing on the virtual, the plane of immanence, and the actual, Deleuze (2005: 31) once put it this way: 'What we call virtual is not something that lacks reality but something that is engaged in a process of actualization following the plane [of immanence, of consistency] that gives it its particular reality . . . the plane of immanence is itself virtual'.

One may say that the plane of immanence is the immanent virtual. Thus potentiality is a never-ending dynamic opening of the immanent virtual that is becoming continuously consistent as possibility, and that might become actualized as phenomenal existence. The ongoing actualizing of the everyday is surrounded by virtual planes of immanence and by virtual chaos in all directions and dimensions. Actualizing our living practices, our cosmos and its multiplicities, we exist in varying degrees in the midst of the virtual, amongst the more indeterminate and potential, and the more uncertain and possible. Virtual indeterminacy is both supra-animate and animate, and so is not tailored particularly to the social. Nevertheless, through planes of immanence the virtual continuously supplies, as it were, the creating of the social. Nonetheless, in its strong sense the liminal in ritual is not the reality of the everyday with its safeguards of common-sense understandings. Within liminal ritual the guards and siphons of planes of immanence are weakened and lessened as the liminal opens further to virtual, energetic indeterminacy. The possible (always limited by the impossible) turns more into the potential and its potency.

In/Conclusion

Writing intently on liminality as indeterminacy, and of indeterminacy as chaotic virtual energy, catches me by surprise. Surely I have drifted tangentially and unaware into science fiction? The late Roy Wagner often taught courses on play and on science fiction. I studied play intensively and I have read science fiction now for some seventy years. So, have I spun here a fantasy of some kind of energetic substrate and supra-strate that enables certain vital transformations to be accomplished through liminal phases of ritual?

And, extrapolating this in a heavily materialistic sociocultural anthropology that nonetheless must imagine and infer invisible entanglements that people are silent about or that they *say* are real – social relationships, friendship, love, trust, and so on – and in relation to which we have developed sophisticated (and common-sensical) ways of maintaining that these are real in their consequences?

Or, should we take an energetics of liminality more seriously?[24] I am not alone in skirting the edges of what seems invisible and implausible to us. Victor Turner did so long ago, and in his full-bodied, exegetical way he both brought this dilemma forward and disguised it (as Edie Turner understood so well). I do not have my dear friend Vic's way with words, so I leave the dilemma stranded on an exposed un-energetic promontory. Nonetheless, one thing is clear: should any of us try to take liminality-as-indeterminacy-as-energy seriously, then we must recognize how crude and simple this formulation is, and just how much contemplative and imaginative rethinking is needed. This will likely include the energetics of the biosphere(s) and of different forms of the animate, perhaps relating to an approach something like Hayles's (2017) distinction between non-cognizers and cognizers, yet ultimately facing (and questioning?) the distinction between the inanimate and the animate (see, for example, Pross 2003). Perhaps someone may even discover one day that traditional peoples who made extensive use of liminality in ritual cultivated, concentrated and focused something that could be called a principle for the conservation of liminality.

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NOTES

1. My use of 'a-stable' is intended to indicate that stability itself is irrelevant to liminality in itself.
2. State apparatuses also evince interest in ESP (extrasensory perception) phenomena and their possible applications, especially for intelligence and military matters. Thus Russian scientists and the military have long been interested in so-called

parapsychological phenomena and, given this, so, too, have the CIA and the American military (i.e. CIA 2011; Stargate Project ([Wikipedia]); Weinberger 2007). For an overview of studies of ESP see Roll and Williams (2010).

Brian Josephson, a Nobel laureate in physics who later became something of an outlier in his discipline, recognizes the possibility, perhaps the likelihood of ESP. Nonetheless he argues that explanation is more likely to come from biosystems research than it is from the nonlocality, the 'spooky action at a distance', of quantum mechanics. Though 'direct action at a distance' may well exist, 'quantum calculations lead to the result that any such effects will disappear under statistical averaging' (Josephson and Pallikari-Viras 1991: 197). Quantum physics deals with quantifiability and thus 'neglects' particular cases, treating 'all cases of a class as if they were the same'. Biology, however, deals with processes and, so, attends to such cases, which may include those of ESP (Josephson 2002: 44).

3. That is, liminality in its strong sense, as I am using this here.
4. See, for example, Satsuka's (2018) fascinating discussion of 'multispecies entanglements'.
5. This section is taken largely from Handelman 2021: 309–11. For a strong yet balanced critique of Prigogine's theorizing, one that comes from the humanities, see Hayles 1990: 91–114.
6. In a somewhat apposite vein, the biologists, Brooks and Wiley (1988: 356) contend that, 'The second law is thus more than the natural law of energy flows; it is the natural law of history.'
7. For example, Corning and Kline (1998: 276) state that entropy neither has thingness nor is it a force. 'It is a property of matter with the peculiar attribute that it is designed to measure the relative absence of something, namely energetic order.'
8. Sato (2012: 234) raises the interesting question of whether entropy has a critical role in photosynthesis: 'The entropy problem in photosynthesis [which appears to release free energy] is important because photosynthesis is the starting point of energy conservation in the whole biosphere . . . If entropy is related to photosynthesis, what is the relationship of such entropy of photosynthesis with the entropy associated with various activities of life, such as DNA, cellular organization . . . ?'
9. Here pivoting may be moebius-like (Handelman 2021), since with near simultaneity the immature girl is outside of herself (being shorn of identity) and inside herself (becoming transformed).
10. Nonetheless, rites of passage are linear in their irreversibility. Passage from one condition of being into another apparently is not reversible. However, I note also that the recursive is critical to the existence of reflexivity, and that without reflexivity there likely is no rite of passage (for that matter there would be no human being who could partake of a rite of passage) (Evens, Handelman and Roberts 2016).
11. James DiFrisco argues persuasively and to the point that Bergson's use of *elan vital* was not a turn to a spiritualistic 'vital force', as this is commonly understood. DiFrisco (2015: 63) suggests that Bergson's perspective is that of 'an encompassing energeticist or thermodynamic view of nature, in which processes or fluxes have a more fundamental status than substances or things'. The elan vital (or *elan de la vie*, as Bergson preferred at times [DiFrisco, ibid.: 66]) is a forceful tendency, perhaps propensity, toward far-from-equilibrium. 'The degradation of energy imposed by the second law of thermodynamics' moves conditions toward equilibrium, yet this is countered by 'the raising of potential energy and distancing from equilibrium, and

hence . . . by the production of organization' (ibid.: 64). This ascending movement of energy, as Bergson called it, toward organization and greater complexity (and, so, no less toward lengthier duration) is the *elan vital*. Moreover, for Bergson the living world's 'future pathways of its release of energy cannot be predetermined, [so that] finally it is a site of "indetermination" and even of creative activity', (ibid.: 66), a position not far from the one that Turner later espoused.

12. Without sidling into his conception of liminoid phenomena that, according to Thomassen (2012: 28), are responsible for the over-application of the liminal to numerous situations having nothing to do with transition and transformation.
13. The late Garfinkel seems to have shifted his earlier ethnomethodology towards the anthropological approach of Ethnoscience of the 1960s and 1970s (see Pollner 2012).
14. This example is used in Handelman 2007.
15. Barad (2012a: 6) writes that: '. . . the play of indeterminacies is ontologically prior to notions of . . . space and time'.
16. Barad continues here, 'Birth and death are not the sole prerogative of the animate world. 'Inanimate' beings also have finite lives.' Elsewhere (Barad 2012b: 21) she comments that, 'The inanimate is always being shoved to the side, as if it is too far removed from the human to matter, but that which we call inanimate is still very much bodily and lively . . . [we are] stuck at the threshold of one of the most stubborn of all dualisms – the animate/inanimate dualism . . .' And, so, and not as an aside, note the dead/living contrariness of viruses, as we live with the new coronavirus during 2020 and on.
17. So quantum particles do not quite exist until a connection, a relationship, emerges into existence; and then there is a relating that simultaneously cuts the particles apart into distinctiveness.
18. Consider the research of Michael Levin and colleagues on the bioelectricity of endogenous electrical fields (Tseng and Levin 2013). They found that during embryonic growth, bioelectric cues provide information on the identities and bodily positionings of organs to be actualized through growth. So, 'Voltage gradients regulate cell behaviors and the assembly of complex large-scale structures . . . artificially setting other somatic cells to the [for example] eye-specific voltage range [in frog embryos] resulted in formation of eyes in aberrant locations . . . eyes could be formed in the gut, on the tail, or in the lateral plate mesoderm' (ibid.: 1). Thus there may be voltage ranges for different organs (and perhaps too at the level of the whole organism). Moreover, Tseng and Levin (ibid.: 7) argue that, 'It is . . . very likely that computational tissues could be made from non-excitable [i.e. non-neuronic] cells.' Thus Levin states elsewhere that, 'There are very few fundamental differences between neural networks and other tissues of bioelectrically communicating cells. If you think that consciousness in the brain is somehow a consequence of the brain's electrical activity, then there's no principled reason to assume that non-neural electrical networks won't underlie some primitive, basal [ancient] form of nonverbal consciousness.' Tam Hunt, 'The Link Between Biolelectricity and Consciousness.' *Nautilus*, 10 March, 2021. Retrieved 10 March 2021 from https://nautil.us/blog/the-link-between-biolelectricity-and-consciousness?mc_cid.
19. On quantum entanglement see Barad 2010.
20. The influence of a variety of approaches in quantum physics on Deleuze's earlier thinking on the virtual is argued for by Plotnitsky (2006).

21. The quantum physicist, David Bohm, proposed the distinction between the implicate order and the explicate order. Without entering into the complexities of Bohm's holistic thinking, the implicate order constitutes an enfolding (hence, implicate) 'immense background of energy, and that matter as we know it is a small, "quantized" wavelike excitation [the explicate order] on top of this background, rather like a tiny ripple on a vast sea . . . space, which has so much energy, is full rather than empty . . . It is being suggested here, then, that what we perceive through the senses as empty space is actually the plenum, which is the ground for the existence of everything, including ourselves' (Bohm 1981: 191–92).
22. This conception of virtuality as ever replenished since it does not exist yet does is the basis for Deleuze's rejection of the second law with regard to the virtual. Ross (2019: 27) summarizes this as follows: 'Deleuze's claim [is] that entropy takes effect in explicated, actualised phenomena, but [does] not apply to the intensive, energetically incommensurable phenomena of the virtual domain.' This echoes Prigogine's theory of the evolution of the universe.
23. The Deleuze and Guattari (1994) problematic is that of how concepts in philosophy are shaped into existence. Their initial focus is on the infinite speed of processes of thought. Can one presume that virtual thought is energetic? And if thought processes are energetic then so, too, are brain processes, and the converse? (As Russian ethnologists have thought for a long time, measuring the brain activity of shamans at work.) And, if brain processes are energetic then so, too, are other bodily processes? And, are these energies held in and totally constrained by the body? This seems unlikely, given what is known of the cultivation of potential somatic energies like *chi* (ki) and so many others (cf. Yuasa 1993).
24. The sociologist of science and technology, Steve Fuller (2018: 182), in discussing Alexander Wendt's *Quantum Mind and Social Science*, comments that, '. . . if we think of ourselves as proverbial blind men trying to grasp the elephant of reality, then there is a serious problem if natural and human science accounts of the fundamental nature of things diverge so radically that each can ignore if not outright dismiss the other.'

REFERENCES

Adam, Barbara. 1998. 'Social Versus Natural Time: A Traditional Distinction Re-examined', in Michael Young and Tom Schuller (eds), *The Rhythms of Society*. London: Routledge, pp. 198–226.

Barad, Karen. 2007. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham, NC: Duke University Press.

———. 2010. 'Quantum Entanglements and Hauntological Relations of Inheritance: Dis/continuities, Space/Time Enfoldings, and Justice-to-come', *Derrida Today* 3: 240–68.

———. 2012a. *What is the Measure of Nothingness? Infinity, Virtuality, Justice*. (100 Notes – 100 Thoughts, No. 099). Ostfilderen, Germany: Hatje Cantz Verlag.

———. 2012b. 'Intra-active Entanglements – an Interview with Karen Barad' (Interviewers: Mabu Juelskjar and Nete Schwennesen). *Kvinder, Kon and Foreskning* 1–2: 10–24.

Bar-On Cohen, Einat. 2009. '*Kibadachi* in Karate: Pain and Crossing Boundaries Within the 'Lived Body' and Within Sociality', *JRAI* n.s. 610–29.

Blacker, Carmen. 1975. *The Catalpa Bow: A Study of Shamanistic Practices in Japan*. London: Allen & Unwin.
Bohm, David. 1981. *Wholeness and the Implicate Order*. London: Routledge & Kegal Paul.
Brooks, Daniel R., and E.O. Wiley. 1988. *Evolution as Entropy*, 2nd edn. Chicago: University of Chicago Press.
CIA. 2000. *Parapsychology in the USSR*. Approved For Release 2000/08/15: CIA-RDP96-00792R000500210001-9. (www.cia.gov/readingroom/docs, accessed March 2020).
Clisby, Dale. 2017. 'Intensity in Context: Thermodynamics and Transcendental Philosophy', *Deleuze Studies* 11: 240–58.
Colebrook, Claire. 2005. 'Actuality', in Adrian Parr (ed.), *The Deleuze Dictionary*. Edinburgh: Edinburgh University Press, pp. 9–11.
Corning, Peter A., and Stephen Jay Kline. 1998. 'Information and Life Revisited, Part I: 'To Be or Entropy', *Systems Research and Behavioral Science* 15: 273–95.
Deleuze, Gilles. 1994. *Difference & Repetition*. London: Athlone Press.
———. 2005. *Pure Immanence*. New York: Zone Books.
Deleuze, Gilles, and Felix Guattari. 1994. *What is Philosophy?* New York: Columbia University Press.
DiFrisco, James. 2015. '*Elan Vital* Revisited: Bergson and the Thermodynamic Paradigm', *Southern Journal of Philosophy* 53: 54–73.
Evens, Terry, Don Handelman and Christopher Roberts (eds). 2016. *Reflecting on Reflexivity: The Human Condition as an Ontological Surprise*. New York: Berghahn Books.
Fuller, Steve. 2018. 'A Quantum Leap for Social Theory', *Journal of the Theory of Social Behavior* 48: 177–82.
Garfinkel, Harold. 1967. *Studies in Ethnomethodology*. Englewood Cliffs, NJ: Prentice-Hall.
Greenfield, Sidney M. 2005. 'Treating the Sick with a Morality Play: The Kardecist Spiritist Disobsession in Brazil', in Don Handelman and Galina Lindquist (eds), *Ritual in Its Own Right*. New York: Berghahn Books, pp. 174–94.
Handelman, Don. 1984. 'Review of, Richard Katz, *Boiling Energy: Community Healing Among the Kalahari Kung*'. *Zygon* 19: 514–17.
———. 1985. 'Charisma, Liminality, and Symbolic Types', in E. Cohen, M. Lissak and U. Almagor (eds), *Comparative Social Dynamics: Essays in Honor of S.N. Eisenstadt*. Boulder, CO: Westview, pp. 346–59.
———. 1998. *Models and Mirrors: Towards an Anthropology of Public Events* (2nd edn). New York: Berghahn Books (1st edn: Cambridge University Press, 1990).
———. 2007. 'How Dynamic is the Anthropology of Chaos?' *Focaal: European Journal of Anthropology* 50: 155–65.
———. 2013. 'Bruce Kapferer, Deleuzian Virtuality, and the Makings of a Ritual Masterstroke.' *Religion and Society: Advances in Research* 4: 32–40.
———. 2021. *Moebius Anthropology: Essays on the Forming of Form*. New York: Berghahn Books.
Handelman, Don, and Galina Lindquist (eds). 2005. *Ritual in Its Own Right: Exploring the Dynamics of Transformation*. New York: Berghahn Books.
Hayles, N. Katherine. 1990. *Chaos Bound: Orderly Disorder in Contemporary Literature and Science*. Ithaca, NY: Cornell University Press.
———. 2017. *Unthought: The Power of the Cognitive Nonconscious*. Chicago: University of Chicago Press.

Hochner, Nicole. 2018. 'On Social Rhythm: A Renewed Assessment of Van Gennep's *Rites of Passage*', *Journal of Classical Sociology* 18: 299–312.
Hori, Ichiro. 1962. 'Self-mummified Buddhas in Japan: An Aspect of the Shugen-do (Mountain Asceticism) Sect', *History of Religions* 1: 222–42.
Jablonka, Eva, Marion J. Lamb and Anna Zeligowski. 2014. *Evolution in Four Dimensions: Genetic, Epigenetic, Behavioral, and Symbolic Variation in the History of Life* (2nd edn). Cambridge, MA: MIT Press.
Josephson, Brian D. 2002. '"Beyond Quantum Theory: A Realist Psycho-Biological Interpretation of Reality" Revisited', *BioSystems* 64: 43–45.
Josephson, Brian D., and Fotini Pallikari-Viras. 1991. 'Biological Utilisation of Quantum NonLocality', *Foundations of Physics* 21: 197–207.
Kapferer, Bruce. 1997. *The Feast of the Sorcerer*. Chicago: University of Chicago Press.
———. 2019. 'Victor Turner and The Ritual Process', *Anthropology Today* 35(3): 1–2.
Katz, Richard. 1982. *Boiling Energy: Community Healing Among the Kalahari Kung*. Cambridge, MA: Harvard University Press.
Leach, Edmund. 1962. *Rethinking Anthropology*. London: Athlone Press.
Lock, Margaret. 2015. 'Comprehending the Body in the Era of the Epigenome', *Current Anthropology* 56: 151–68.
Magnani, Lorenzo. 2016. 'Commentary: Einstein, Prigogine, Barbour, and Their Philosophical Refractions', in F. Santoianni (ed.), *The Concept of Time in Early Twentieth-Century Philosophy*. Cham, Switzerland: Springer International Publishing, pp. 249–51.
Majumdar, Mrittunjoy Guha, and Brian D. Josephson. 2020. 'Unified O – Field: How Self-Selected Fluctuations Can Underlie Reality'. Retrieved 24 January 2024 from https://researchgate.net/publication/347512656.
Moore, Sally Falk. 1975. 'Epilogue: Uncertainties in Situations, Indeterminacies in Culture', in Sally Falk Moore and Barbara Myerhoff (eds), *Symbol and Politics in Communal Ideology*. Ithaca, NY: Cornell University Press, pp. 210–39.
Mosko, Mark S. 2005. 'Introduction: A (Re)Turn to Chaos: Chaos Theory, the Sciences, and Social Anthropological Theory', in Mark S. Mosko and Frederick H. Damon (eds), *On the Order of Chaos: Social Anthropology and the Science of Chaos*. New York: Berghahn Books, pp. 1–46.
Plotnitsky, Arkady. 2006. 'Chaosmologies: Quantum Field Theory, Chaos and Thought in Deleuze and Guattari's *What is Philosophy?*', *Paragraph* 29: 40–56.
Pollner, Melvin. 2012. 'The End(s) of Ethnomethodology', *American Sociologist* 43: 7–20.
Prigogine, Ilya. 1997. *The End of Certainty*. New York: Free Press.
Prigogine, Ilya, and Isabelle Stengers. 1984. *Order Out of Chaos: Man's New Dialogue With Nature*. New York: Bantam.
Pross, Addy. 2003. 'The Driving Force for Life's Emergence: Kinetic and Thermodynamic Considerations', *Journal of Theoretic Biology* 220: 393–406.
Roll, William G., and Bryan J. Williams. 2010. 'Quantum Theory, Neurobiology, and Parapsychology', in S. Krippner and H.L. Friedman (eds), *Mysterious Minds: The Neurobiology of Psychics, Mediums, and Other Extraordinary People*. Praeger/ABC-CLIO, pp. 1–33.
Ross, W.J. 2019. 'Order and the Virtual: Toward a Deleuzian Cosmology'. PhD thesis, School of Creative Arts and Engineering, Staffordshire University.

Rothem, Nitzan, and Shlomo Fischer. 2018. 'Reclaiming Arnold Van Gennep's Les Rites de Passage (1909): The Structure of Openness and the Openness of Structure', *Journal of Classical Sociology* 18: 255–65.

Sato, Naoki. 2012. 'Scientific Elan Vital: Entropy Deficit or Inhomogeneity as a Unified Concept of Driving Forces of Life in Hierarchical Biosphere Driven by Photosynthesis', *Entropy* 14: 233–51.

Satsuka, Shiho. 2018. 'Sensing Multispecies Entanglements: *Koto* as an "Ontology" of Living', *Social Analysis* 62: 78–101.

Sered, Susan Starr. 1989. 'Rachel's Tomb: Societal Liminality and the Revitalization of a Shrine', *Religion* 19: 27–40.

Thomassen, Bjorn. 2012. 'Revisiting Liminality: The Danger of Empty Spaces', in Hazel Andrews and Les Roberts (eds), *Liminal Landscapes: Travel, Experience and Spaces In-Between*. New York: Routledge, pp. 21–35.

Tseng, AiSun, and Michael Levin. 2013. 'Cracking the Bioelectric Code: Probing Endogenous Ionic Controls of Pattern Formation', *Communicative & Integrative Biology* 6(1): 1–7, e22915.

Turner, Victor W. 1967. 'Betwixt and Between: The Liminal Period in Rites de Passage', in *The Forest of Symbols*. Ithaca, NY: Cornell University Press.

———. 1992. *Blazing the Trail: Way Marks in the Exploration of Symbols*. Tucson: University of Arizona Press.

Villani, Arnaud. 2007. '"I Feel I Am a Pure Metaphysician": The Consequences of Deleuze's Affirmation', *Collapse* III: 45–62.

Wagner, Roy. 2018. 'The Energy of Liminality', in Frank A. Salamone and Marjorie M. Snipes (eds), *The Intellectual Legacy of Victor and Edith Turner*. Lanham, MD: Lexington Books, pp. 85–88.

Weinberger, Sharon. 2007. 'The Weird Russian Mind-Control Research Behind a DHS Contract', *Wired*, 28 September.

Wicken, Jeffrey S. 1981. 'Evolutionary Self-Organization and the Entropy Principle: Teleology and Mechanism', *Nature and System* 3: 129–41.

Wikipedia. 2020. 'Stargate Project'.

Yuasa, Yasuo. 1993. *The Body, Self-Cultivation, and Ki-Energy*. Albany, NY: SUNY Press.