Editorial Introduction

Robin Mackay

The conceptualization of uncertain events as a set of possibilities each assigned a numerical value—a schema which draws on the circumstances that originally occasioned it, namely the game of chance, the die and its faces—is an enduring one. Although probability calculus was mathematically formalized in the 1930s, abstracted from this 'occasional cause', the spontaneous metaphysics of the gambler continue to exert an intuitive hold on thinking concerned with uncertain eventualities, colouring its interpretation and its application to diverse situations. Stripped of these semantics, the meaning of probability remains as enigmatic as ever: an idealized construct that neutralizes contingency by integrating infinite 'trials'; or a real property, propensity, or 'random generator'

inherent in the real but inaccessible to us? A mode of knowledge, or a limit to knowing?

The asymmetry of the wager is dramatised in the figures of the naive punter who faces every roll of the die as a hazardous adventure, and the casino manager who controls the long game and never loses. On one hand chance may be figured as subjective epistemological shortfall, on the other as the object of statistical knowledge. This tension between knowledge and contingency is conceptually condensed in the notion of probability and latterly in that of risk—a concept belonging to a relatively recent intellectual history, but one with immense consequences for modernity.

In recent economic history, financial tools constructed on the basis of probability models in order to manipulate risk have presided over catastrophic failure, having generated conditions that surpassed the capacities of those models. Meanwhile, in gambling itself, an increasingly technically managed and controlled environment means that any calculation of the 'odds' must look beyond the confines of the gaming table. Noting this double obsolescence of the casino model, the eighth volume of **Collapse** explores new ways of thinking risk and contingency outside the space of the idealized game of chance.

One of the colloquial legacies of the epoch-making financial crisis of 2008 has been the notion of 'casino capitalism'. The term implies the squandering of

potentially productive resources on a game that is governed merely by chance; at the same time, it connotes an indictment of the asymmetrical allocation of the risks and rewards of such 'wagers'. Without dismissing the indignation neatly conveyed by such a formulation, we might suggest that the notion of 'casino capitalism' has served to occlude the complexity of the financial instruments involved, and the exact nature of the financial system's intrication with the political. Nevertheless, taking the phrase at its word serves usefully to call into question the actual relationship between gambling and finance; that is, between the complex probabilistic calculations employed within the world of finance and the games of chance from which the rudiments of this calculus originally emerged.

One of the initial impulses behind this volume of **COLLAPSE** was to unpack this righteous denunciation, to call its bluff by evaluating the extent to which the model of the casino—the game of chance—really does invest the field of finance; to investigate the ways in which chance, risk, contingency, and the wager integrally structure the global order. In parallel, however, the volume also asks whether the model of the game of chance encapsulated in probability theory obtains even *within* the casino, by way of a number of inquiries into the modern and contemporary history of the gambling industry. In this way we hope to interrogate

and problematize what seems to be a pervasive image of thought.

In order to survey those practices in which intellectual resources are most acutely concentrated on the production and exploitation of risk, and to uncover the conceptual underpinnings of methods developed to extract value from contingency—in the casino, in the markets, in life—we have brought together contributors who extend the philosophical thinking of contingency beyond the 'casino' model, gamblers whose experience gives them the authority to considerably refine our understanding of what it means to master chance, researchers who analyse the operation and experience of risk in diverse arenas, and artists whose work addresses both the desire to confront chance and the desire to tame it by bringing it to order.

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Our volume opens with **Jean Cavaillès**'s 1940 survey of the state of the art in probability theory in the first half of the twentieth century. Beyond its philosophical-historical interest, the text is invaluable for the way in which Cavaillès, through a technical dissection of the core concepts of a nascent probability calculus, extracts some fundamental problematics that act as a guiding thread throughout the volume.

Cavaillès begins by observing that the model of probability based on games of chance extends itself, in the absence of explicit theoretical justification, into all areas of society ('in the techniques of social economy as much as in physics'). The fundamental grounds for this widespread application to reality are no less contentious today than when Cavaillès was writing. Formulating his critique of the first attempts to produce a mathematical formalization of probability to rival the axiomatisation of geometry, one that would ostensibly decouple probability from its gaming origins, Cavaillès remarks on how the spontaneous metaphysics of the gambler continue to exert an intuitive hold on statistical thought, colouring its interpretation and reflecting its intended applications. Inversely, he shows how, when probability is theorised for itself, certain elements of our intuitive grasp of the notion are inevitably lost, and empirical instances are subjected to certain idealisations. Cavaillès's prime example here is the notion of the *collective*, which transforms the game and its repeated trials (dice throws) into a completed (if infinite) set, in which results occur with a determinate frequency that converges toward a limit and is valid for any place-invariant subset of the collective. In this way probability is effectively submitted to elementary calculus—and yet of course a collective is not something that is ever encountered in any possible field of application. As he discerns, these

treatments tend despite themselves not so much to *explain* the principles of probability as to subtly codify the assumptions that make them *useful*.

Cavaillès's exposition continues with the observation that every wager presupposes the delimitation of a game and one's situation within it, and the stability of that game; a presupposition which constitutes a wager in itself. Thus 'the judgment of probability is always a wager, logically anterior to the production of the event to which it applies'. As he concludes, if 'old notions of chance' continually creep back into formalizations, vitiating their coherence, if probability continually 'overflows its definition', if the attempt to reassuringly house probability within a 'realist ontology' free of any abductive leaps fails, and if therefore, when it comes to probability, mathematical idealisation is involved in a continual dialectic with its applicability to real models, this is because the question of probability is not a regional but a *fundamental* problem for science—for prediction. The infinitude of the collective is a vicarious figure, within mathematical formalization, for the indeterminacy of a becoming whose future we seek to fix with laws; it stands in for a hypothesis that is fundamental for all scientific endeavour, 'where acts and wagers intersect each other' and where the success of each wager makes possible new acts. Cavaillès's conclusion grounds this process in the 'vital, extra-intellectual' character of hypothetical reasoning, and

calls for a recognition of the hybrid character of the wager: it 'is situated on the dividing line between pure lived action and autonomous speculation; at once an impulse toward the future, a recognition of radical novelty, risk; and, on the other hand, an attempt at domination through the imposition of an order, and the establishment of symmetries'. An obscure situation that invites 'a conceptual renewal in which the elements issuing from [the] analysis of the wager play the preponderant role'—a renewal toward which this volume hopes to contribute some orientating elements.

One of the most intriguing ways to encounter the disparity between idealised models and actual instances of games of chance is from the point of view of those who attempt to pry open the gap between the two. And there is no better authority to speak on this subject than **Steve Forte**, who granted **Collapse** a very rare interview to discuss his career as a player and as a consultant in 'game protection'.

As Forte outlines, both the advantage player and the cheat, who seek to exploit extraneous elements in order to influence the game in their favour, and the casino protection operative, who seeks to detect and foil these exploits, recognise that the milieu of every game constitutes an 'information environment'. Whether through systematic knowledge, technology, perceptual training, or sheer discipline, the notional confines of the game are expanded by them to encompass a whole

raft of factors that do not belong, as Forte says, to 'the *theoretical* game'—including the physical equipment, the gaming environment, and the human elements therein.

Detailing a choice selection of exploits, Forte gives us an insight both into the skill and dedication necessary to beat the house, and that called for on the other side of the table to detect these scams. Every assumption about the 'game of chance' is challenged here: randomness is approximate, no shuffle is complete, even a dice throw can be controlled, biases can always be detected; disciplined observation and analysis has the potential to transform almost any game of chance into one of knowledge and skill. The scammer's art extends to engineering the environment by stage-managing credible narratives, establishing routines for cover, manipulating expectations, and sometimes elaborate 'turns' designed to distract attention. While manufacturers of equipment and casino managers increasingly seek to establish systems to stabilise the gaming environment while maintaining an atmosphere conducive to play, gamblers continue to 'scientifically dissect every component' of the game. Forte assures us that, no matter how much protection is in place, new high-tech updates of the old scams will always appear, and that, once taken outside the realm of idealised chance and into the casino environment, the game is always operating across many overlapping milieus:

probabilistic, but also physical, psychological, social, and perceptual—as exemplified by the 'linework' of an unknown artist reproduced here from the collection of memorabilia built up by Forte throughout his career, and which serves as an appropriately subtle and deceptive figure for the cues, imperceptible to the average punter, that can tip the game in one's favour.

By way of contrast, **Natasha Dow Schüll** describes a casino environment where automation and player control seem to be almost total, and where the very desire to win has itself morphed into something new and disturbing. Her research into the world of machine gambling, increasingly central to casino culture, charts the emergence of an industry which specialises in the precise targeting of a very particular set of psychological predilections quite different to those traditionally associated with the gambler. No longer either *agon* or *alea*, neither a test of skill nor a heroic submission to chance, the 'game' here seems to consist in a quest for nothingness, escape, or even self-erasure, in what machine gamblers call 'the zone'—a state of continuous, immobile narcolepsy that technological solutions are rapidly evolving to deliver ever more reliably.

Through her dialogues with machine gamblers, Schüll develops a detailed phenomenological account of the zone. In parallel, her investigation into the industry shows how the development of aesthetics,

ergonomics and environmental cues to encourage 'zone' playing are complemented by a series of invisible adjustments to the probabilistic structure of the game itself, which have succeeded in normalizing digital duplicity. These machines have become seductive skeuomorphs which maintain the aspect of their forebears, but whose delivery of a 'gambling experience' is radically discontinuous with the inner mechanisms by which they secure a steady profit. Whereas the players are served up an affective fix of randomness perfectly calibrated to ensure continued play, behind the screen any remnant of chance is entirely extirpated not only through statistical calculation but through a continual modulation of the human-machine coupling.

The traditional drivers of gambling behaviour seem to be important here only as a 'gateway': The hope of winning may bring the player into the zone, but once there, 'no rational action is possible'—one is 'beyond reason'. As Schüll's sources reveal, the efficiency with which the design-loop between players and manufacturers has enabled the machines to key into behaviour patterns means that even the designers themselves find it impossible to 'disenchant' themselves once drawn into the zone.

Schüll thus quite rightly presents this as a case study in what Deleuze called the 'control society': a kind of collusion between the players and an industry that actively solicits their addiction, its result is a

casino in which 'the calculation of probabilities is the rule, the house has the edge and, as much as possible, nothing is left to chance'. The zone itself is 'beyond contingency', affectively suspending and providing an escape from life under capitalism, while at the same time constituting a bleeding-edge model of its most advanced mechanisms of control.

The rise of machine gambling can also be read in an architectural register. Far removed from what was once 'learnt from Las Vegas', the occupation of erstwhile retail real-estate by machine gambling establishments has become a familiar feature of our cities. **Jaspar Joseph-Lester**'s photo-essay focuses on the Wedding district of Berlin, remarkable for its concentration of these small casinos which come in a variety of shapes and sizes and yet have begun to form a recognizable architectural genre, albeit one that is largely functional—even if their facades continue to deploy a jaded vocabulary of Vegas imagery, these sites are as far removed from the palatial excesses of the golden age of the Strip as Schüll's interviewees are from Dostoyevsky's gambler. In his examination of the architectural merits of these spaces Joseph-Lester riffs on Ed Ruscha's deadpan methodical approach (*Some Los Angeles Apartments*, 1965), documenting the situation and formal characteristics of these deracinated spaces for zoned-out gamblers.

If there was ever someone who conformed to Steve Forte's characterization of the shift of the image of the advantage player from 'stereotypical professional gambler [...] into the science-orientated, geek-like, college whiz kid', it would be **David Walsh**, the Australian gambler whose sports betting syndicate The Bank Roll is one of the most successful in the world. Although in his interview with **Collapse** he immediately places the instinct for gambling in an anthropological and evolutionary perspective, Walsh numbers himself among the 'nerds' who have cultivated the ability to counter the evolutionary artefacts that bias human response to risk, and thus to maintain the attitude that marks out a 'professional' gambler.

On a different scale and in a different league—one is tempted to say a different world—from Wedding's hypnotised slot-players, Walsh's disciplined approach has led to a level of success that has allowed him to risk a bold move in an entirely different sphere, with his extraordinary Museum of Old and New Art in Hobart, Tasmania. In our interview, Walsh, echoing Forte's emphasis on the discipline required of the advantage player, emphasises the fact that successful systems are based firstly on insights that enable an edge, however small, to be established; and subsequently on a correct estimation of that edge and its disciplined and patient application. The glimpses Walsh affords us into his own system paint a picture not of sudden strokes of

mathematical genius, but of a system based on the principle that surpassing the already considerable 'efficiency' of the betting public by even a small margin can pay great dividends. Reflecting upon his career and his latter day role as art collector and 'unmuseum' director, Walsh goes on to emphasise the vicissitudes of chance in life, and how selection effects colour our perceptions of fortune, success, and failure.

These forays into the world of the casino proper only go to reinforce Cavaillès's argument that once concepts of chance and probability are brought to bear in concrete applications, the tension between idealisation and experience yields a complex interference pattern. The same is true of the industrialisation of risk: contemporary reality continues to be shaped by the operationalization of probabilistic thinking through the systematic assessment of risk in all spheres of society. This is achieved largely through the use of models whose relation to the real, in Donald MacKenzie's famous phrase, tends to be that of 'an engine, not a camera'. Taking up this theme with an overview of his research into the statistical modelling of flood risk, **Anders Kristian Munk** brings us into the heart of the contemporary *manufacture* of risk enabled by such models. Beginning with William James's pragmatist premise that our understanding of chance, and the concomitant notion of non-actual events, remains incomplete without an understanding of how the latter

are *made real* by mobilising some kind of galvanizing force, Munk addresses risk models as a particular form of science-fiction, wherein the 'fictitious' capacities of physical modelling are cultivated and activated by the application of the probability framework.

Exploring 'the difference made by models' and in particular the exigencies imposed on models whose aim is to 'enabl[e] things to express themselves in monetary values', Munk gives a detailed account of these hybrids of empirical data, physical modelling, and general statistical principles abstracted from the specificities of any particular event. The 'orchestration of futurity' that will allow 'the future to be thought of as a game of chance' brings into play a set of assumptions whose provenance is a bizarre mix of stereotyped curves, flying bombs, and kicking horses. Here probability figures not as incomplete knowledge, but as a supplementary construction that requires a 'leap of faith'—a 'cocktail' of knowledge and generic idealisation that is necessary in order to make indeterminacy go 'live' as an effective machine-part. Munk thus lays bare the construction of probability models as a 'platform for intelligibility', and reveals how those tasked with this construction are compelled to give pragmatic answers to some crucial theoretical problems (how to make a flood model without any data? How likely is it for water to go uphill rather than down? How are individual flood events independent

from or correlated to each other?). Finally he offers us an analysis of how this process articulates the two aspects of the 'janus-face' of probability—as epistemic (incomplete information) and as 'explorable property of the future'—so that they may complement each other and yield a monetizable model. He concludes that the conditions put in place to ensure the 'liveness' of indeterminacy in fact mutilate the latter, depriving it of the other vital aspect of Cavaillès's understanding of chance: the emergence of radical novelty. At least, this is the case for the domain modelled; as for the actions of models themselves, they may interact with the world to present unforeseen outcomes. Indeed it is at this level that they 'make a difference' and, rather than representing reality, 'bring something hitherto unavailable [...] into being'—even if in doing so they may also 'exacerbate unintelligibility'.

It is this movement and its seismic historical effects that **Nick Land** addresses in a grand synthesis that seeks to 'transcendentalise' the notion of 'casino capitalism': according to Land, the inherence of risk to modernity makes of capitalism the system for which, at the (immanent) limit, 'the casino has become the stake'. Risk is a historically specific category: as Munk shows, it is constructed, rather than (like chance) suffered; and Land argues that the construction of risk also calls for the construction of new, formalised synthetic agents as their vehicles. At the limit of a planetary-scale

experiment in which modernity and the calculative determination of risk are inextricably intertwined, Land sees artificial intelligence and capitalism converging in the construction of synthetic subjects that 'formalise agency and restructure time'. Abandoning any aspiration to make probability an exact science, Land here foregrounds the Bayesian approach which epistemologises risk within a framework of the incremental revision of inferences, allowing probability calculations to mitigate for their incompleteness, bringing learning and risking into immanence as 'integral cognitive hazard' and 'unplanned design', and fully unleashing the disruptive capacity of the pursuit of risk via its effective commodification.

Inevitably, this sovereign role played by risk in capitalism is accompanied by an inherent opposition to any supposedly external instance by which such risk could be judged or to which its imperative could be subordinated. Hence justice as such is risk's other, for, as Land insists, whereas a risk society is that for which society as such must be put at risk, the demand for justice is a demand to limit vulnerability, to keep the game *inside* the casino—a resistance to the escalation of the stakes to those of Russian roulette. This resistance, he argues, consists in the refusal to expand the weak subcategory of the *wager* into the full form of the *venture*, for which adoption of risk entails risking the loss of the agent itself.

Thus understanding risk-vehicles such as companies as already-exi(s)ting AIs heralding the complete integration of venture and agency, Land asks how we are to understand the discourse of 'mankind' from this perspective: As the pursuit of a continued struggle of an extra-economic form of agency against its absorption into the 'venture-form'; as reference to a species whose statistical consideration confidently predicts its imminent demise; or as a nonspecific concern with intelligence which, as such, would be indifferent to the corrosion of traditional subjecthood? The suggestion here is that, once capitalism is out of the box, our answer to this question implies at most a minor adjustment to the horizon of *existential risk* looming over the human subject—for leaving the table is no longer an option.

Contemplating the fate of mankind from a similarly lofty perspective, **Milan Ćirković** asks whether more, rather than less, risk might be the order of the day. In 'The Greatest Gamble in History', Ćirković meditates on existential risk, however, from the point of view not of terrestrial singularity but of extraterrestrial diaspora, examining the prospect of what might seem like a 'reckless gamble' on the part of a beleaguered species—namely, a decisive collective investment in extraplanetary migration. In introducing this possibility he considers the present situation of humanity in terms of an embedded series of 'games' at which we

have, so far, been lucky. We are faced with a choice of several extremely uncertain and risky ventures with regard to our sedentary terrestrial situation (one of which—no less hazardous, given the potentially 'negative adaptive value of intelligence'—is to stay put). The stakes here are no doubt existential: Can we transform our situation from that of a game of chance into that of a game of skill? On a sober analysis of the odds, he argues, we may stand more chance of surviving to take another turn if we risk stepping out of the planetary 'cradle'.

Following this intense multiscalar amplification of risk, from the theory of probability to modelling to existential risk, an ascent that brings together the adventure of human intelligence, risk, capitalism, and futurality, we might firstly question any apparent congruency or continuity between Land's account of the disruptive force of risk under capitalism and Ćirković's call for a collective wager on an extraterrestrial future. After all, Tsiolokovsky's cosmist call for an escape from the earthbound casino to a collectively-willed future, with which Ćirković opens his reflections, was premised on a notion of collective endeavour that seems prima facie incompatible with the organisation of resources and intelligence presented by the risk-order of capitalism. Although the financial crisis has revealed, in accordance with Land's thesis, that the major instances of sociopolitical heredity are already

effectively subordinated to the risk-vehicles of financial markets, an obvious response to his transcendental deduction of the futural essence of capitalist intelligence would be to observe that a certain class of subjects seem in fact to have succeeded very well in separating their own fate from that of their ventures. For the net effect of financial crisis has been to transfer the downside of risk from those who pilot complex financial vehicles to the citizens of what were once nations and societies, and indeed to prevail upon the waning sovereign power of the latter to prop up their ailing enterprises.

Yet in the absence of any conceptual grasp on the general nature of the financial instruments involved and their relation to the dynamics of capitalism, the satisfaction of such denunciation rings somewhat hollow. Cavaillès's observations hold well for these sophisticated instruments: at least a part of the catastrophic nature of the systemic crisis owes to the fact that they proliferated instrumentally in the absence of any firm understanding of their inherent logic.

Central to this cognitive deficit is the question of derivatives. The notion that the increasing sophistication of these financial instruments poses the threat of systemic failure disaster is nothing new;[1] and yet, although they are generally considered to have 'failed'

1. See for example Richard Thomson's popular account in the aptly-titled *Apocalypse Roulette: The Lethal World of Derivatives* (London: Pan, 1998).

in some way, the underlying assumptions of the models that provide their basic operational logic—specifically, models for derivatives pricing—do not appear to have been significantly questioned or revised.

In an attempt to respond to this state of affairs, our volume presents a set of contributions which seek to understand the systemic nature of the global market in risk, which includes human agents, but also and increasingly the 'synthetic agents' to which Land refers; to evaluate precisely what sort of intelligence is in play in the latter; to understand the inherent logic of the derivatives market and the singular role it plays in the global economy; and to clarify the relation of this advance guard of the finance sector to the capitalist mode of power.

In a famous passage from his 1936 book *The General Theory of Employment, Interest, and Money,* Keynes charged, against the notion of the rational economic actor, that human behaviour is often driven by 'animal spirits' rather than being 'the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities'. Agreeing with David Walsh's conviction that risktaking behaviour can be understood in terms of our evolutionary inheritance, **John M. Coates**, **Mark Gurnell and Zoltan Sarnyai** caution against a too stringent separation of reason and emotion, thus extending this questioning of certain abiding philosophical and economic prejudices.

One of the images conveyed by the notion of casino capitalism is that of an elite of 'bankers' driven by the worst excesses of human (or, in fact, masculine) behaviour. Coates et al. provide a scientific context for this 'irrational exuberance' in which it becomes evident that the mechanisms that drive these 'violations of rational choice theory' may be the same ones that, within certain parameters, are functional and optimizing in risk situations. Their contribution to this volume, documenting an experiment which tracks correlations between biochemical shifts in the bodies of traders and their performance in the market, delivers some suggestive results. Endocrinal mechanisms that help the body to adapt rapidly to changing environmental circumstances, in an environment of 'uncertainty, novelty and uncontrollability', they suggest, may be responsible for the characteristics that make for a successful trader, able to respond appropriately to high-frequency signals; however, in chronic situations these same mechanisms may lead to behaviours that exacerbate systemic fear, with risk behaviour and chaotic markets amplifying each other in a biological-financial feedback loop that effectively hooks up the accelerated delivery of glucose to the brains of individual humans to inceasingly volatile markets.

This image of world markets wired into the metabolisms of bodies and the preconscious circuits of the brain rather complicates the alternative between

rational assessment of information and 'masters of the universe' exuberance. In a network of bodies whose competencies amplify 'animal spirits'—biochemical and sensorimotor reactions to uncertainty and expected harm, instrumental within certain boundary conditions, potentially catastrophic beyond them—risk becomes a question that is as evolutionary and biochemical as it is political and financial: in other words, the figure of the trader is placed in the ramified space of the 'casino' described by Ćirković, comprising the contingent factors that produced both the peculiar animal *homo sapiens* and its technical milieu. Risktaking becomes a strange kind of hybrid object that cannot be addressed from any one disciplinary perspective, a syndrome that is neither entirely natural nor constructed or fabricated.

In invoking a 'neuroeconomics' that would provide the link 'between economic events and brain processes', Coates et al. suggest in closing that the trading floor might be a laboratory in which we could attempt the control, optimisation, and modulation of these biochemical aspects of the risk system, harnessing their positive cognitive role while guarding against their chronic effects (possibly through a 'feminization' of the trading floor).

Yet one might wonder for how long humans will play any role at all, considering the supercession of traders by various species of algorithmic 'black boxes',

and the rise of high frequency trading. Although the stressed 'hormonal economic agents' of Coates's experiment were engaged in rapid trading, holding positions for only a few minutes at a time, automated computational trading today creates an environment the speed and intricacy of whose operations are simply intractable to human cognition. What role is left for 'the remnants of the human trading population' in this 'evolving ecology' whose 'emergent rhythms' are the expression of ever more densely interconnected relations between processing nodes of densely encoded knowledge and strategy?

It is this increasingly inhuman ecosystem that **Nick Srnicek and Alex Williams** describe, an environment in which 'technology redefines the risk landscape itself', with increasingly fine-grained and liquid transactions giving advantage to those with sheer speed on their side. From computational dynamics to hardware configuration to physical location, firms competing on this landscape constantly strive for optimisation, and cyberspace's much-vaunted tendency to 'compress space' now sees the physical itself becoming the next frontier for finance as 'the earth itself becomes an impediment'.

With an eye on Land's future AI, Srnicek and Williams ask in what sense and according to what principles these agents 'think'—what kind of intelligence is embedded in them? On the basis of this question the

authors of the 'Manifesto for an Accelerationist Politics'[2] expand and further finesse their understanding of accelerationism by distinguishing between a mode of acceleration that would operate 'in redefining this space so as to change the very rules under which the game itself is played', and a sheer operative increase in speed that aims 'simply [to] dominat[e] an agreed space of competition', suggesting that the latter in itself cannot be a 'game-changer' in any significant sense.

What might be the result of such sheer acceleration for *representation*, given both the impossibility of securing any kind of 'cognitive mapping' of these transactions which seem to reformat space itself, and the mode of nonrepresentative subjectivation that corresponds to the intensification of finance-power? As Srnicek and Williams observe, there remains a stubborn materiality to these operations, and indeed the geographical location of their major processing operations has become crucial, to the point where they are protected as major national assets: 'while popular perception portrays Wall Street as the central location of global finance, it is in fact New Jersey and Chicago where much of American finance is corporeally instantiated [...] and is regarded as a component of the nation's critical infrastructure'.

For this volume **Sam Lewitt** undertook the self-consciously vain task of capturing an image of one of

2. On accelerationism, see R. Mackay and A. Avanessian (eds.), *#Accelerate: The Accelerationist Reader* (Falmouth and Berlin: Urbanomic and Merve, 2014).

these 'constitutively dislocated' locations, as a way to measure the almost total withdrawal of finance from representation. In fact, his contribution instead recounts how this original plan was thwarted by way of a misadventure that led to the erasure of said image and a visit from the FBI's Joint Terrorist Task Forces.

What ensues is a reflection on the accelerated abstraction of the value-form and the forces that are mustered to defend its remaining physical outposts. Lewitt's 'Notes from New Jersey' recall how his attempt to photograph the Mahwah datacentre—an enterprise whose interest lay in the impossibility of extracting from its blank facade any insight into the abstractions facilitated therein—triggered off a startling security response. The agents (of what power it is not clear) who forcibly redacted Lewitt's digital images compounded the interpellation by suggesting that the only permissible representation of this 'disappearing monument' to a globalised automated financial network of abstraction would be one made by human means unsupported by any mode of recording save for the traditional skills of the artist. This unexpected turn of events, as Lewitt records, added further dimensions—those of guilt, erasure, and subjection—to his original project to test the conditions of representation under accelerated capitalism.

Although they may represent the cutting edge, the high speed operations transacted in Mahwah

are perhaps more a matter of the *next* crisis than of the one whose protracted tail-end we are still living through. As already indicated, more germane to the latter would be an understanding of the infamous CDOs and, more generally, of derivatives. The mathematical instruments used to price derivatives—classically, the Black-Scholes-Merton formula—are underwritten by a model that ostensibly consists in assigning numerical probabilities to future events. The work of **Elie Ayache**, who has spent many years dealing first-hand with the complexities of the speculative options and futures markets, presents us with a new thinking of the market, as the primary manifestation in the world of radical contingency, to be thought entirely outside the terms of probability and prediction.

Ayache argues that in practice derivatives traders do not calculate price on the basis of a confined range of future probabilities, but directly and effectively *write* price as the contingent reality of the market, *now*. The market is therefore not a set of probabilities, but the very *medium of contingency*. It is a regime of events whose vicissitudes we cannot better grasp by addressing our failure to deal with highly improbable events (Nassim Taleb's 'Black Swans'), but whose events are effective without prevision or reason—according to the title of Ayache's book, *Blank* Swans.

At the beginning of *The Blank Swan* Ayache even goes so far as to suggest that it indeed this *philosophical*

default played a crucial role in the current financial crises: The image of the market that circulates amongst those who daily recreate it is based on a frail philosophy of probability that fails to capture its most characteristic operations. He understands the act of writing derivative contracts or 'contingent claims' instead as a material inscription of difference directly in the real, creating a future that is in principle unforeseeable. Derivatives can thus be considered, in Ayache's words, 'technologies of the future'.

In our extensive interview Ayache not only avails us of his expert knowledge of derivatives pricing technology, but clarifies and extends his critique of Taleb, and gives the most in-depth account yet of his pursuit of a 'philosophy of the market'. The latter is distinguished by a move from an epistemological point of view—the idea that there is a 'real' random generator which models attempt to approximate—to an ontological one in which pricing as act—as a continual writing *in the gap* of discontinuity—is what drives the continual event of the market, *as place* rather than *in time*. For the market, Ayache argues, is a 'massive event' that moves in the dimension of writing, not that of time, and which has no external guarantor or generator for its processes. In this way, as he describes in detail in his responses, he develops his own conception of a 'unilateral' speculative materialism without any 'dogmatism of the absolute'. In surpassing Meillassoux's

thinking of radical contingency by insisting that he must understand his own work as a *writing* (philosophy as a practice wherein 'writing is faster than thought'), the question becomes no longer one of thought acceding to an absolute real (just as it is not a question of the derivatives pricing model capturing the 'real' random generator of the underlying), but one of discovering the matter of writing 'in which the event is repeated'.

Jon Roffe's review of the overall movement of Ayache's thought reiterates this movement 'from depth to surface, or from thought to writing'. Explicating the major contribution of Ayache's approach—that of refusing to subordinate the understanding of the market either to predefined political categorisations or to probabilistic frameworks—Roffe asks what are the axioms of an immanent 'philosophy of the market', one that thinks the market outside of these imported constraints, and without arbitrarily expelling those aspects of the trader's activity that exceed them.

Roffe goes on to confront Ayache's theory directly with the question of CDOs, the privileged instruments of financial misfortune: Since the pricing of CDOs demands a supplementary level of probability-based calculation Ayache dismisses them as 'degenerative fantasy'; yet Roffe takes issue with this hygienic expulsion of CDOs from his model, arguing that they cannot be excluded from the 'generalised surface of the market' it predicates.

Suhail Malik's contribution draws Ayache's thinking further into the domain of the political by reading price as the medium of political order, and the market as the medium of *capital-power*. Turning from the intrinsic logic of the market to the shifts in global power dynamics implied by the sheer volume and financial magnitude of derivatives trading, Malik sets out from the fact that these markets demonstrably pose a systemic risk to national economies, and that their size and transnational nature means that they cut across and where necessary countermand the power of states. The uninhibited and unconstrained uncertainty unleashed by these risk-bearing instruments thus spells immanent crisis for a whole legacy of political certainties, since they constitute the greatest planetary concentrations of power and pose an 'existential risk' to sovereign power as traditionally conceived.

In what promises to be a significant contribution to political economy, Malik seeks to combine the philosophical understanding of the nature and logic of the derivatives market with an analysis of the entirely novel, structurally-specific mode of capitalist power it expresses. This ambitious 'ontology of finance' supplements Ayache's understanding of the fundamental logic of derivatives with Jonathan Nitzan and Shimshon Bichler's account of *capital as power*. Such a 'power theory of finance' answers both to Ayache's claims as to the singular importance of derivatives for an

understanding of pricing as such, and to Land's claim that risk-bearing vehicles and agencies tend to corrode the inherited social forms from which they historically emerge. According to Malik, though, this inquiry requires the adjunction of Nitzan and Bichler's understanding of capital *qua* absentee ownership, with its primary ordering mechanism of *differential accumulation*. Equally, however, it necessitates a supplement to Nitzan and Bichler's own account: the latter already agree that ownership of property, stocks, bonds, and derivatives all pertain ultimately to the same, immanent market, with all of them being ordered by means of the universal mechanism of *pricing* (namely, through the discounting of anticipated future earnings). They also countenance the refusal to subordinate the analysis of capitalism to any dependency upon conditions exogenous to finance (diverging from Marxism in insisting that finance is not an excrescence of 'real production' or a 'parasitical, supplementary or "fictitious" mode of capital'). However their analysis must be extended to take account of the specific operations of derivatives, in order that it might encompass the new modalities through which their complex operations multiply and transform the power axiom of differential accumulation, and, crucially, the transformations they bring about in the inherent dimension of *sabotage* that Nitzan and Bichler see as integral to capital-power.

For Malik then, the order of futurality involved in derivatives markets, in discovering price as sole ordering mechanism, fully unveils a universalising logic that heralds a comprehensive reordering of the social via finance-power, one which extends the latter's reshaping of 'political futurity in terms of price magnitudes'. Extending Ayache's understanding of the market as writing, he offers an original analysis of the constitution of derivative pricing through the Derridean concept of *différance*, with the 'contingent claim' at once instituting price difference and deferring the exchange that would realise that difference, with the pricing surface as the 'stage of presence', and with the ultimate valuation of the derivatives contract featuring as a 'supplement' that serves only to structure the contingent unfolding of its quantitative role in the market. Contrary to Ayache's expulsion of time in favour of the 'place' of exchange, however, Malik reads pricing as a *temporization*, as a 'becoming-time of price'. Pricing emerges as a form of 'time-management' *and* as the basis of a new political economy, with derivatives trading integrated into Nitzan and Bichler's general model of price as the 'single quantitative architecture' of capital-power: Ultimately finance-power can be determined only by a 'realism' (yet a 'non-correlationist' one) that integrates both the power dimension and the risk dimension.

This analysis yields as its final term the *arkhéderivative* as 'a priori of the political economy constituted

by the ontology of price'. The existential risk faced by capitalist modernity, the 'absolute volatility and indefinite plasticity' that constitute the 'risk-order' of these markets, is then understood as that of an 'ineliminable futurity that splits the present', a universal normless order that is 'necessarily contrary to stability' and constitutes an 'intensive differential sabotage' that lays waste to sovereignty.

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As regular readers of **Collapse** will know, the thinker most responsible for initiating a renewed debate around the concept of contingency (and whose conception of radical contingency converges, in Ayache's work, with the practice of pricing as technology) is **Quentin Meillassoux**. Meillassoux makes a welcome return to the pages of **Collapse** in this volume, opening a sequence of contributions that relate to the role of chance in the work of art by contextualising his recent work on Mallarmé, *The Number and the Siren*, in terms of his general philosophical orientation. He positions Mallarmé's *Coup de dés* as a *materialist* gesture that presents a unique solution to the predicament of the artist following the crisis of the withdrawal of all divine warrant, the poet confronted by Chance, that 'dark absolute' recognised by modernity as the only presiding power. In this confrontation with the sole

reign of Chance, according to Meillassoux, Mallarmé succeeds in elevating himself *qua* writer of the *Coup de dés* to the level of a *material divinity*.

The 'Master' of the *Coup de dés*, who, in an eternal moment of hesitation, holds the dice in his hand but does not yet throw them, recalls Mallarmé's earlier protagonist Igitur; yet while Igitur was constrained to choose, in the *Coup de dés* Mallarmé *infinitizes* this hesitation: if everything is subject to chance, except for infinite, eternal chance itself, then Mallarmé, in devising a situation where the dice is both thrown *and* not thrown, *becomes* chance—the only modern divinity, and a thoroughly meaningless one whose celebration, in a ritual of solitary reading, leads not to a humbling of the human before jealous gods who demand allegiance, but rather to what Meillassoux describes as a neo-epicurean materialism, realized in the poet's eternal hesitation.

Following from this undecidable fate of the poet whose performative gesture makes him equal to chance, Meillassoux's ontological translation of Hume's critique of causality[3] and its evocation of a hyperchaotic universe where the laws of nature could alter at any moment inspires the tale of another type of performative tribute: **Sean Ashton**'s short story recounts the strange fate of a man who decides to 'put his body in the service of a philosophical notion'. This weird tale in which

3. See Q. Meillassoux, 'Potentiality and Virtuality, in Collapse 2.

Chesterton and Lovecraft meet Meillassoux, brought to life in suitable style by **Nigel Cooke**'s illustrations, describes a more homespun attempt to embody a philosophy; a singular experiment that wavers undecidably between philosophy, art, and performance, and leads the protagonist who knows where….

Proposing a further study in the activation of chance, albeit of a more violent sort, **GegenSichKollektiv** address the demand that the work of art itself must involve a risk on the part of its audience. From the time of the avant-gardes, this expectation of sensory and/or cognitive jeopardy has been a mainstay of the self-image of the modern artist, and is still omnipresent in the claims of contemporary art, but is rarely taken as literally as in the CAUTION experiment they propose. They approach the question from within a practice that feels it most acutely: under the banner of 'noise', various practices of experimental music have pursued the aim of a sensory and cognitive disruption of all norms of musical structure, style, and expectation, only for 'noise' to degenerate into a series of stereotyped gestures which have given rise to a marketable genre. Can anything be salvaged of the claim to provide a locus of real risk outside the calculative depredations of the consumer system? Drawing on the work of Ray Brassier, GegenSichKollektiv's diagnosis of this predicament leads to an analysis that suggests that only a dialectical articulation of the sensory and the cognitive—avoiding the dead

ends of subjective abolition and conceptual overcoding of experience—can draw noise out of its safety zone and present the possibility of a true risk on the part of the audience, thus leading the way to a 'game' that would propel the collective body toward a real encounter with chance. Although the text itself operates as an invitation to the game, the reader is indeed advised to use their 'recipe' with the utmost caution.

Continuing this interrogation of the relation between art and contingency are two artists' works that cut through the entire volume. **Jean-Luc Moulène**'s series of images relay Cavaillès's exposure of the vital-abstract roots of the problem of probability. This is precisely the double-register within which Moulène's work operates, endowing his three-dimensional works with a 'formal cruelty' through objects which are at once visceral and conceptually truncated. In Moulène's unsettling edition for **Collapse,** the operations of abstraction involved in thinking and operationalizing chance seem to be glimpsed at a second remove, as images of devices of thought. These figures are then interleaved as 'feuilles volantes' throughout the volume, with this redistribution offering yet another material image of chance.

Often an artwork's claim to contingency or chance is configured in terms of indeterminacy or ambiguity: by courting the indeterminate or explicitly invoking an interpretative relativism, artworks seek to be 'open to contingency', as if this were a decision the artist could make.

In her contribution **Amanda Beech** instead presents us with the order of coincidence. Her series addresses and invites the desire to order, to make sense of contingency and, in particular (as often thematised in her work) the desire to focalize the contingencies of power into a decisive image. In a series of images deriving from her 2013 collage-découpage installation work 'The Church The Bank The Art Gallery' (Banner Repeater, London, 2012), Beech tempts the viewer to formulate their suspicions as to the entanglement of the artwork in the three eponymous systems of power. Passing through the pages of the volume, these three loci are subjected to slippage, coincidence, and dispersion, yielding no definitive order. The three series, relating to each of these authorities suspected of compromising the artistic endeavour, provide the basis for a faltering, uncertain moving image, a montage sequence that interrupts the reader's progress through the volume, or which one can 'fastforward' flipbook-style, maximising the chance of divining some continuity at the price of turning the remaining content into an unintelligible blur.

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Three different viewpoints on contingency and probability, in philosophy, in science, and in the market, close our volume.

Fernando Zalamea reminds us that the concept of absolute chance was introduced into philosophy in the late nineteenth century by Charles Sanders Peirce, in the form of his 'tychism'. The pertinent difference between this concept and that of Meillassoux (and Ayache) lies in Peirce's insistence on a paradoxical integration of the principle of absolute contingency with that of continuity (synechism). In insisting upon synechism, Peirce attempts to avoid the potential vitiation of any systematic universal philosophy by the introduction of contingency; at the same time the dialectic with tychism avoids the impoverishment of specificity that might issue from the espousal of a universal 'continuism'. In his recapitulation of the universal 'forms of evolution' through which his theory of contingency is developed, Peirce seems to anticipate Ćirković's 'universal casino', as he progresses between different orders of contingency, whose consequences in the general system of dialectics between tychism and synechism Zalamea sets out in detail. As Zalamea describes, with reference to Reza Negarestani's architecture of decay, it is the 'back-and-forth' dialectics between the two principles—'a sort of chemical reaction'—which makes of Peirce's philosophy an impressively complex and subtle instrument that particularly deserves to be revisited in the context of what Zalamea, following Rosa María Rodríguez Magda, calls 'transmodernism', a condition that demands—beyond both

modernism and postmodernism—precisely this marriage of the espousal of universal continuity and the acknowledgement of contingency.

In the opening text of the volume Cavaillès declares that probability remains a 'live paradox within the system of the sciences'. No more so that in quantum physics, where probability plays a central role—an event which seems to go counter to the entire trajectory of 'exact science'. **Michel Bitbol** suggests that we draw the full consequences of this event by understanding quantum mechanics as a metatheory which formalizes the general conditions of possibility for prediction as such for phenomena whose detection is inseparable from their production.

Bitbol continues the general trend among our contributors, by disposing from the outset with an epistemological reading of probability—one that would see the operations of probability as pertaining to subjective ignorance of the phenomena in question, with those phenomena understood to belong to a real generator that could in principle be known. As he observes, the emergence of probability in the sciences saw it attached to (Lockean) 'secondary qualities'; in quantum mechanics, however, even what were traditionally understood as 'primary' qualities are demoted to 'secondary' qualities *qua* 'indirect manifestations'. It is no surprise then that the association of the knowledge of secondary qualities and of probability with

epistemological weakness should have given rise to resistance when the lineaments of this science began to emerge. Bitbol suggests that we should not be afraid to read the central principles of operationalism, holism, and perspectivism as countering this trend with a certain return to Pascal's recognition of anthropological limitations on knowledge and of the knower's entanglement with what is known.

If we insist on the retention of primary qualities, we can take up a stance according to which they can consistently be postulated, but only as inaccessible to any experimental practice—entirely breaking the cycle between theory and experiment that constituted the real value of the determinist hypothesis. The alternative seems to be to project indeterminism 'into the things themselves'—meaning that we conceive of the real, equally speculatively, in terms of propensities or potentialities. Bitbol insists that while either stance may be fruitful as a standpoint from which to motivate scientific research, the philosopher, rather than trying to obviate the problem, should intensify it, fully confronting what QM has to tell us about our situatedness, and examining what it is that the structure of the theory of QM owes to the situation of the experimenter. This 'reorientation' begins with a recognition of the expanded form of probability employed within QM, which emerges as a response to the type of phenomena it is bound to deal with. The differing contexts of

experiments are intrinsic to the results they deliver, and cannot be unified in such a way as to eliminate them. Therefore a new apparatus evolves to articulate these incompatible contexts: a 'metacontextual form of probability theory' able to reconstruct these fractured data within a programme of universal applicability.

As Bitbol demonstrates, later developments of quantum theory do not escape but only deepen this extension of probabilistic thinking, further developing the 'metacontextual predictive structure' that confirms the inseparability of detection instrument, milieu, and phenomena. Furthermore, once one comprehends the structure of quantum theory as such—as consisting of this metacontextual form of probability, twinned, in each instance, with a specific set of symmetries—it becomes possible to understand the quantum theory not as a 'physical theory' in the sense of Newtonian physics, but as a 'generalised theory of probability' whose potential applications reach well beyond the sphere of physics.

In Elie Ayache's closing text, 'A Formal Deduction of the Market', he adds further precision to his concept of the market by returning full circle to the questions Cavaillès broached in his opening text, and by delivering on the latter's presentiment that 'it is to a more profound reform of our ideas about the real that probability calculus invites us, a reform whose magnitude we should not underestimate'.

However, where Cavaillès problematizes the axiomatisation of probability by pointing out the slippages that take place with regard to empirical probability and intuitive concepts of chance, Ayache argues that it is this utter abstraction of the formal model that harbours the potential to transform our understanding of events themselves, by stripping them definitively of the artefactual trappings of the 'casino' model. The latter is reduced to being just one possible model for the probability axiomatic, but one which is no longer permitted to overcode it.

Utilising the recent work of Glenn Shafer and Vladimir Vovk, Ayache demonstrates how the formalism can be stripped of its relation to concepts of repetition, time, and propensity (the real random generator) altogether, so as to move toward the notion of an 'ultimate and global event' that integrates *trading* and the category of *money* into the understanding of probability at a fundamental level.

Ayache argues that this liberated version of the axiomatic, dispensing with trials, repetition, outcomes and statistics, which demands a revision of the concept of the event and a rethinking of the relation between reality, matter, and formalism and a 'reshuffling' of chronology, yields precisely the figure that he calls the *market*.

Here we are party to a strange visitation by the ghost of Mallarmé's master, when Ayache declares that if

'[t]here is something pressing to say when holding the die [...] this won't take place in time' since 'time is no longer essential to contingency'. For the intensive understanding of contingency he ultimately proposes seems precisely to correspond to the eternal hesitation of the Master's dicethrow.

Finally, in what Ayache speculatively proposes as a 'revolutionary' conclusion, it is the formalism itself that would give rise to reality: 'reality in the sense of genesis and inception'.

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As will be readily appreciated from this brief introduction, this volume has aimed to assemble a constellation of work which, as in previous volumes, acts through a series of partial overlaps and resonances so as to render vivid and urgent a set of problems that manifest themselves in diverse disciplines and practices.

Far from claiming to fully resolve the uncertainties engendered by such a montage, the aim is to intensify a set of problematics that are not only still 'live' epistemologically and ontologically, but whose ramifications continue to unfold at the heart of contemporary actuality. In presenting this set of resources with which to begin a renewed thinking of the questions of contingency, probability, and risk, we hope at least to have encouraged readers to resist surrendering

the 'demon of chance' to deterministic idealization, to our own epistemic shortcomings, or even to the arrow of time. And in examining the forms of 'game control' integral to a society that feeds on risk but still dreams of ulterior certainty (if only the certainty that the arena of risk itself will remain secure), we hope to have suggested that, beyond the confines of the casino, these questions remain the site of a compelling and still mysterious configuration of the production (or writing) of the real, formalization, and the contingencies of human knowledge.