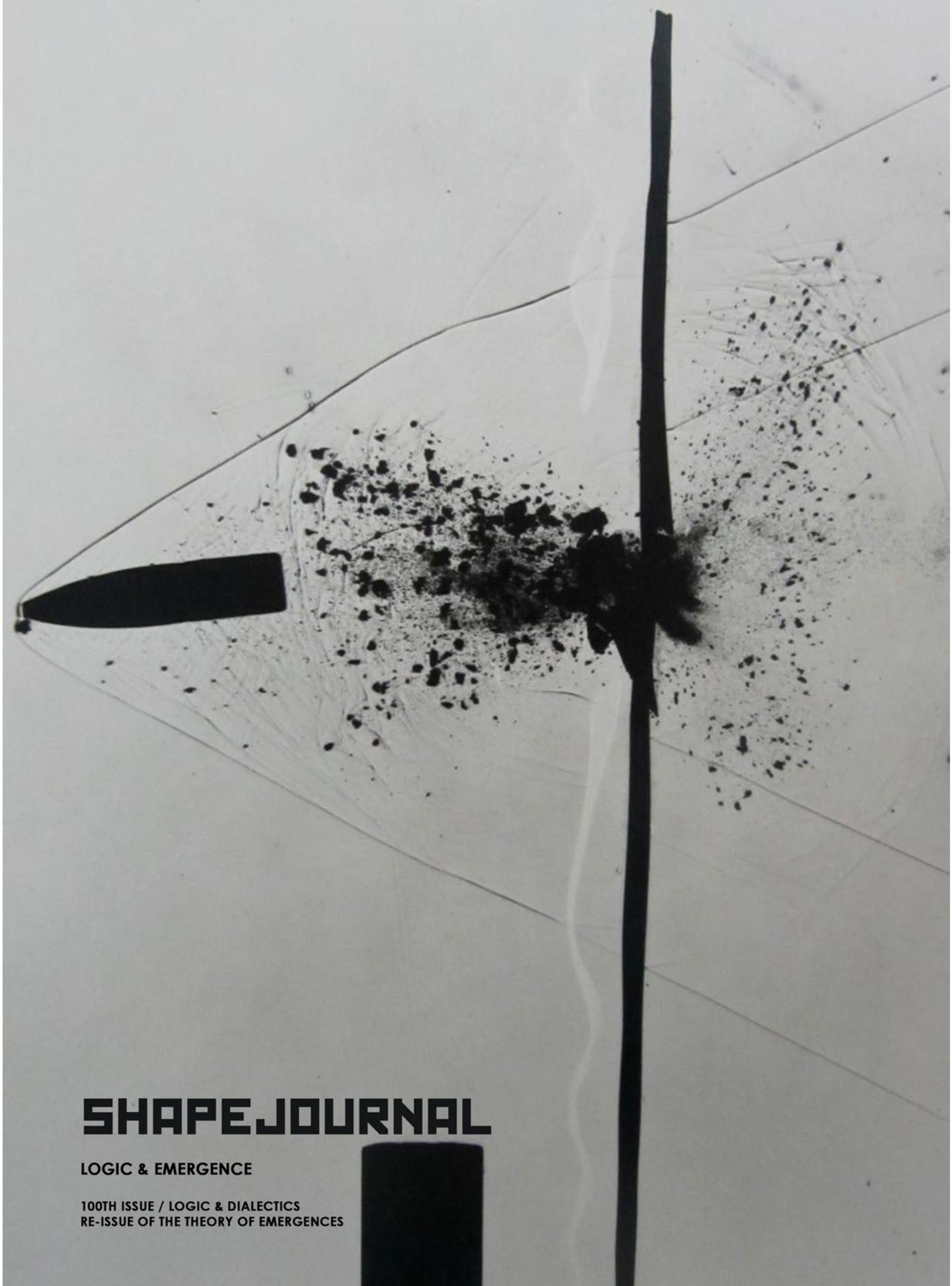


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LOGIC & EMERGENCE

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Logic & Emergence

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Preface

100 issues of SHAPE

Welcome to the 50th Issue of the SHAPE Journal.

Taking issues and specials together this journal has now published 100 editions of cutting-edge marxist theory and science, since we launched back in 2009. This one has been compiled to celebrate that achievement and to initiate the vital discussion about where we go next.

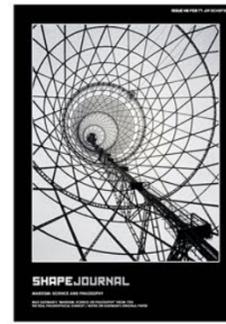
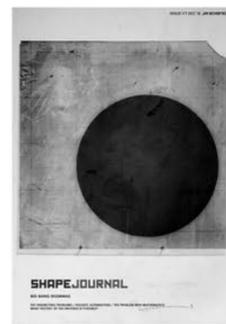
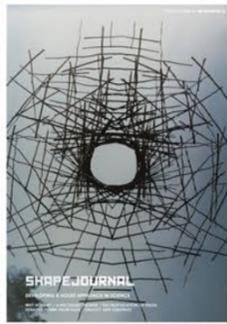
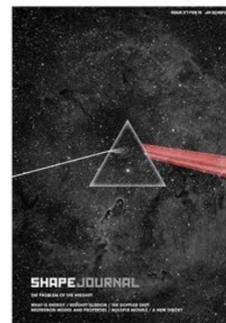
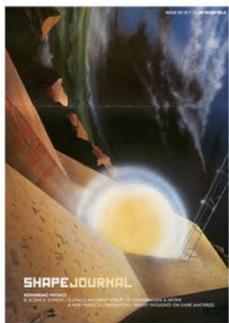
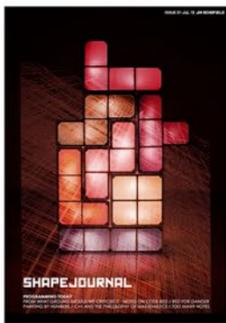
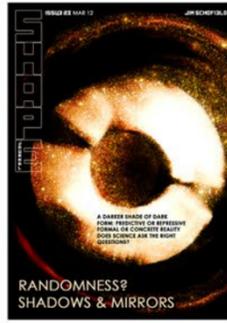
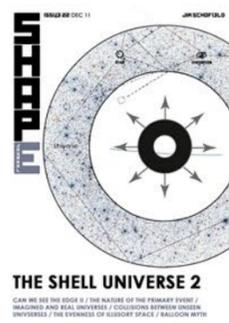
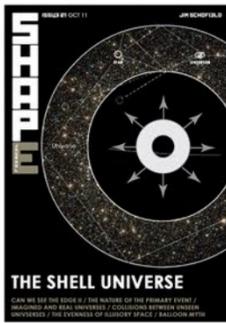
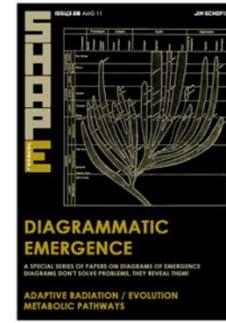
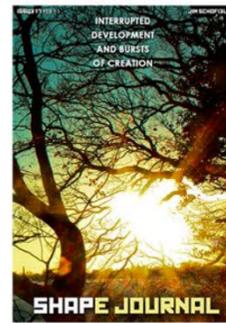
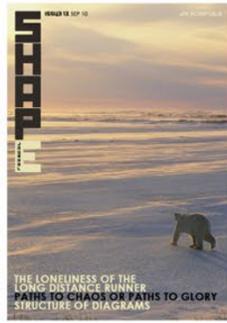
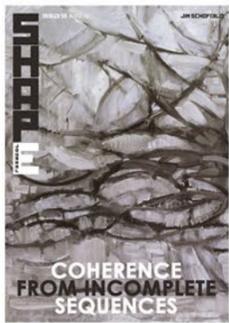
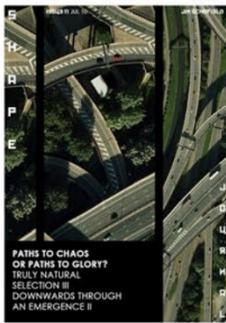
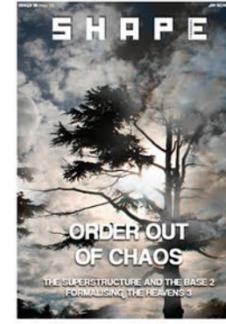
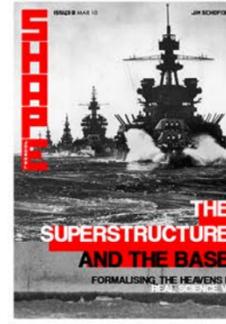
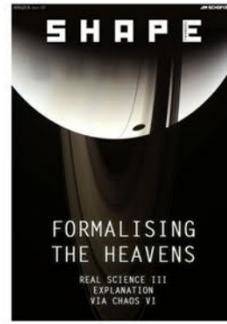
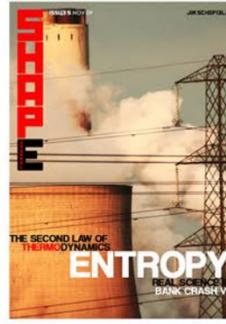
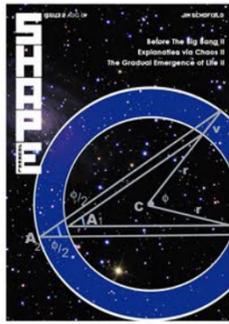
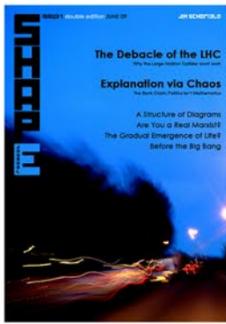
This journal has become the primary outlet for the radical theories of philosopher Jim Schofield, whose seminal work *The Theory of Emergence* was published by SHAPE in July 2010, as Special Issue 1.

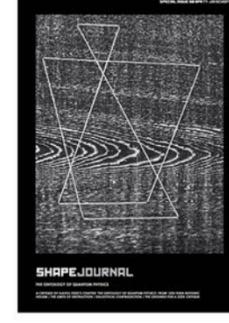
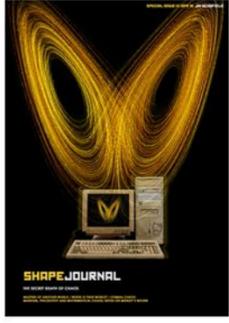
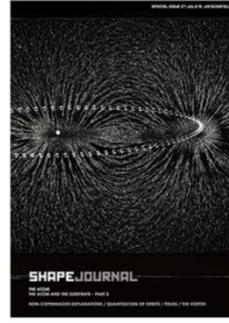
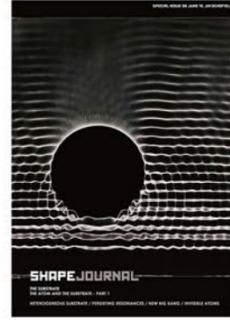
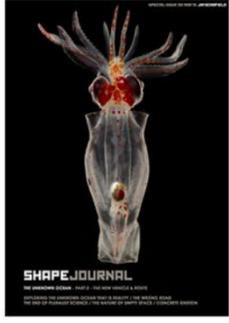
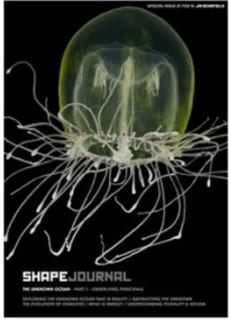
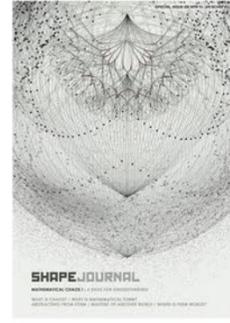
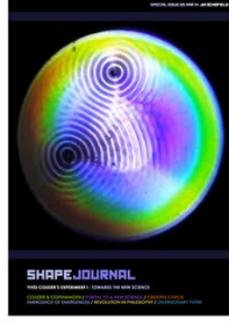
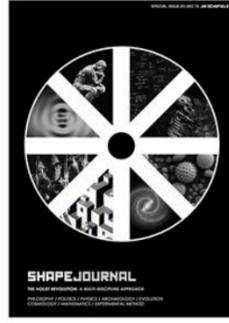
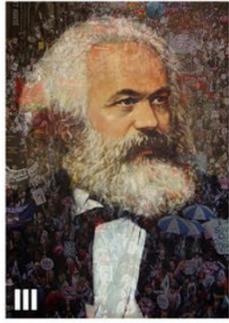
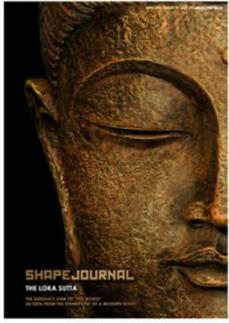
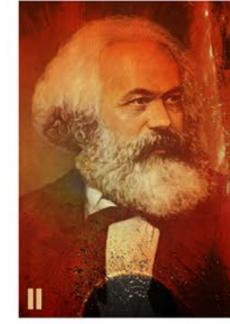
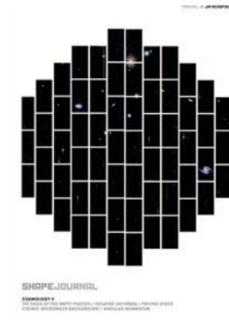
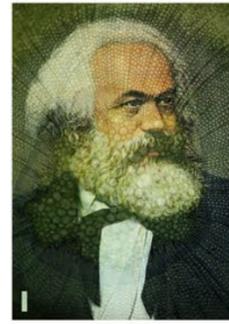
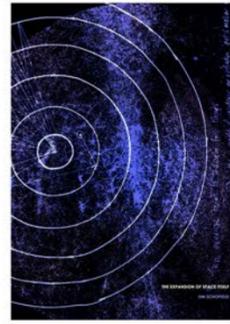
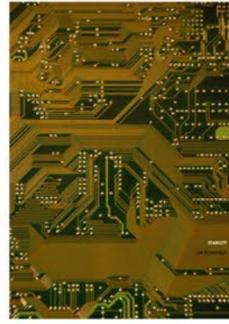
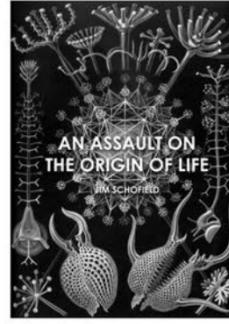
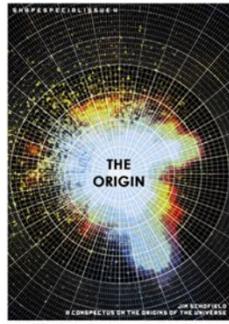
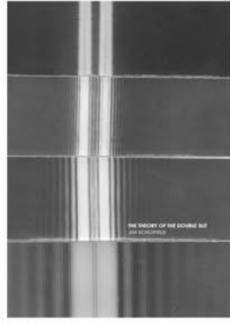
Alongside his latest work on Logic, this important thesis is included here again, to reveal the trajectory of this work over many years, but also to demonstrate fully the profound limitations of Formal Logic when dealing with change, or the emergence of the entirely new. In this challenging new work Jim looks at the dialectical resolution of contradictory concepts, via their natural appearances in concrete reality, predominantly within emergences.

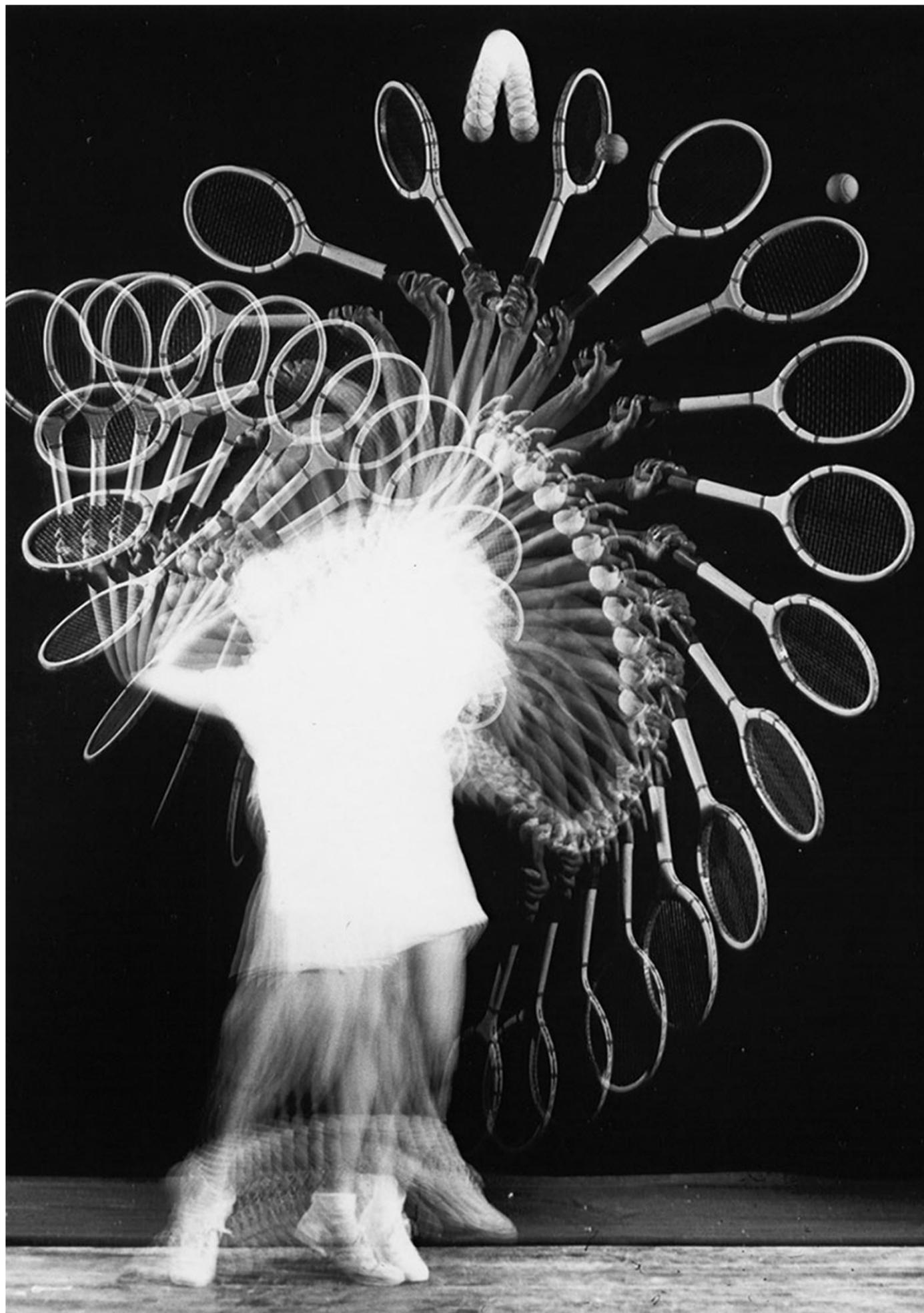
Mick Schofield
June 2017



THE THEORY OF EMERGENCE
JIM SCHOFIELD







Logic I

The Logical Resolution of a Contradictory Dichotomous Pair via the Correcting of Different Premises

Hegel's careful study of the emergence of Dichotomous Pairs of contradictory concepts, in classical Formal Reasoning, did indeed lead to a brilliant and significant breakthrough, which had, until then, remained undiscovered for over 2,000 years - and though occurring, throughout that time, and most clearly, in the very carefully described examples dealing with two of the most intractable Paradoxes discovered by Zeno of Elea - the two that he had termed

1. Achilles and the Tortoise
2. The Arrow!

And, Hegel saw the two concepts involved, as those of *Continuity* and *Discreteness*, which both seemed exactly equally applicable in most situations, but that turned out to be, most certainly, not to be the case, as only one of them was usually appropriate. So, choosing which one to use, was also impossible to decide using only the normal Formal Rules of Reasoning.

To find out which was applicable, in a given situation, had to be determined by "suck-it-and-see", purely pragmatic try-outs. Formal Reasoning alone, always failed in such a pair of possibilities, and always, alone, delivered only a non-transcendable impasse.

Hegel's area of research, which he entitled Thinking about Thought, began to reveal an ever increasing number of these situations, which were always clearly indicated by an inevitable dead-halt in reasoning - the unavoidable impasse, being due to the clearly-linked emergence of usually two possible concepts that might, quite-legitimately, be applied to enable a resolution.

But, neither could be indicated only by the reasoning involved thus far. Instead, the "causing" Dichotomous Pair of concepts seemed equally applicable, but they were never so. Nothing could decide which one to use, in order to proceed with the reasoning.

It was much more serious than just coming across the odd Paradox: there was something crucially-wrong with Formal Logic, and it invariably occurred when the application of seemingly "opposite" concepts appeared equally likely.

Hegel set himself the task of discovering why these impasses and Dichotomous Pairs occurred.

He finally arrived at the conclusion that the fault had to lie in the assumed-premises for what was being worked through - via Reasoning. For such Reasoning always implies an often-obvious, and yet not-overtly-stated, set of assumptions, which "underlay" all reasonable possibilities in what was being dealt with.

But, clearly that was not the case, when these impasses arose! Something was inappropriate, extra, wrong, or even missing-from the assumed premises, and Hegel's job was to reveal exactly what that was.

NOTE: I first used Zeno's Paradoxes many, many years ago, when teaching "A" Level Pure Mathematics to mature students at a Further Education College - to help my students understand The Calculus, but it took somewhat longer to see their profound relevance in the whole gamut of all Formal Reasoning! And, in this current undertaking, I feel it essential that these two

paradoxes will have to be spelled out, in full, to clearly reveal the problems.

Achilles and the Tortoise

Achilles and the Tortoise had a race! The confident Achilles knew he was bound to win, so he gave the Tortoise a head start, and then set off after him. But, by the time he reached where the Tortoise had been, some time had elapsed and the Tortoise had moved on. So, Achilles again set off in pursuit. But, by the time he reached where the Tortoise had been, some time had elapsed and the Tortoise had moved on. So, Achilles again set off in pursuit. And, then, you've guessed it.... But, by the time he reached where the Tortoise had been, some time had elapsed and the Tortoise had moved on. So, Achilles again set off in pursuit. And, so on ad infinitum.

The unstated assumption was that Time was infinitely divisible. And it clearly was not! So we proceed to Zeno's Paradox of:

The Arrow

Let us consider the flight of a fired Arrow through the air. At a certain point it will be in a given position, but at the "next instant" it must be in a different position for movement to have happened. But, that would mean it would have had to vanish from the first considered position and then reappear in its next position - without any intermediate positions having been occupied. Now, if this is correct Movement is clearly impossible!

The unstated assumption here was that Time was divisible into discrete steps. And it clearly was not!

So, the two dichotomous alternative concepts of Continuity and Discreteness, when applied to Time, BOTH led to an obvious error in particular reasoning - normally considered entirely legitimate. Each could work in certain contexts, but not in others.

Now, any sole preoccupation with Time, would never lead to a resolution: Hegel realised that it was about the premises involved. It was a flaw in Formal Reasoning, that could only be overcome by recourse, outside of Formal Logic, to Reality itself - to reveal the premises involved in every case.

Wise men arguing would never be sufficient, alone!

Now, this also opened up a veritable "can-of-worms" in Formal Logic, which was congenitally undermined by an even more important General Principle, without which not only Formal Reasoning, but, perhaps surprisingly, the whole of Science too, was, and still is, based.

It is the inamous Principle of Plurality!

Surprisingly, prior to the brilliant contributions of the Greeks, a very different Principle had been universally accepted: namely that of Holism - which was "Everything affects everything else".

There could be no doubt it was substantially true, but it gave absolutely no indication of how any progress in real understanding of Reality could be achieved. The Greeks decided that Reality was, at base, determined by fixed Natural Laws - so fixed, indeed, that any means to discover them was legitimate: nothing could affect them - they couldn't be changed.

So, at first very slowly, and then, much later, at an increasingly faster pace, Mankind began to control defined situations purposely to reveal these Natural Laws, one-by-one - each in the ideal circumstances to display it clearly.

Reality was assumed to be merely the acting-together of many different eternal Natural Laws, in varying mixes and proportions. But, sadly, none could ever be used upon Reality-as-is - totally unfettered Natural Reality. They just never worked there.

They could be made to work, however, if and only if, the precise conditions in which they had been discovered, were re-instituted again for their actual USE. And, this couldn't happen initially, not until Mankind knew enough to be able to both control-and-maintain the situations involved, to the necessary extent.

Thus began the Industrial Revolution, though, initially, only with what became known as scientists! Though, increasingly, their developed means could be achieved by a much wider range of people, who were less concerned with "Why?", than they were with "How?"



A wider penumbra of Technology arose around, and based upon, what the scientists had revealed.

Now, though Hegel had effectively solved the proposed problem of the essay, it certainly wasn't sufficient to solve all the problems inherent in classical Formal Reasoning. Indeed, there were many other, even more important flaws, which still had to be addressed.

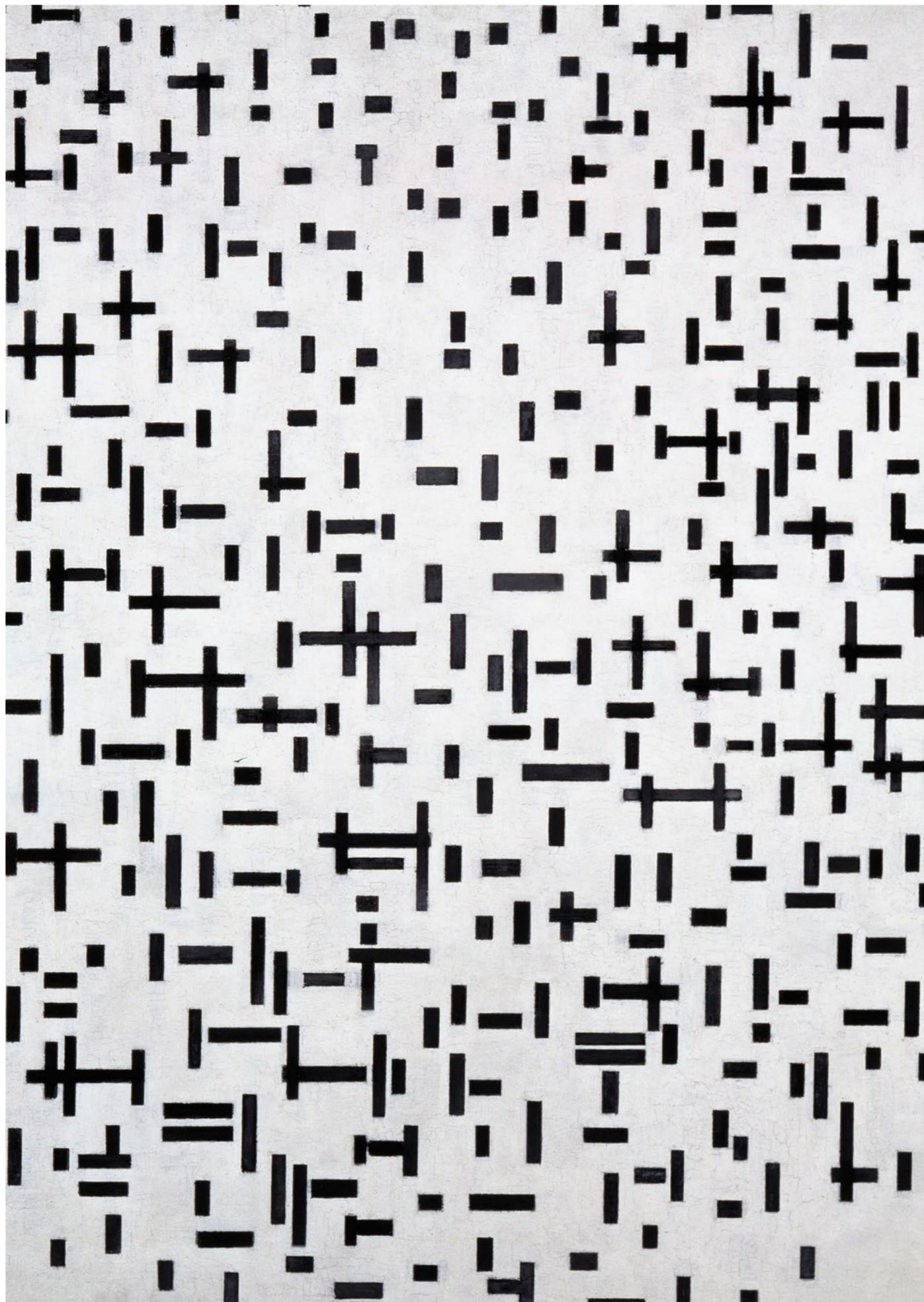
And these problems were all down to the apparent constancy of most things in the World, which remained the same for exceptionally long periods of time.

Yet, that World was also full, on every hand, of variability, change and even development, and these features were often inexplicable and commonly ascribed to supernatural, non-physical causes, while, on the other hand, its most re-assuring, and susceptible-to-study nature was surely to be found in the evident constancy - the Stability, which, indeed, appeared to be eminently-investigate-able.

Hegel knew that a pluralistic Formal Logic - based solely upon fixed Formal Laws, could never deliver Qualitative Change. in its most important aspect - The Delivery of the Wholly New!

And, hence his Thinking about Thought could not but lead him onwards to a required Logic of Change - what he called the Science of Logic, and which he embodied in his Meta-Logic - Dialectics.

Clearly, there is much more to deal with in a comprehensive critique of Formal Logic and its still paramount role in Reasoning and even Science.



Logic II

Stability and Dominance in a Holist World The Trajectory of Qualitative and Creative Change

Now, to address the real task here, we must first attempt to lay the necessary foundational premises, for an entirely different approach to the objective, which has not been established as the consensus, in any consistent and comprehensive form, for 2,500 years in the West, but has, nevertheless, still inevitably coloured absolutely everyone's own implicit stance, to accompany the universally agreed consensus.

So, we now need to overtly-and-consciously lay-out, in detail, the coherent bases required for our completely Holistic Stance. But, to do this will not be at all easy!

Millennia of the everywhere-agreed, and everywhere-used premises of Plurality, have established themselves deeply within our Thinking, endowing it with an (almost Post-Modernist) nexus of several contradictory component standpoints - including Materialism, Idealism, and even Pragmatism, which has made the pragmatic switching between stances to become so common, that we are often totally unaware that we are doing it.

To clarify just how difficult it has been, consider how, in spite of Zeno of Elea's Paradoxes - published some 2,500 years ago, it took 2,300 of them to deliver the first real breakthroughs by Hegel, and the following major revolution of Marx and his followers, to even indicate that an alternative was both available and, in fact, and increasingly, absolutely imperative.

Yet, to this day, and at the heart of Western Civilisation - in its justifiably-lauded Science, that essential alternative-and-superior means, is still totally unavailable, within that set of disciplines, and, is elsewhere too, a very long way from being complete.

The barriers across our path, turn out to be the assumptions of totally separate-and-eternal Natural

Laws, which have always been assumed to be exactly-the-same, and will remain-so-forever! And, many consequent ancillary holist ideas, will also bite the dust along with those all-embracing and determining pluralist beliefs.

For example, the possibilities of successful and reliable prediction forwards, and also of trustworthy reductionism backwards, will both have to be jettisoned.

Except, that is, in specially-farmed contexts, which, though useable, can themselves, be compromised by the very products that they have produced, so that any successful use can only be in a rigorously straight-jacketed run-through, with constant, active maintenance of the necessary optimum conditions.

And, in Formal Logic too (also only possible with such unchanging Laws), the unavoidable rational impasses, regularly generated by what are termed Dichotomous Pairs, will frequently bring reasoning to a dead halt, only transcend-able by a revealing of the causing imperfect premises and their immediate correction.

Seen holistically, any natural, totally unfettered situation will always involve a group of several, different, causal factors, which are never eternal, nor totally independent of one another. Their simultaneous presence will always mutually affect-and-modify each other, and even the produced results, whatever they turn out to be, will then further and maybe, differently, change whatever factors are still remaining, or have been intrinsically self-generated. The context, itself, will have been modified too.

So, holistically, it initially sounds impossible to actually do Science, or even Reasoning, in such circumstances, and; indeed, it certainly is.

It required, and still does, the invention of simplified, farmed and rigorously-maintained Stable Contexts, as the only way to carry out “revealing” investigations.

And, consequently too, the only way to use any Law, so-extracted, would be, if, and only if, the use-context was re-constructed to replicate-exactly that of the investigation-and-extraction phase, so that it was maintained as such throughout.

And, of course, all such investigative-and-use-Domains, would be individually-optimised to reveal only a single-causal-factor. Any other factors in the natural situation to-be-”conquered”, would each require its own, uniquely-farmed context, so, the whole required set could NEVER be either investigated or applied together.

The experimental-equivalent to the natural, totally unfettered situation, with all factors acting together, would be impossible to deliver and measure. Instead, a sequence of separate phases, each one optimised for a given factor, would have to follow one another over-time, to deliver something like (but, certainly, NOT exactly the same as) the unfettered natural situation.

Clearly, within the actual holist world, there are features, which allow the above pluralist conceptions and methodologies to actually deliver, while, at the same time, and inevitably, also producing the impasses and failures that are also unavoidable when using that stance uncritically.

The reason is that even in a holist world, Stabilities not only regularly occur, but also often even-persist for extended periods, and are also crucial in allowing actual

further developments, and even the creation of the wholly new, to naturally emerge.

But, that is a very different Stability to the one assumed by Plurality. Pluralist-stabilities are the norm - assumed to be caused by mixes of separate, wholly independent, eternal Natural Laws.

Whereas, in contrast, all Stabilities in a holist world are temporary, a combined transitory balance of multiple and modifiable natural factors. They can persist overall, while the changing components still, together, maintain an overall balance.

But, such is never permanent - not least because such stabilities are always local, and nearby outside conditions can intervene, or even naturally-established dominances, within-the-stability, can finally undermine the situation and cause its dissolution.

Plurality assumes Fixed Natural Laws which give natural Stability as-the-norm, whereas Holism assuming modifiable factors produces Dominant sub processes and temporary Stabilities, which will inevitably, at some point, dissociate, and cause significant qualitative changes, which can be large-scale and even revolutionary.

Plurality - offers only Complication of fixed Laws, while **Holism** - offers constant small qualitative changes, and even occasional major Emergences to deliver actual innovative Development.

Logic III

The Dialectical Resolution of Contradictory Concepts via their Natural Appearances in Concrete Reality - carried over into Thinking And their Dramatic Role in Emergences

As should be crystal clear, from Hegel’s 100% idealist stance, the emergence of Dichotomous Pairs of concepts, in his Dialectics, were all entirely about Human Thinking. Marx’s transference of the whole system to a Materialist Stance, meant that these important features were in-addition also about Concrete Reality - independent of Man’s interpretations of it.

So, in this essay three things will commenced to be addressed:-

1. What will this mean in Science, and vice-versa, particularly in Evolution?
2. What light will it throw upon real Physical Emergences & Social Revolutions?
3. How does all this affect the ill-famed Copenhagen Stance in Sub Atomic Physics?

NOTE: On second thoughts, the above ambitious list seems a gigantic agenda to be tackled in a single paper, even as part of an introduction to the subject. So clearly, addressing such a width of vital topics will generate several more chapters in this project.

Clearly, the many limitations of the Principle of Plurality, and its consequent inevitable distortion of Formal Logic, as the basis in all Reasoning in Science, as well as its clearly-defining role in the discipline of Mathematics, has meant that Science is practised and Laws delivered, ONLY within their necessary Stabilities - either natural or man-made.

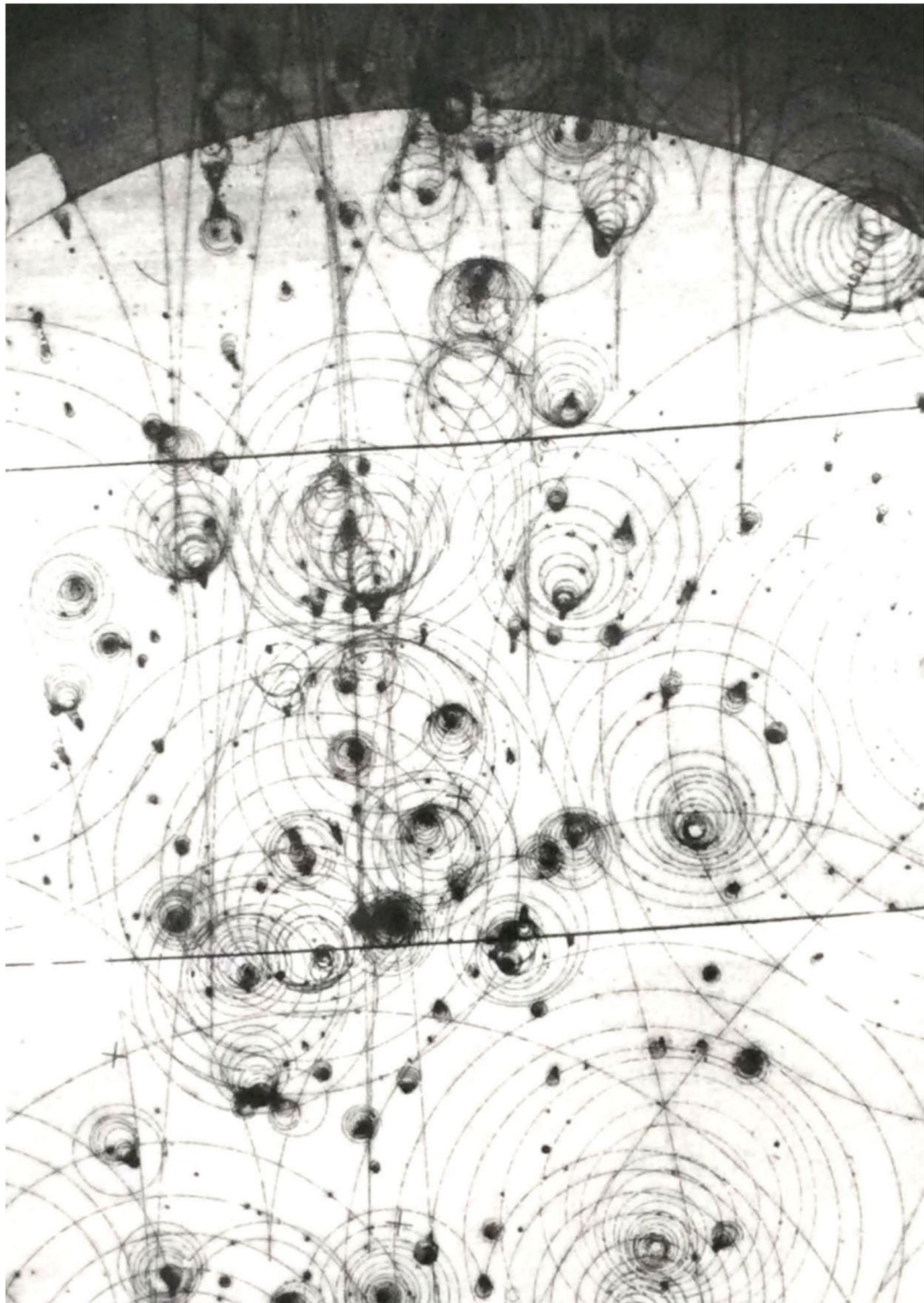
And, Mathematics is, for the same reasons, limited to the study of only simplified and idealised Forms. So, both of these disciplines impose their own limitations upon Mankind’s conceptions of Reality.

Now, if these criticisms seem overwhelmingly damning, then that apparently terminal assessment must be removed immediately. For, they are a natural carry-over from Man’s hunter/gatherer period, then based solely upon Pragmatism, yet it did, even so, still lead to an effective and enabling Technology. It may well be that, in the longer term, it also decisively crippled both our Reasoning and even our Science, within their primary-imperative of developing Real Understanding, on literally all fronts.

But, we must never forget what we are! In terms of both our distant and near relatives in the Animal Kingdom, we were already giants. We were not equipped by evolution to Reason and Explain, but solely to survive as intelligent and effective hunter/gatherers.

What we have achieved since that long initial period, which occupied perhaps 95% of the existence of our species, was not given to us solely by our “Naturally Selected” genetics: it was, at times, very slowly, actually learned and passed on, socially, via an amazingly developed Language. Mankind learned how to “pull itself up by its own bootlaces”, so-to-speak, and teach what we gained to our fellow humans, and principally, to our children.

But, primarily in this series of essays we must now make-the-link between concrete Reality and our Thinking about it, and find its source within the Real World itself,



and how we, by stages, and partial Truths, then gradually, and often falteringly, approached a better Understanding of the World and Ourselves.

Two key extractions about the World have long dominated our Thinking. They both attempt to encapsulate the general nature of Reality: but they are diametrical opposites. They are the basic principles of Holism and Plurality. Holism is primarily captured in the statement - "Everything affects everything else!" while Plurality attempts the same with "Eternal Natural Laws in various mixes and amounts produce everything there is!"

The former is certainly closer to the Truth, and keeps our attention on the diversity and interconnectedness of Reality. While, the latter reflects our momentary glimpses of "order?" therein, and the consequent possibility of beginning to understand it.

Clearly, while Holism is all-embracing, Plurality promises the possibility of Analysis into component causing-parts - the revelation of what makes things what they are!

And, of course, both are indeed partly true, though seemingly opposite in potentiality. They have come out of the experience of Mankind, but were only consciously recognised and begun to be used around 2,500 years ago, after millions of years of development as Hominids, and the last around 200,000 as humans - homo sapiens.

So, the primary question must be:-

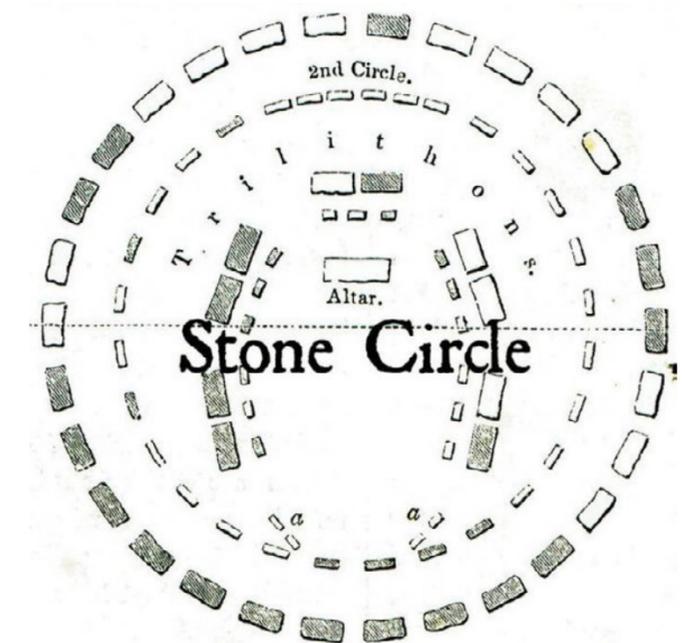
"What is it about concrete Reality-as-is that elicited these contradictory concepts to be arrived at by Thinking Humans?"

For, the natural outcome of Holism appears to be total un-analysable Chaos: while that of Plurality seems to be an Understandable Order. So, that for both to somehow be a valid reflection of the true situation seems impossible.

Our first, and most important task must therefore be to see where these opposite conceptions lead, just as we conceived of them, and in rejecting our idealised conclusions reveal the real Nature of Reality, which can deliver both of these partial truths.

We must start with concrete Reality itself!

The answers to the above dilemmas will not be found, as the idealists believe by solely studying Thought alone, but as the materialists believe by studying Reality too.



Logic IV

The Dialectical Resolution of Contradictory Concepts via their Natural Appearances in Concrete Reality

So, let us begin with the implications and extrapolations of both Holism and Plurality, when consistently applied to some versions of Reality.

If the tenet “Everything affects everything else” is true, and Reality consists of multiple components, then the only result, over-time, will be what we call Chaos, or more precisely Random and Constant Change. And, of course, we use such a conception in particular circumstances which we feel are appropriate, and have even found ways of extracting overall features out of them, such as Temperature and Density for example.

If, on the other hand, there is truth in idea that “Everything is, one way or another, only the effect of eternal Natural Laws, summing in various mixes”, then Laplace’s conception of a “Clockwork Universe” analysable down to final Elementary Units and a full set of such Laws, is a possible outcome!

And, as any scientist knows, we use both of these pragmatically, when they help.

But, they are indeed contradictory assumptions, and our purpose here must be to reveal the real Nature of Reality, which can encompass BOTH of them, as the extreme-extends of a much more common, complex and involved real-general-situation.

And, demanding,ly, it must also include the possibility of real Development, that is not just mere Complication, but also Creation - the Emergence of the wholly New.

Now, Mankind has always suffered from a seemingly totally debilitating disadvantage - each individual’s lifespan is microscopically-short compared with his and its own long-and-past Development and History, and even more so when compared with the age of the Earth,

and thereafter the Universe itself. Almost all accrued changes have been almost entirely both prior and totally inaccessible to Man.

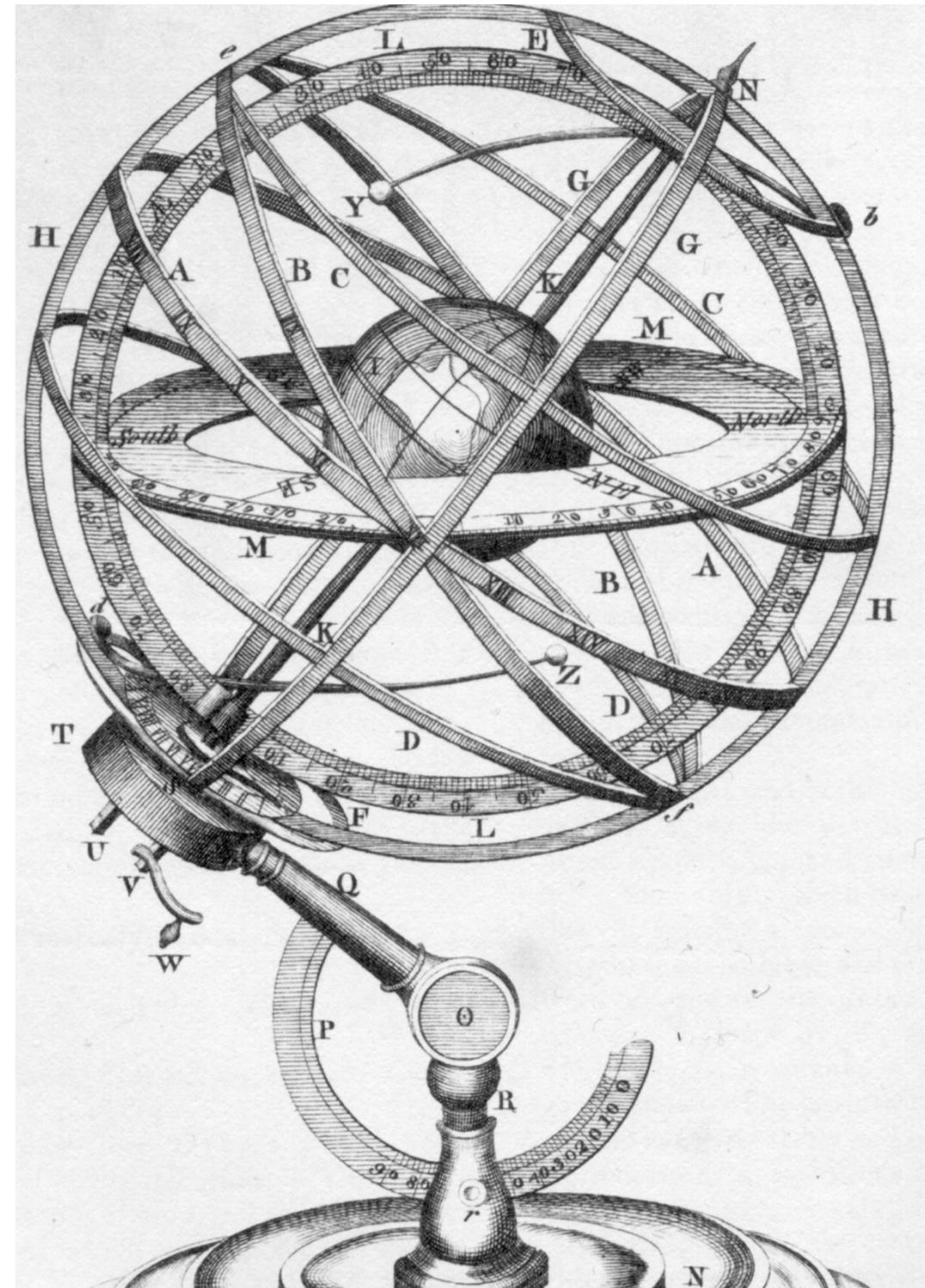
So, though Change is always evident, the bulk of what any individual human being can observe, appears reassuringly-constant: so that a human being could count upon building up knowledge that could be relied upon in the future. But, of course, things have changed and Mankind has found ways and means of “re-constructing” (at least to an extent) some conceptions of developmental changes over time.

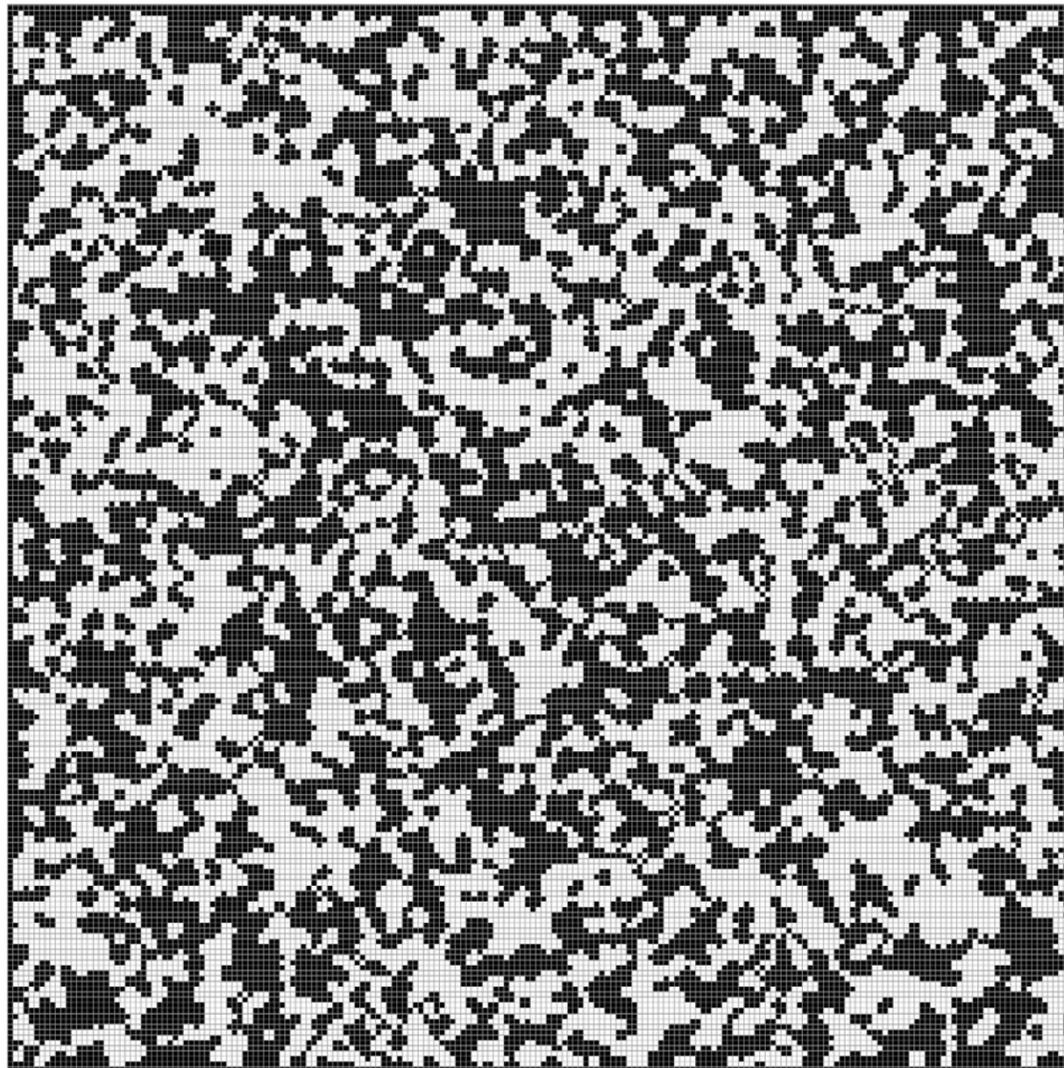
So, here we must draw upon that source to re-investigate Reality, and more accurately plumb its actual Nature and Development, in order to transform our partial conceptions of it.

There are certain things that we can assume have persisted for eons of time. We can, at least for the Earth, assume the permanent existence, of some versions of Land, Sea and Air along with Volcanic activities, Weather, and the constant supply of heat from the Sun.

Indeed, with a version of this set of components, Stanley Miller, in his famous Emulation-of-the-Primeval-Earth Experiment, managed, in only a single week, to generate amino acids in his sealed apparatus, with no other imports apart from Heat (as the Sun) and Lightning (as in Weather).

Clearly, supposing something like the currently available Elements were also fully present, throughout that vast history, we can imagine innumerable chemical reactions being possible, perhaps, in the most conducive environments, which would differ across all parts of the Earth and even in different localities of such connected expanses as both the Atmosphere and the Oceans.





There would be local differences depending upon immediate contexts, and these would ensure the predominance of certain substances in preference to most others: while, in-time, the above-mentioned connectedness would also guarantee the purely temporary nature of such a mix in any particular locality.

Now, in order to investigate local developments, we have to see natural Processes inevitably occurring. And, these would involve the inter-reactions of adjacent substances to deliver very different products. Thus, every such process would be incrementally adjusting the amount of current substances, while also adding others to the mix.

But, certain processes would have a major advantage, due to a preponderance of the necessary reactants in that context, and these would predominate. using up required resources, while also enlarging the contribution of their products.

Very clearly indeed, this would only very rarely be Random Chaos, it would rapidly become dominated by the most well-endowed processes, and would tend to move the overall mix to a very different situation. Indeed, without any replenishment from local sources (such as run-offs from the land), it could change dramatically.

On the other hand, with such regular replenishments, the initial predominances could well be maintained, and enormous local differences established in such areas.

But, either way, in such circumstances, we also have to consider what this theorist has entitled Truly Natural Selection, which, unlike Darwin's version concerning Living Things, is, in these circumstances, considering only the competition of Non Living Processes for the same resources.

Now, things depart, both short term, and long term, from any idealised self-maintained situation, for, in every case, the reactions taking place are constantly changing things, and moving predominances up and down, and at some point causing the dominances of particular processes to change-over to newly, well-endowed alternatives instead.

And, even this re-definition is something of an idealisation, for it keeps the processes as remaining separate and unchanging. That is very unlikely to be the case. For processes product(s) will be the resource(s) required by others, so the latter, if their necessary

substances are sufficiently common will be given a major encouragement too, and will therefore produce more of their resultant products also.

NOTE: Anyone who has played with Simple Life Games on a computer will be aware of the outcomes of even the most simplified interactions, with often one process totally dominating, or even an on-going oscillation between two dominances.

NOTE2: An interesting real world case is when a reaction of two very still liquid substances produces two different liquid products, until they predominate, which immediately totally reverses the reaction to now producing the two initial substances again. A colleague of mine was working on such a situation, where the switch overs could be clearly seen (as the colours involved changed dramatically). He was able to show that such reactions took place conforming to a moving, toroidal-scroll reaction front.

Indeed, we are still not yet thinking of such corresponding (or conducive) processes forming linked chains with both their providers of resources, and the takers-up of their products. But, in the most conducive circumstances, such chains are inevitable, and even closed loops of processes like the Krebs Cycle happen in the Metabolic Pathways of ideal living tissues.

I could go on, but perhaps its getting too chemical or biological for my readers, so I will not insist upon wandering too far from my own remit. I am sure the point is well made that neither the simplistic version of Holism, nor the usual version of Plurality are solely appropriate as bases for revealing the true Nature of Reality.

And, what the above paragraphs have been about is one aspect of a developed version of Holism which I call Holistic Science. It is, of course, only one limited aspect to such a project, for the major contribution has to involve the wedding of Materialist Dialectics and Science into a wholly new and comprehensive approach. AND, most important of all, the inclusion of the Theory of Emergences to address qualitative Development and Creative Change.

Logic V

The Dialectical Resolution of Contradictory Concepts via their Natural Appearances in Concrete Reality and predominantly towards Emergences

So, now for the culmination of this short series, let us, at least, point the way to the intended materialist Form of Dialectics, and its ultimate development into the Theory of Emergences - or how the wholly new is created.

Some indications have been revealed in earlier papers in this series, but almost exclusively at the basic level of chemical reactions (or processes). But, of course, invariably treating such processes both separately and with unchanging possibilities, just has to be inadequate, from a holist standpoint.

As already intimated, the very actions of such processes, within a given locality, not only changes the overall composition in that place, but also allows different possible inter-reactions to become established, and also enables the on-going relations of mutually-conducive processes into systems-of-processes. And, once that has become established, similarly mutually beneficial relations can-and-will be established between these higher systems too.

And, thereafter, the same sort of natural selections due to competition and cooperation will become established at this, and many succeeding levels too.

To grasp the nature of such a hierarchy, it was necessary for Karl Marx (originally an historian) to attempt to make sense out of major flips occurring in the social relations and economic systems of Succeeding Societies, and, in particular, the causes, nature and consequences of Social Revolutions.

As soon as he widened Hegel's Dialectics to include all levels of concrete Reality, rather than being solely about

Human Thought, Marx realised that the same general features were present at every level of organisation of Reality, and unlike the majority of developmental levels, and their involved phases, those in History were available-for-study.

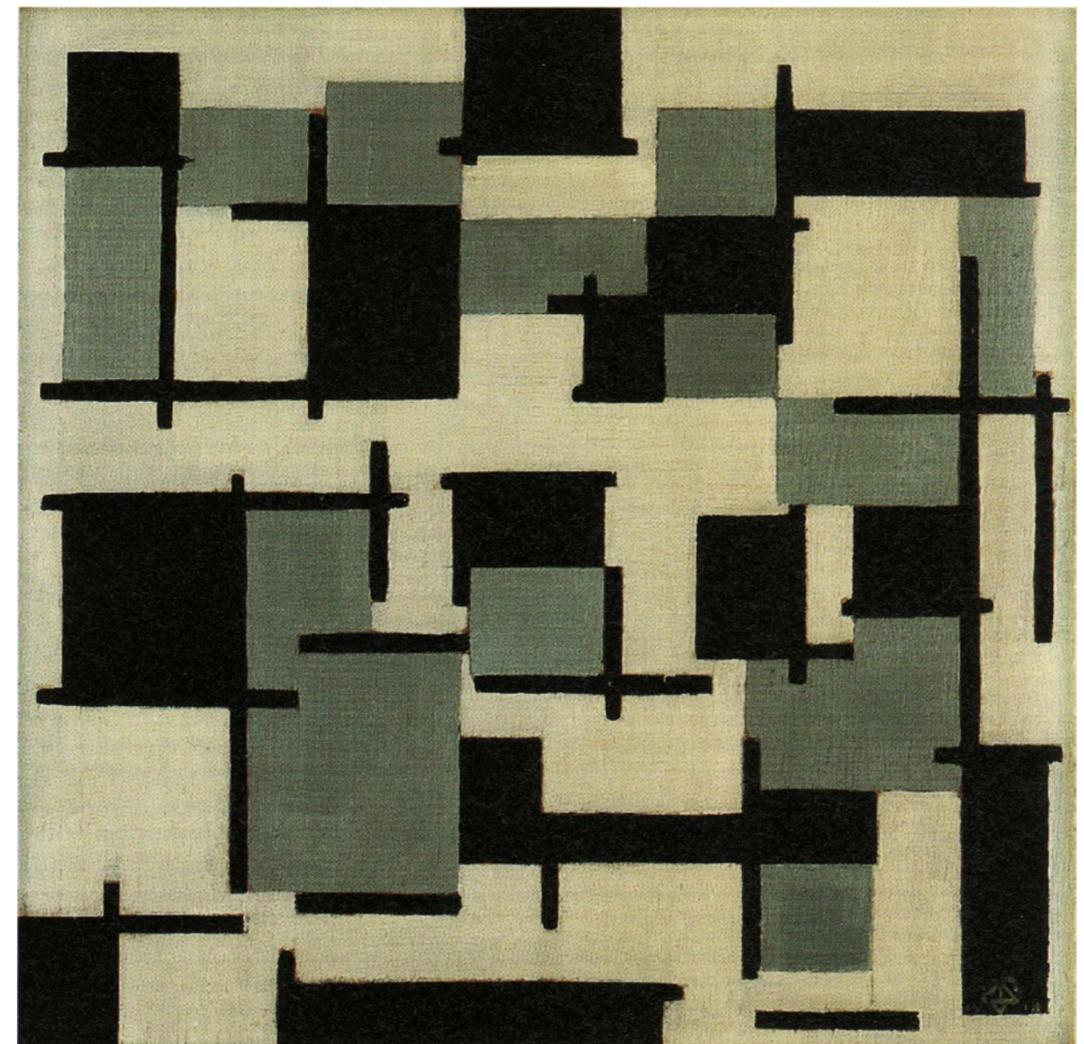
He relied not only upon his own historical studies but predominantly upon the brilliant History of the French Revolution recently completed by the French historian Michelet.

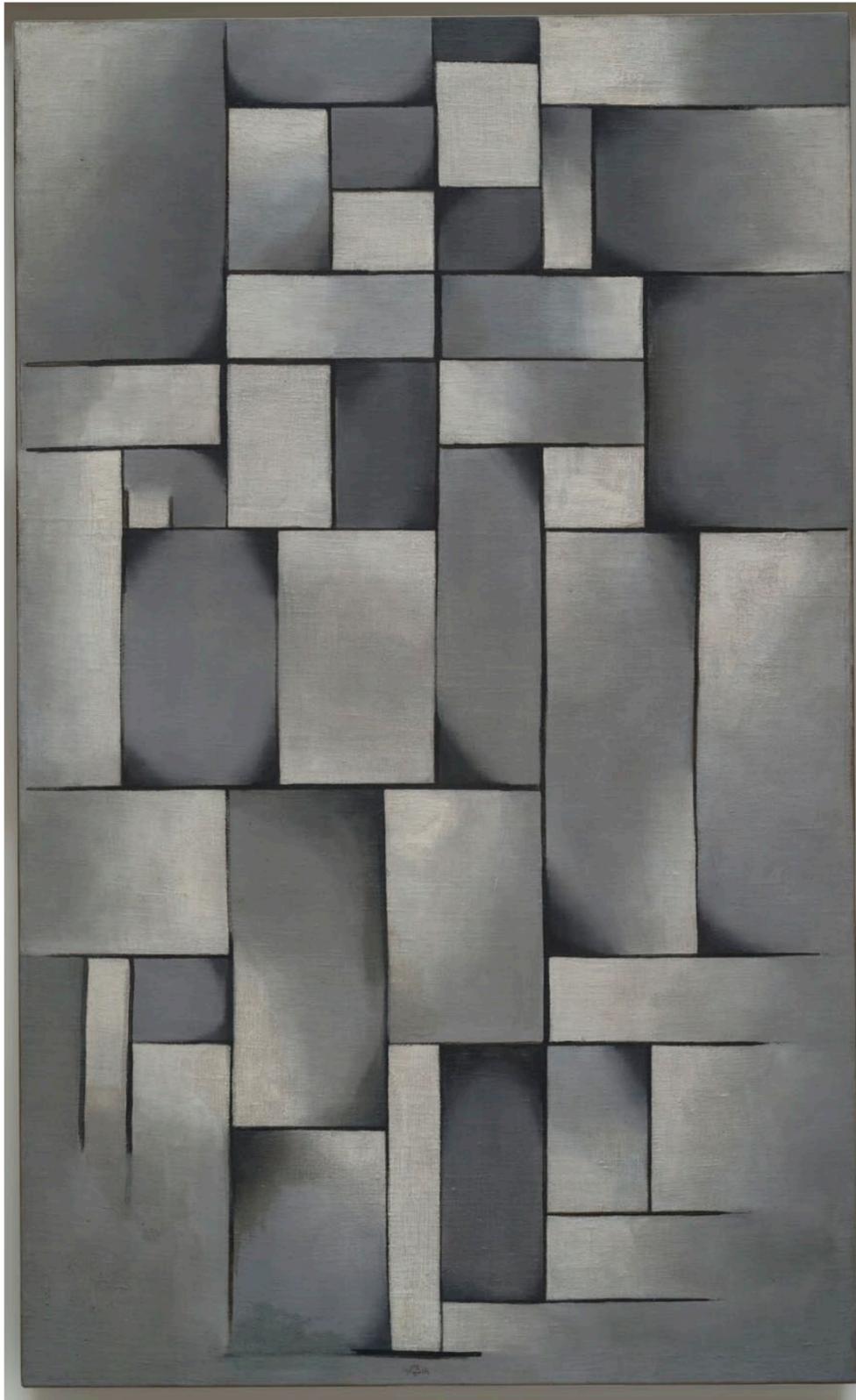
To use a modern term, Marx realised that there was recurrence-of-processes at every level - susceptible to a wholly new kind of analysis, at a meta-discipline level, which enabled the interpretation of Qualitative and Developmental Changes, Crises and even System Overturns and Replacements: and this discipline was Hegelian Dialectics - but used in a new way encompassing things well beyond Human Thinking alone.

Now, we have to be clear where this came from!

Ever since their establishment some 2,500 years ago, the contradictory principles of Plurality and Holism had not only produced disciplines such as Mathematics, Formal Logic and the first steps in Science, but had also revealed their own regular faults and limitations.

Right at the beginning Zeno of Elea had recognised contradictory impasses in Reasoning about Movement, which he demonstrated in his famous Paradoxes. But, it wasn't until a couple of millennia later that the German idealist philosopher, Hegel, finally addressed these rational impasses, when he noticed that they always were revealed in what he termed Dichotomous Pairs





of contradictory concepts, both of which, logically, appeared to be equally valid in the given context: but, in fact, they never were.

Only one of the two actually allowed the logical sequence to be continued, and which-one-it-was, could only be determined by “suck-it-and-see” try outs: he had always to use the pragmatic, “If it works, it is right!” tenet. But clearly, he had been forced to depart from logical reasoning to transcend the impasse.

This troubled the idealist philosopher, whose main area was Thinking about Thought, and he determined to reveal what was actually amiss, by seeking out the assumed premises, which had led directly to each and every impasse. And, he began to unearth the causes in mistaken or even omitted premises, which when addressed, made the choice between the alternatives of the previously “dichotomous pair” entirely straight forward. It became, instead, a Branch-point in the reasoning easily selected by reference to the changed premises.

NOTE: Much, much later, in Dichotomous Key diagnostic computer programs, this feature became absolutely crucial.

He also revealed that such impasses were everywhere in Formal Logic reasoning, and determined to eliminate them via his “correction of premises method”.

But, of course, with a seemingly common premise basis all the way to that impasse, it only had the different premise for each side to be revealed and involved: but the fact that they were resulting in mutually exclusive opposites also had to be explained.

Hegel did not find that explanation, but he did recognise the importance of such opposites and developed a more flexible approach than the simple switch of the Dichotomous Tree.

He purposely sought-out Opposites, and related them to their places in an overall range of outcomes, with the usual outcomes as the extremes of this range.

NOTE: Having already mentioned Dichotomous Key programs, for diagnostic purposes, I cannot refrain from mentioning the version I frequently supplied to Biologists, which included the possibility of an “I don’t Know” answer to a dichotomous question, yet still

allowed a useful outcome. Instead of a single diagnosis, the tree could be traversed in a particular way to deliver a graduated range of possible diagnoses, which surprisingly was often sufficient for a single outcome to be arrived at. And, Hegel considered what was happening at the situations in-between the terminating extreme opposites. He called it the Interpenetration of Opposites, and named his full set of adjustments to Formal Logic - Dialectics.

It was, as he saw it, only the beginning of his objective of a new Science of Logic.

But, it was never achieved, and hence the best of his followers - The Young Hegelians, decided upon following Feuerbach’s insistence upon a wholesale transfer of Hegel’s development from the Idealist Stance to a wholly Materialist one, so, the process was terminated for Hegel’s line of development.

The change was transformed by Karl Marx into a New Philosophy which was materialist, but also dialectical, so though it was meant to unify Philosophy and Science, to ever do that, it also had to effectively dispense with the Mechanical Materialism of literally all the scientists of that time too!

Logic VI

The Dialectical Resolution of Contradictory Concepts via their Natural Appearances in Concrete Reality and predominantly towards Emergences

The key question in Hegelian Dialectics is surely to do with why seemingly exact Opposites are so significant! Why do they predominate so clearly, and become the consequential outcome of a flip from one dominating influence to another - always(?) its exact opposite?

There is NO purely rational reason why this should be the case!

Even, in an assumed totally-random mix of profuse and very different processes, there is no obvious reason why such “dichotomous pairs” should assume such a major role.

Indeed, as always, in dealing with Reality, the investigator cannot just juggle “established truths”, via a purely Formal Logic. That will always be insufficient in addressing wholly new discoveries: and, in addition, will regularly grind to an unavoidable-rational-halt, presenting the thinker with a Dichotomous Pair of concepts, with absolutely-no-answer, within such Reasoning alone, as to which should then be followed, to transcend the current impasse, and allow a direct carrying-on with the prior line of reasoning.

[Indeed, without the detour into Pragmatism, via “If it works, is it right!”, no continuance is possible!]

To resort to careful and detailed study of Reality, a whole sub-system of concepts will be required, to possibly trace developments, in even that supposedly idealised situation, never mind in the much more complex and creative qualitatively-changeable situations as actually exist!

Yet, working from that usual idealised starting point, but, thereafter, using an alternative holist approach, rather than the usual pluralist one, various phases of development can be revealed.

Clearly, it is necessary to show why this assertion is correct, by contrasting these two diametrically opposite approaches.

First, Plurality, the usual default assumption, sees Reality as composed of eternal Natural Laws, which just add-together n varios complexities. Yet always, without, in any way, changing themselves (or one another), they supposedly produce, via hierarchies of mere complication, absolutely everything that there is!

[It is the usual default premise in Mathematics, in Science and even in Formal Logic, and, in them all, allows complex rational structures to be built, and similar complexities to be successively analysed - so it is clear why it is endemic across most of human intellectual disciplines!]

But, Holism, on the other hand, though much closer to unfettered Reality than the pluralist stance, is vastly more difficult to use, but, nevertheless, is the only way of ever approaching an understanding of that Reality.

For, its premise is often encapsulated as “Everything affects everything else!” - clearly, much more difficult to use than the simplifying-and-idealising that is the usual consequence, and hence the methodology, of Plurality.

But, nevertheless, though helped by consciously-and-temporarily-employed, pluralist detours, it always and necessarily involves regular-and-corrective recursive





loops (see the Loka Sutta attributed to the Buddha): loops which always qualify-and-correct any consequent changes involved, and, of course, recursively, result in their produced differences, in the “finally-caused” effects.

Classically, (as in the fore-mentioned Sutta) these recursions are an infinite series, but the remarkable thing, about holistic sub-systems, is that they not only can be terminated, sometimes prematurely, by the thinker, but also tend to do so, in-themselves, as real-world sub-systems: so the holist thinker can make surprisingly profound discoveries (unobtainable by reductionist-pluralist reasoning alone!).

So, having made a few things somewhat clearer, by the above comparison, we can now address the major initially stated problem “Why Opposites?”

To justify the alternative I am about to propose, I feel I must resort to my solution to a problem, to which I have returned, frequently, throughout my adult life.

As a one-time committed and excited teacher of Biology (in what was termed a Middle School in England for 10-14 year olds), I had, as a professional physicist (with six years studying Chemistry too), also often wondered about:- How Life could “evolve” from totally non-living processes.

Within the classically taught subjects of my own education, there was nothing to get even close to explaining it. The usual random-chance-plus-unchanging-Natural-Laws was at best a mere placeholder, and did nothing but expose the inadequacies of the pluralist methodology involved.

It was only when the misgivings of Friedrich Hegel, on Formal Logic, was brought to my attention, that I began to seriously study his alternative stance of Holism, and, being a physicist, and hence a materialist, I was also intrigued to encounter Karl Marx’s determination to transfer the complete, holistic and dialectical approach of Hegel, into a resolutely Materialist stance (Hegel was an Idealist!).

It was abundantly clear that such an approach certainly deserved a detailed look.

For, not only were all the Sciences significantly pluralist, but the 1927 switch to Idealism by the supporters of the Copenhagen Interpretation of Quantum Theory in Sub Atomic Physics, did nothing to solve their problems, just as the very same stance also dominating Mathematics merely imported its own set of anomalies into the Copenhagen mix too.

If carried through to success, the as yet unfulfilled ambitions of Marx, would dramatically transform numerous major areas of human intellectual concern.

Of course, any purely philosophical arguments would never convince the now widespread, and well-entrenched, considerable commitment to eternal Natural Laws. So, in tandem with the necessary definition and description of a sound philosophical stance, there would also have to be a transcending of many theoretical impasses within the New Physics too.

And, that is already well underway by this theorist! [see the numerous papers already published on the Web at SHAPE Journal and SHAPE Blog]

Clearly then, the task here will be primarily philosophical, but, the necessary foundation-premises used will have also to be established, at least in part, physically too!

We will have to consider concrete situations, to reveal how “opposites” come to be crucial in a changing physical context! And, to do that will first involve the careful and detailed addressing of Complex Physical Situations.

So, let’s start with an initial, idealised situation, to see how it would change, with multiple interactions of a significant population of very different yet simultaneously-occurring processes.

As is the usual assumption, we too will also assume that, if everything else was of equal weightings, for all possible interactions, they will then, in the main, tend to cancel out - indeed, the classical random mix!

But, as the relative abundances of the various components of any local area will be determined by the local availability of sources (for their delivered resources), the more likely starting point will surely involve the one or more processes that are, in that particular context, exceptionally well-endowed - with an abundance of their required resources: and it would be these determining-

preponderances that would selectively allow those processes, which require those abundant resources to quickly predominate.

NOTE: Now quite apart from the dynamics-of-abundances, and their effects upon one another due to competition, there will also be a selection of the various kinds of processes possible, for they will, of course, be processes requiring the locally available resources. They will be members of a family of processes, determined by the providing sources delivering the given availabilities as well as the dominating preponderances.

And, the preponderant processes will be minimally inhibited by the rest of the other processes present, as those less-well-endowed, will generally cancel-out any successes, by their own rivals, for their identically required resources only.

Concentrating instead upon our well-endowed, in-the-right-place processes, they alone will directly compete for the same single, though profuse resource, and the best-situated ones of even these, will benefit at the expense of any competitors not so well served.

In such a situation, ultimately only TWO competitors are likely to grow rapidly: they will both produce profusely, in spite of competing for the very same resource, but they will also produce very different products with it. And, crucially, their preferential-selection will, in addition, be due to their ongoing-relations with other processes using their products, which will certainly be different.

Indeed, the more different they are, the more likely it is that they will ultimately be only one of the two that finally dominates!

NOTICE how only a holistic approach would ever even address such considerations, and arrive at a generalised solution.

Clearly, the crucial results will be revealed (observed) by their very different products. So, the question then arises, "What could, thereafter, happen to these two?"

Neither of these opposing processes will necessarily process at the same rate, or require exactly the same set-of-resources (apart, of course, from the single

predominant one, common to both, which selected them for dominance in the first place). So, it is likely that one or the other will, for a time at least, become noticeably dominant one!

Let us consider what we seem to have established here based on a few premises. First, we traced competition between different, totally-non-living processes, where local resource-predominances will favour-dramatically two processes in preference to all other less well-endowed rivals, for achieving Dominance.

So, when circumstances favour one of these two, more than the other, we call it Stability-due-to-Dominance, while, if both prosper to a similar extent, it will be a Balanced Stability, while the situation which leads to a dramatic flip from one Dominance to that of the opposite process, we term a Qualitative Transformation - an Emergence at the processes level.

Next, we must step up, to very similar things happening at the next, or proto- Systems, level, when processes form inter-related systems, and, thereafter, do likewise. level-upon-level, until we are dealing with Societies, and the transition we then call a Revolution!

Now, the odd title of this essay should become clear. Let us spell it out!

The usual, classical-pluralist idealisations are of Totally Random Mixes based upon multiple-cancelling Eternal Natural Laws at one extreme, while at the other, is extractable, simplified-and-idealised farmed versions of a particular, local situation delivering a single apparently-dominating process. Anything else is totally unobtainable with that stance!

The former can only deliver overall or statistical Results. While Production is always a sequence of multiple latter cases

What the proposed subscription to Holism and Dialectics actually enables is a both dynamic as well as complicated alternative, which, though always "on-the-move", will display different, though sometimes very-long-winded stable interludes, which effectively-hide the still-present underlying dynamic changes involved, within phases of relative Balance, or homeostasis, which we term Natural Stabilities [though we also frequently impose such situations, by appropriate "farming" of the multiple

factors present, achieved by eliminating some, and controlling others]. But, even these situations are NOT what we consider them to be - that is caused by eternal Natural Laws, but, on the contrary, are a temporary, self-maintaining balance of multiple factors, responding to a change in one, by a correcting change in another. Such an homeostasis can be naturally occurring, but is never permanent.

And, the so-achieved situation can, and will, move from that seemingly "fixed, stable" interlude, to display very different features.

Indeed, it can actually subside into a period of continuing imbalance, and even an oscillation, with what we call a Crisis of the prior Stability, which may be returned to that previous, or indeed another balance, with similar features to before.

Or, alternatively, it may undergo a System Collapse, generally followed by a powerful creative reconstruction into achieving a New homeostasis, with very different features - the overall Process being such a dramatic flip, as to be termed a Revolution, or more generally depending upon its level an Emergence.

The Theory of Emergence

by Jim Schofield

Originally published as Special Issue I
of SHAPE Journal in 2010

Introduction

In a significant series of papers culminating in the late summer of 2009, this author was able, for the first time, to indicate a route from his previous criticisms of a pluralist Science to the clear beginnings of a truly holistic alternative, which was finally in a position to properly address Qualitative Change (often called Evolution, or even Progress), and, via this attempt, was able to define a clear and consciously pursued holistic scientific method.

The area in which such an approach had to be applied had long been pinpointed, but never previously carried through. Indeed, ever since Miller had performed his famous Experiment into the possibilities of natural ongoing chemical processes within the primaevae atmosphere of the early Earth, the questions as to exactly what was going on in that Experiment had been evident, but unanswered, due to the nature of his experimental technique, which was entirely holistic, but incapable of revealing anything other than a final result.

The realisation of what should constitute a truly holistic methodology, had long seemed entirely impossible, because the usual analytic techniques seemed to demand a wholly pluralist method and this, as always, would destroy the interacting processes of Reality-as-is, which were the essence of Miller's Experiment.

Clearly, if the actual parallel and sequential processes of that famous Experiment, which ultimately delivered a significant set of amino acids on completion, could be exposed for further study, they would then indicate where further research should be directed.

At the same time ongoing researches into such questions finally led this author to arrive at a meaningful description of what must be the actual trajectory within Emergences – those revolutionary turnovers such as the Origin of Life and of Consciousness, where, in a relatively short period of time, a complete overthrow of a well-established stability would occur in a cataclysm of dissolution, out of which a new and indeed higher stability was inevitably produced.

Such studies have rarely been pursued, primarily because the most confusing feature of any Emergence seemed to be that it was impossible to predict from any processes in the prior and producing Level of Stability.

All efforts seemed to be totally limited to wholly WITHIN the prior Level, or alternatively concerned only with developments AFTER the establishment of the New Level. The actual trajectory of the transition seemed inaccessible, and was therefore never pursued.

This series of papers are only the most recent in a study which has occupied this author for almost 20 years. But, mostly in 2009 the various elements came together to address both a New Miller's Experiment and the actual Trajectory of a true Emergence.

All the papers of this author are currently being published in the SHAPE Journal on the Web, but current papers will not get their turn in that Journal for another couple of years, so it has been decided to "jump the queue" and publish these important papers NOW in the form of a SHAPE Special Issue.



Dissolution & Creation

How Avalanches of Change can also be Uphill!

In the very long series of small gains which culminated in this author's recent Theory of Emergences (2009), it is easy for someone so involved in attempting to solve the inevitable (and innumerable) difficulties which arise in such an undertaking to assume that the ultimate, coherent mix is evident to all who read the final exposition. But it isn't, of course.

Many of the past gains, now firmly established for the writer, can be given the barest of mentions in many of the long series of prior contributions, and, of course, instead of the final exposition being a comprehensive, coherent and indeed telling argument, it is most likely to engender a whole series of genuine questions about the "seeming" assumptions made throughout, and not clarified here.

Of course, these would not be assumptions made unconsciously as is often the case in most theories, but though firmly established in the head of the writer, they are not usually overtly included in the final theory, where later, more pressing, and certainly more profound, additions, become the main concerns.

To do otherwise would indeed require the writing of a whole book – not the usual form for something so new and still in the process of extending to its final form.

So here I will address a very important, and somewhat counter-intuitive, foundation-stone that underlies the Theory of Emergence: It is that concerning positive feedback or avalanches, and, most particularly, when these lead to genuine progress – avalanches uphill!

But before we deal with this counter-intuitive exception, we should first define the usual idea of positive feedback as it occurs in general Dissolution. The phenomenon is about how Stability (near its limit) can be precipitated into either erosion-type degradation, or alternatively into catastrophic collapse. The latter is, of course, similar to the usual avalanche form, but the former is closely related to mini or partial avalanches (of just a few rocks, say)

and hence only imperceptibly undermines the overall stability, until it arrives at another type of stability – such as there being no remaining pile of rocks left to fall. Indeed, the erosion-type of gradual and accumulating dissolution engenders keeping the pile always close to its very edge of stability, so any slightly larger disturbance will precipitate a full-blown avalanche.

It is clear that the famed Second Law of Thermodynamics is the embodiment of the erosion-type degradation of stability – Rust Never Sleeps! But such must be taken together with the more cataclysmic avalanche, because both definitely occur engendered by the same conditions and forces. But, these (as the Second Law insists) are all downhill - from Order to Chaos, and scientists regularly interpret this as the most general Law of inevitable decline, so that ultimately all stars will go out, and all that remains is dark, dead matter, gradually disappearing into one resultant and indeed final Giant Black Hole, after which nothing will remain. What terrible pessimists are these reductionist scientists! Don't they ever allow themselves to study Life?

But, returning to our intriguing "avalanches uphill", in order to investigate such natural processes, we have to raise our sights to consider processes, and even higher, to coherent systems of processes. To realise how Science must be transformed to deal with such questions, we must first consider the generally agreed basis of all scientific endeavour, which is usually considered to be the Relations between quantitative parameters. These are extracted from nature and transformed into universal equations, each applicable an extended variety of unrelated areas.

We can, and indeed do, farm the situations from which we obtain these relations, and in which we subsequently have to use them. With great control and skill we produce required and predictable outcomes, though in order to get exactly what we want in a particular way, we must always isolate the action in very restricted environments usually termed the Domains of Applicability of the



particular relations. This vital preparation suppresses all other possible relations, and lets the chosen single required relation “act alone” and in a controlled and predictable way.

We carve-up Reality, and rebuild small but rigorously controlled and maintained sectors to enable us to do this sort of thing. But in doing so, we rip-out our initially “glimpsed” relation from its natural context, where it is “part” of an extended and mutually determining “mix” of forces. Indeed philosophically we pluralize Nature by assuming that it is in fact entirely “composed” of separable Parts, each of which can themselves be further analysed into yet more, and lesser, Parts.

This is a profoundly significant assumption.

It immediately rejects the alternative conception of Reality, which is entirely and comprehensively holistic – where everything both affects and indeed determines everything else. This choice of method also positions the experimenter firmly in the camp of Idealism, because the purpose of experiment is to reveal the relations as disembodied laws, which are together deemed to make Reality what it is.

This can ONLY be idealist because it has these merely formal relations as primary – and therefore actually driving concrete Reality! The question arises, “How are they supposed to do that?” Now, the holist alternative (and which in Science is the materialist alternative), sees everything concrete affecting everything else, and hence has Reality itself as the producer of all relations, (while also at some point also bringing about their certain demise!)

From this standpoint no relation is then eternal: its ground for applicability will always, somehow or sometime, be exceeded, and actually disappear, and it will then, of course, FAIL! So this is clearly the opposite position to that which is universally embraced in Science today. The actually embraced process has developed so far that Modern Sub Atomic Physics has become merely Mathematics (indeed the Handmaiden has been promoted to Queen).

Now, such ideas are (as is unavoidable in a short paper as this) are not fully established here, but are dealt with properly in other writings by this author. What is planned to be addressed here doesn't happen within pure, isolated, and totally-controlled, relations. It is

about processes involving many simultaneous relations in close and affecting proximity, and indeed, therefore, really about Systems of Processes taken as a whole – much closer to a properly holist view of Reality.

But it must be admitted that the dominance of pluralistic assumptions (the Whole and the Part), plus the isolation of relations, still colours our thinking when we move up to processes and systems. We still address them from the same pluralist standpoint. Multiple participations are still considered as entirely separable, and their actions, taken-together, are seen as a Summation of Separates. Even when dealing with processes and systems we still control to the nth degree – and the extant epitomes of this are the Large Hadron Collider and any Oil Refinery.

Now, the above comments may seem to be a rather inflated preparation for a paper on avalanches, but it isn't! If such processes are seen in isolation they can go only one way – downhill! But, when complex mixes of processes, which affect one another, are considered together as systems, remarkable alternatives do indeed emerge. Let us consider positive feedback, first in a pluralist, isolated way, and then in a holist way.

The classical avalanche – of loose rocks, is precipitated when a stable pile of such units is disturbed by the dislodging of a single significant piece, which then moves erratically downhill under gravity. It can then dislodge other pieces along its wrecking path, which in turn do the same to yet further rocks, until there is a general and catastrophic descent, only finally terminated by the total exhaustion of the necessary agents (loose rocks), and the necessary motive force – gravity (removed by hitting the lowest point in the local landscape.).

Now this is all well and good with rocks and landscapes, but what about chemical processes – and even more interesting, these diverse chemical processes presenting a rich, complex and changing mix, with new substances regularly being introduced, and recurring cycles of warming and cooling – ALL occurring in that simple yet universally available solvent water? Will it be the same? Will a particular resource that produces a consequent product be in time exhausted, causing the avalanche to necessarily terminate?

Well sometimes that is the case, but occasionally the product from one process can become the resource for another, and one avalanche of change can be made to

produce another. Indeed, sequences of such processes are very likely, and in such a “mixing pot”, there could easily occur a product which turns out to be exactly the required resource for the initial process in the sequence. A cycle of processes in avalanche will have been established, but actually internally controlled as to tempo by the rates along the sequence chain. What was a headlong accelerating catastrophe becomes mediated by availability of resource and even “stable”.

Now, let us be clear, even sequences and cycles of sequences will never be entirely self-contained. They will need external contributions of some kind or other. So if we looked at our system pluralistically – that is as composed of entirely separable processes AND in isolation, it would still run out of something and always terminate. We could still not get what we are suggesting actually occurs – a creative positive feedback without continual external contributions. But, if these externals are sunlight, atmospheric gases and water currents for transport and these transform a very local calamity into something considerably more involved and interesting.

Now, though these are by no means THE factors involved in the creation of the First Life, you can see why once living things had been created, such things as Plants were greatly favoured. Energy from sunlight and ever-present gases are what FEED plants, and the medium of water is the perfect internal and external transport system.

So, what would happen in the best circumstances?

We would get what I choose to call mutually conducive processes, which give them a decided advantage over other possible processes, and which via sequences and cycles could persist, proliferate and finally dominate. And this is well before the actual Origin of Life had even occurred! There can be no doubt that in competition for resources among involved chemical processes, those which as part of such a system could proliferate, would garner more resources than others requiring the same things. Isolated or mutually contending processes, on the other hand, would not be able to compete and would be swamped.

Now consider what such an avalanche of processes would create: they would change the composition of the mix into one which was (to an extent) self-perpetuating, and as long as primary resources were abundant, the situation would be radically transformed.

But this is just a start! Consider a process which benefits from one of the products of our system-processes, but also inhibits exterior competitors requiring the same resources. This too would enhance the system at the expense of these competitors, while itself benefiting from getting its own resource from the system. It becomes a different kind of partner in the overall system!

Likewise, we could conceive of another non-system process, which, by acting as a non-changed intermediary, could significantly accelerate a system process to a substantial degree. It too could become part of the system of processes.

We are beginning to get non-productive but clearly advantageous inhibitors and catalysts too as part of an overall system! And these could effectively defend and promote the core system. The system becomes, not only a series of productive sequences, and crucially cycles, but includes a set of system-maintainers too. The possibility of a new, stable, self-maintaining Level is surely high with such a scenario?

Now, clearly this narrative is oversimplified, but then ALL our theories about everything are, of necessity oversimplified. Pulling yourself up by your own bootlaces ensures that you have to find all sorts of ways to go forward, even ones which are mistaken. Indeed, there is a very exciting theory of Dichotomous Trees, which shows how mistaken paths from a DON'T KNOW answer to a question within the Tree, can still be crucially informative for one of the questions subsequently presented could be seen as clearly and entirely inappropriate, and the path we are on, with all its consequences can be abandoned. We learn prodigiously from all our gains, even those which are shown to initially clearly lead us astray.

So, what we needed to establish was some form of creative positive feedback. And I believe we have indicated something in that direction in this paper. When such ideas are brought into the usual area of both positive and negative feedback, it is transformed from a mechanistic and severely limited discussion, into one with a potential hierarchy of qualitatively different Levels. Once a locality is dominated by such a system as I have described, we also define its limits and boundaries with the rest of Reality, and wholly new laws pertaining to those situations also become evident.



Consider the Great Red Spot of the planet Jupiter. This is not alive. We are not in water. It seems to exist solely within the thick, gaseous atmosphere which supports an exceedingly rich and complex set of weather systems. Yet the Spot persists over truly vast periods of time!

Why?

Could it be an example of what I have attempted to outline above: a system of self-maintaining processes, including those types of vital cycles, yet fed from essential inflows from outside? Apart from the Sun, we certainly seem to have heat from within the planet itself, and you only have to see time-lapse movies of the Spot's swirling surroundings, and clearly active boundaries, to begin to guess at truly stable Systems of Processes as we have described occurring there too.

NOTE: It must be seen that gradual changes will ALL be such as to be destructive and dissolutionary. So, it can be no surprise that physicists extracted the Second Law of Thermodynamics as their fundamental Law of Change. Order MUST turn into chaos over time! And such a position does seem wholly incompatible with the creative change which also certainly exists (and leads via crucial Events termed Emergences) into things such as the Origin of Life on Earth.

How can these two diametrically apposed tendencies BOTH be correct? The answer lies in circumstances.

To have the Second Law you have to have Order for it to be destroyed, and this Order is best seen as a self-maintaining System of Processes often termed a Level. All that happens within a stable Level is indeed a form of dissolution, and this can in time accumulate to pass an essential Threshold, after which the Level is precipitated into an all-embracing avalanche of total dissociation. This would seem to be exactly what the scientists say is the ONLY possible result.

But using the same logic, what happens when there is absolutely NO order left – when the self-maintaining Level has vanished? There is then clearly no stability (order) left to dissociate. There can no longer be a Second Law: it too has vanished completely!

Remarkably though, in these unusual circumstances, a very different Law becomes dominant. It is the one that actually creates and thereby builds into an entirely new stability. It is NOT recognised because it is not present in normal circumstances, In fact it only switches in during one small phase of the Event we call an Emergence: a tiny quickly-passing phase in which all such creation takes place. At all other times only the dissolution of the Second Law can be observed. It is these ideas that are at the heart of the Theory of Emergence, and explain the role of these crucial Events in the actual and indisputable ascent of Reality over the last 14 billion years.

Systems of Processes

The Emergence of Bias & Direction in the Evolution of Reality Establishing the Bases for a Theory of Emergences

Let us consider an absolutely static situation in a long past primaevial time on Earth. We should choose something like the depths of a vast ocean, both far from any land, and also from any "black smokers" (undersea volcanic emissions primarily composed of very hot water with dissolved minerals). The idea of such an exercise is to define a spot totally incapable of any sort of development. In such a place there would be neither light nor heat, and no influx or transfer of new materials: the place would inevitably be a "processes desert". Literally no processes would, or even could, take place in such a place, for there would be neither driving energy nor any continuing and changing availability of resources to supply such things. Nothing would be happening, and certainly no developments could possibly occur there.

The exact opposite environment, on the other hand, might well be found in very shallow seas in a warm climate close to land, with sea currents driven by the sun and winds and diverse run offs from different land areas. A regular input of heat from the Sun would reach all parts of this local micro-climate, and nearby tectonic action would have produced mountains to deliver the required regular rain and run-offs, and also various kinds of volcanic activity.

In such conducive circumstances processes would surely abound!

Now to define this opposite extreme to our initial Processes Desert, we should be looking for circumstances in which everything that could possibly happen, would indeed happen given enough time and availability of resources and accumulation of products.

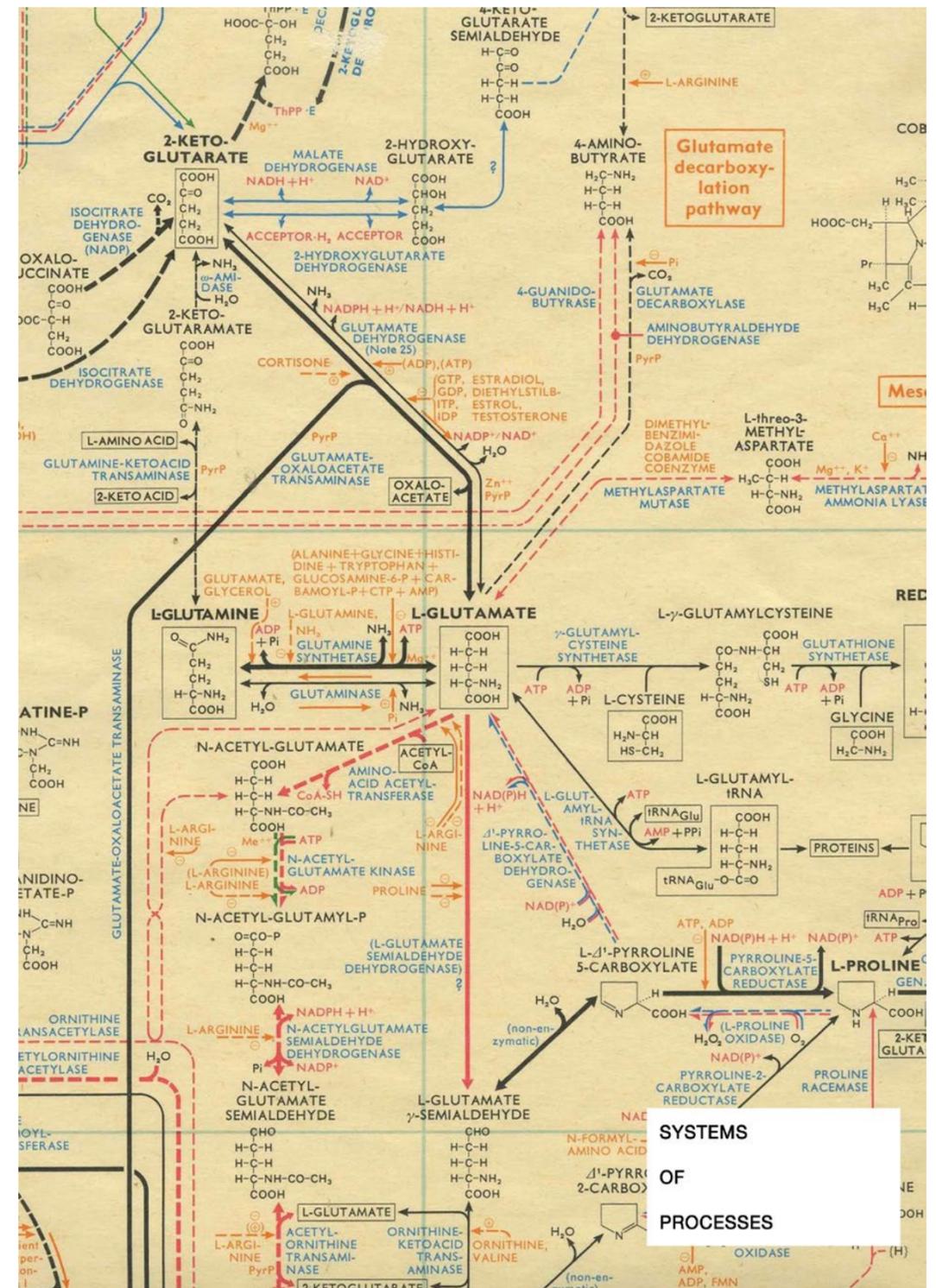
The "classical" definition of such a situation is said to be one with multifarious processes happening both constantly and "randomly" – with equal likelihoods for each and every process occurring there – sometime!

This was, of course, long the "preferred" situation for the Advent of Life on Earth, and has only recently been usurped by the increasingly desperate funding necessities of NASA, which required more "space-likely" scenarios in much less well endowed circumstances for Life to appear, and therefore for them to discover given the necessary funding!

But, as the current history of space exploration has itself regularly proved, such ideal predicted circumstances "for anything" are rarely fulfilled. Reality turns out to be much stranger than any that our rational speculations can ever muster (and even more so when we have ulterior motives).

The reason for this particular muse is the usual one for me. If we are to tackle the many as yet uncracked problems in our understanding of Reality, we must first address our flawed, consensus assumptions, and instead attempt to get a handle on how Reality really is!

Models based on absolute and even-handed randomness inevitably lead to fairy-tales in which unlimited monkeys, on innumerable typewriters, and over incalculable time-spans will, at some point, and entirely by Chance, deliver the Complete Works of William Shakespeare. Any serious study of such invented ideas very quickly leads to the rejection of such "wonders" as not "unlikely" but clearly totally impossible! This is NOT an opinion! It is the certain truth, if the assumption of "equal chances" is incorrect! Only with such an assumption could every



single possibility be visited. Without it such amazing possibilities truly are impossible!

Yet such probabilities are calculated for all sorts of events, and the “approach” is even thought to actually explain why certain miraculous events have actually occurred in the history of our Universe. But even in the most “perfect” circumstances, the model is simply untrue, and purely mathematical! It is therefore a “formal truth” and not a concrete one - a description of “possibilities” at best, and absolutely never ever a cause!

Finally, it must be emphasized that in a holistic World where everything affects everything else, even a single “moment” where all cases are of equal likelihood occurring is impossible, never mind a continuing situation where such a state is maintained over colossal periods of time. Indeed, the most likely trajectory will be one where changes accumulate into a new situation where an avalanche in a particular direction, results in some overall Change of State, before yet another direction begins to dominate. The simmering pot of equal chance of all changes is a myth! It is a consequence of a pluralistic view of Reality: it never occurs in a real, holistic World. It ignores History!

If we are to extract anything of value from examples within the range from a Processes Desert to a Processes Paradise, we must address the whole range - the self-change of any individual states, and the circumstance-sequence in which developments could actually occur. We can no longer use the myth of equal chance randomness and the consequent “probabilities for everything involved, to paper over the vast gaps in our understanding of this range.

What actually has to be addressed, is what constitute Systems of Processes – what makes such systems both occur and persist, and what factors tend to undermine such systems, even if they seem stable and indeed permanently self-maintaining. The nature of self-maintenance has to be sussed first!

We are not talking about something decided upon and achieved by both a conscious and a monitoring intelligence, such control has, on the contrary, to be entirely automatic, unconscious and indeed intrinsic to the system in question. Clearly, we cannot work out the answers to this question by speculation. We must see exactly how any such system was originally

firmly established, to also see how it will inevitably be undermined.

Let us, therefore, start at the extreme end of our “possible” range, where almost everything is deemed equally probable.

Now, we cannot (and indeed we must not) assume that all possible processes are totally independent of one another. In fact, it would be much closer to the truth to say that all processes affect one another in a variety of ways. For example, as processes consume their required resources and energy, and produce both products and by-products, they operate as possible separate processes and are not for anything. They have no required objective outcome. They just do what they do because it is possible to do it. Whether they are carried out will be entirely determined by the availability of the necessary resources and the required conditions. But, clearly the products of one process could very easily be the necessary resources of other quite separate processes. Or, two different processes could both require (and hence effectively “compete for”) the same resource.

Hence, without any overall plan, processes can significantly affect one another either positively or negatively.

We say that pairs of processes can be mutually conducive (or assisting) or mutually contending (or competing). In addition to these relations between processes, there are also substances which can, (without themselves being consumed) noticeably encourage given processes: these are catalysts. So their presence for whatever reason will always give such a process an accelerated rate of action compared with others not so well served.

At the same time, there can be substances, which, when present, can very effectively reduce the rate of process of certain process: these are termed inhibitors. And their effect will be to reduce the effect of such processes compared with others not so affected.

So, we have to consider systems as very different from mere mixes of many different processes. In fact it is probable that such a “mere mix” cannot actually occur: it is an idealised myth!

Mixes become systems as a result of the mutual effects of processes on one another, and of the presence and

preponderance of appropriate catalysts and inhibitors. Indeed, these latter substances don't appear from nowhere, but will have themselves been the products of other present processes.

Systems are therefore mixes that certainly are composed of processes which are neither random nor independent, and very quickly give any particular situation a very clear set of biases. The various supported or encouraged processes must be kept at a sufficient level to allow the situation to continue, while other inhibitory biases will keep other processes in check at a low enough level not to threaten the continuing overall system.

NOTE: What must be considered is exactly how such systems arise. We must consider what will be the best initial conditions to allow the widest variety of processes to be occurring. In other words the maximum number of sources of the resources involved from diverse and separate conditions, with sufficient natural transport of all these substances into, and about, the initial mix. And when all these various effects between processes, and of substances on processes, get going, it is obvious that the famed equal chance of everything occurring will nowhere be possible.

Clearly, sequences and even cycles of processes can greatly enhance the occurrence of certain member processes, and keep levels at or around the optimum rates. The template for such systems has to be the famous Metabolic Pathways, which include all the relations of processes referred to above. These occur at the very heart of all Living Things, and something very similar must have occurred even before the Advent of Life for the reasons outlined above. And these are the kind of systems which either move a situation in a certain direction, or maintain it at a fairly stable and enduring mix.

As soon as we see mixes of processes in this way, the myth of all processes being of equal chance of happening becomes a purely speculative, and clearly untrue, construct, and never a naturally occurring and continuing state. Also, such systems can cause a sequence of states, which effectively can be seen as imposing some sort of “direction” on a situation.

All those myths that lie at the heart of Probability Theory are only true for things like dice or playing cards, where equal likelihoods have been expressly designed for, and hence closely match the purely formal features that

constitute the Theory. Such situations are never natural! But, such a description, as I have outlined above, has other profound consequences too. For, though we talk of stability and self maintenance, such “equilibria” can only ever be temporary. For against the system-constructing mixes of conducive processes, with both replenishment and re-use cycles, there is always and ever an unavoidable deterioration as embodied in the famed Second Law of Thermodynamics. In spite of the attainment of new sub-systems and their entities and laws, there is always an almost-impossible to inhibit set of deleterious, destructive processes, which if they grow numerous enough will always undermine any stable system, and when the level of such processes passes a certain threshold, will result in a general collapse of the system, and a veritable avalanche of dissociation. The stability will always be destroyed - sometime!

Now, stated thus, it must be clear that the inevitable move from Order to Chaos at all times and in all circumstances cannot be the full story. Otherwise we would have no Life either emerging or continuing. It would have long ago gone the same route into inevitable oblivion. But, not only has Life persisted, it has also and regularly survived the most colossal catastrophes, and, thereafter, advanced anew. We must drastically modify our model of systems to include not only dissociation, but also, and significantly, creation too! And though our incremental model with thresholds and avalanches is completely adequate for dissolution, it turns out to be entirely useless in explaining creation! Something very, very different must be involved in Events such as the Origin of Life on Earth, and in the continuing train of smaller miracles that constitutes the Evolution of Life. You do not have avalanches uphill!

Yet, the remarkable thing is that such problems are generally by-passed by an earnest, yet blinkered, Science. The easy targets are much too tempting to be ignored or delayed for later work. The mad-dash for discovery within the realms of our usual and well established methodology of Plurality and Reductionism will evidently deliver immediate results by well understood methods. So that was certainly the way to go!

It was the big questions that were delayed for later (and preferably for someone else to tackle), and then never get dealt with. It is like an explorer limiting himself only to the lowlands on his journeys of discovery in a new land, and basing his conceptions of the whole land on

Purity + Noise

Probability as Cause! The Pluralist Basis of Random Noise

such easy to conquer areas. The mountains can be left for others to address!

But, though there have been honourable exceptions, they have still only been equipped with the tools found to be adequate for the lowlands of search and discovery. Problems, un-solvable by such methods arise at every turn, and most explorers were defeated by the hostile terrain.

The hub of all the problems was in explaining what can only be seen as the opposite of the Second Law of Thermodynamics. For though that Law fitted comfortably with pluralist and incrementalist ideas, which treated only downhill movements from “Order to Chaos”, no one could even commence the task of explaining creation – an uphill movement from relative chaos to Order. All the extracted “major principles” of ordinary Science seemed to be cast aside in developments such as Life and Evolution.

Now, great thinkers and scientists (Hegel and Darwin come immediately to mind) KNEW that such changes were the crucial areas for their studies, and set about describing the full and true landscapes of their respective areas, and indeed were not unsuccessful! But the descriptive phase of Science is only the first step and though Natural Selection did indeed reflect what was happening, the actual engine of variation essential to

this theory was not understood. A new concept of “randomness as engine” was put forward, with the assumption that every possible change in a totally random situation was possible, and from this, Natural Selection could filter out the most efficacious for greater survival chances. Such a mechanism “seemed” to offer an answer, but what it really did was to actually hide innovation in a continuing (almost infinite) series of incremental changes over similarly close to infinite timescales.

It was not an adequate mechanism, and STILL is not an adequate mechanism.

The reason for its universal defeat has to be in the philosophy and methodology of all scientists. It has to be a consequence of the assumption of Plurality – the division of everything into Wholes and their constituent Parts. Such a strict hierarchy could only ultimately reduce to basic units and laws, whereas what was essential was to begin to understand systems – how they appeared and grew. How they deteriorated and died, and, most important of all, how they were transcended by wholly new systems with wholly new features and functions. In other words pedestrian Science would have to be shelved in such areas, and a Science of Emergence commenced.

The most surprising elements in the currently dominant pluralist methodology in Science have to be those elements that are at the same time both natural and totally contradictory, while being absolutely necessary to make the system “work”. The methodology seems to involve the sound distilling out of the purest, formal relations, which are then assumed to be the essences which ultimately “drive” the World. But, at the same time, that system could never account for Reality without at least one unexplained teaspoonful of Noise, for if this was omitted the clearly non-matching “essence” would immediately seem to be just pure invention, when directly compared to Reality-as-is, which it purports to encapsulate as one of its contributing elements. The main ingredient in this approach is the isolation, extraction and abstraction of a relation, which having been removed from Reality, matched to a perfect abstract Form (provided by Mathematics), and then refined via further carefully controlled experiments, with the purpose of perfecting this relation with the ever more precise evaluation of its constants to finally become the pure and perfect contributing Essence.

But, even when this process has been taken as far as possible, and the researcher is quite satisfied with his resultant Equation, it will still never perfectly match the Reality it is supposed to represent as a “determining” source.

At this point a further surprising, yet universally accepted, “fitting” takes place. Each “Essence” is assumed to be accompanied in Reality by many other such pure and essential relations, and in a very small detour into the diametrically opposite standpoint of Holism, these are supposed to be acting together simultaneously to deliver unfettered Reality exactly as it is! And, this

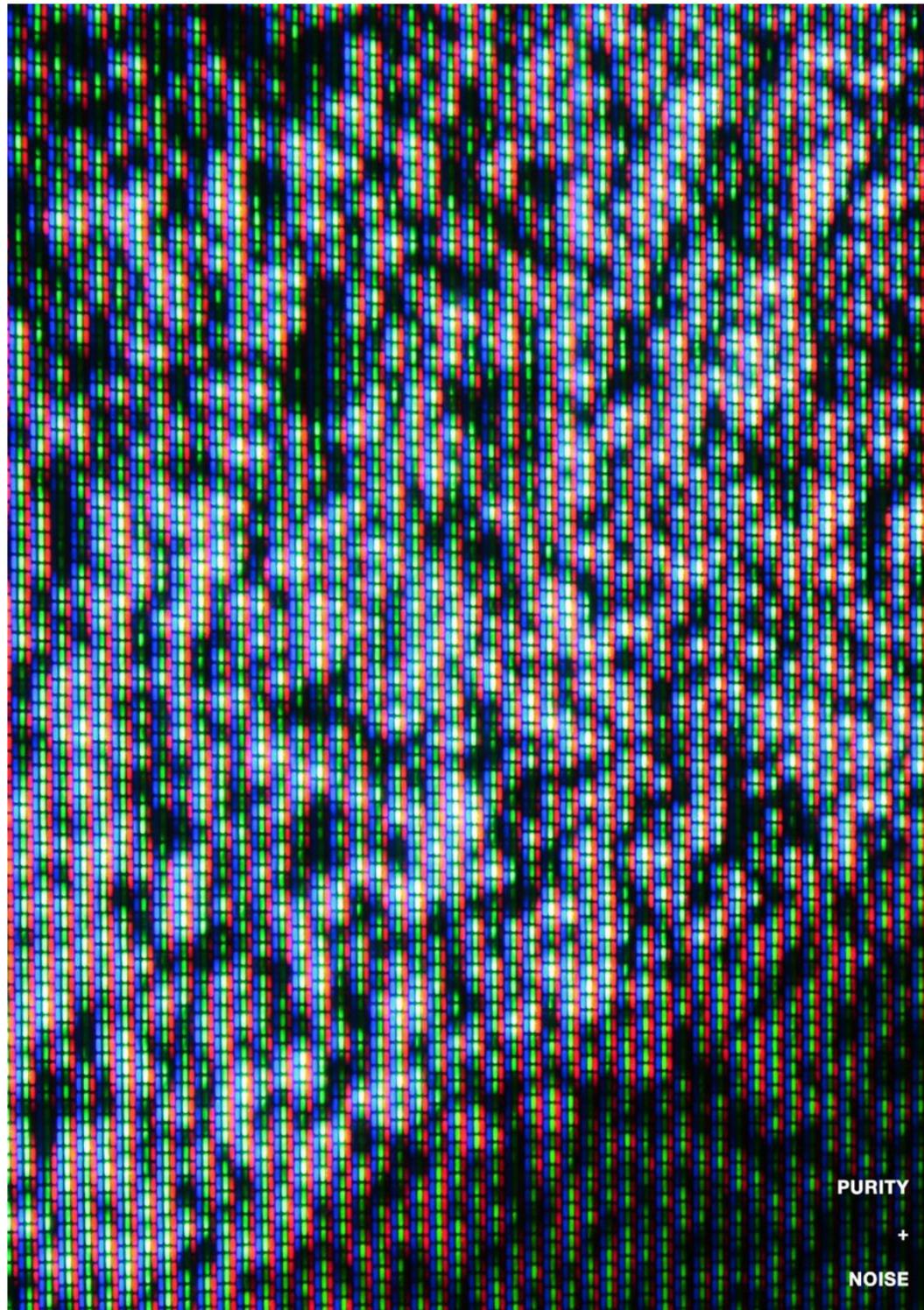
being so, without our skilful pluralistic isolation of each contributing Part, it would be impossible to determine its actual performance, and its nature.

The conceived-of process of these multiple, essential relations is assumed to be a kind of Summation! And this is crucial! Reality is the SUM of many essential relations, which are NOT changed by their simultaneous partners in any way. The individual essences remain exactly as they were, but combined with others – clearly indubitably pluralistic! This reduces the nature of Reality to something very close to mathematical Arithmetic, and an old fashioned sum-type complexity.

Now all of this is crucial to the following developments and uses of what has been achieved. It allows the Parts to be treated as immutables (just as we treat the numbers 2 and 3 in arithmetic). And in the same way that we cannot allow any Number to become another Number, we also assume that same isolate-ability for any extracted Parts of Reality.

This assumption also allows some very clever footwork to explain the evident variations from any particular extracted equation when it is applied back in Reality, for scientists are not stupid!

They do not apply any of their relations (equations) directly back into unfettered Reality. They very soon realised that the best way to ensure their veracity was to use them only within the same conditions under which they had been isolated and extracted, and in which the constants of their final abstract form had been determined. They always farmed Reality to provide situations in which the equations would be correct and the outcomes predictable. They were quite clear about



such necessary Domains of Applicability, and provided them when USE was intended to be the next step (Or more accurately these were provided by the Technologists who wanted to use the equations to help them construct useful things.)

But, in spite of that eminently sensible arrangement, the equation, even then, never fitted exactly. There was always an added variability, which appeared nowhere in the given equation. Our scientists did not turn a hair!

That would, of course, be due to multiple other minor relations that were too small to identify and either remove or control, and what is more, these could be assumed to themselves “sum” into eminently handle-able Random Noise!

NOTE: The conception developed about this Random Noise is both clever and interesting. Though at any particular moment when a measurement was taken, the noise would impart a small but evident deviation upon it, which took it away from the result predicted by the relation, these were never exactly the same, nor in the same direction. Instead, they were so diverse that by taking multiple measurements in seemingly identical circumstances, then taking averages, they could be “removed”. This could only mean that these fluctuations were being caused by multiple factors which were basically mutually contending. Indeed, if the variations showed a bias in a particular direction, it was NOT of this type and would impart a systematic error. The conditions of the experiment (and subsequent use) had then to be adjusted to remove the effect of such factors. Indeed, because of the increasingly sophisticated control that was available to scientists, these adjustments could be refined so that the ONLY remaining aberrations would indeed be entirely mutually contending, and the conceptions and procedures employed would deliver reliable formulae and practical, achievable results.

The conception was that the major contributions (other than those targeted as directly contributing to our relation) had been totally removed by our rigid constraints for performing the experiment, and all that were left unaddressed were both

1. Very small
2. Mutually contending

These assumptions matched well with what seemed to be the nature of the variations, and most importantly, could be removed by the averaging of multiple, “same conditions” results.

Now, all of this (as a pluralist technique) is entirely acceptable, if pragmatism is your goal. And scientists usually only chose areas for study where these things could be successfully achieved. But, they could not be used everywhere uncritically. When it came to the naturally isolated motions of the planets in our Solar System, they could only assume that any “missed out” contributions would be from other bodies (both planets and other material detritus) that were probably around. But, they wouldn’t necessarily be mutually contending and hence addressable by mere averaging.

And if we go to the Big Bang itself, which is supposed to appear “from Nothing” and also create Space itself – all projected into absolutely Nothing, there could be NO others to produce any necessary Random Noise! Nevertheless, the usual pattern is still applied – formulae plus random noise! I have to ask, “Where does the random noise come from?” Now, I know what the response will be. It will be that any equation we use will be accompanied by many others, and they will sum to give us random noise. But we are also informed that the Big Bang was initially only Energy, and that only later did Matter get “condensed” out of this. Now, you can’t have your cake and eat it!

The agreed conception of the Big Bang precludes such assumptions. If, as it is assumed, the Big Bang emerged as Pure Energy from a “Physical Singularity”, the form of it could only be entirely homogeneous and completely symmetrical! What could possibly distort it? And, if we think about it, with such an origin, NO actual aggregations could ever occur! To get them we MUST have our added condiment of Random Noise! How else could the actual following history of the whole Universe occur?

Now, this concentration on the Big Bang was chosen because it allows the stripping away of all convenient and assumed padding.

But that is NOT the most crucial effect of the set of assumptions employed. The real condemnation must involve Plurality itself. Though useful in purposely simplifying Reality in order to study it, it cannot be taken as the “way of the World”: it cannot become the basis

for a scientific philosophy! Plurality by its very nature precludes Development! It only allows joint action – or complication. And what is absolutely essential in dealing with Reality is that it is most certainly holistic, and it evolves! Things are consistently changing into something else: and in particularly significant interludes, it certainly creates. All seemingly immutable “Parts” are always only temporary, and in fact in time change into other things. The only other kind of change allowed in a pluralist perspective is that which involves the dissolution of complication – in other words, back to more and more basic Parts (as encapsulated in the Second Law of Thermodynamics – “Time’s irreversible arrow from Order to Chaos”).

Whereas we know that Life really did occur. And Life is no mere complication of inanimate relations!

Once we have to address Life, we also have to explain myriads of other New Levels all the way up to Consciousness.

None of this is remotely addressable using “essential relations” plus “Random Noise”. Notice how crass the explanation of the Origin of Life has become with ONLY pluralist methods! Guess what they say actually caused the Miracle of Life?

Yes, you are indeed correct! It was supposed to be the Random Noise! Probabilities and the myth of monkeys with typewriters, and the Complete Works of Shakespeare are expected to explain ALL! They don’t!

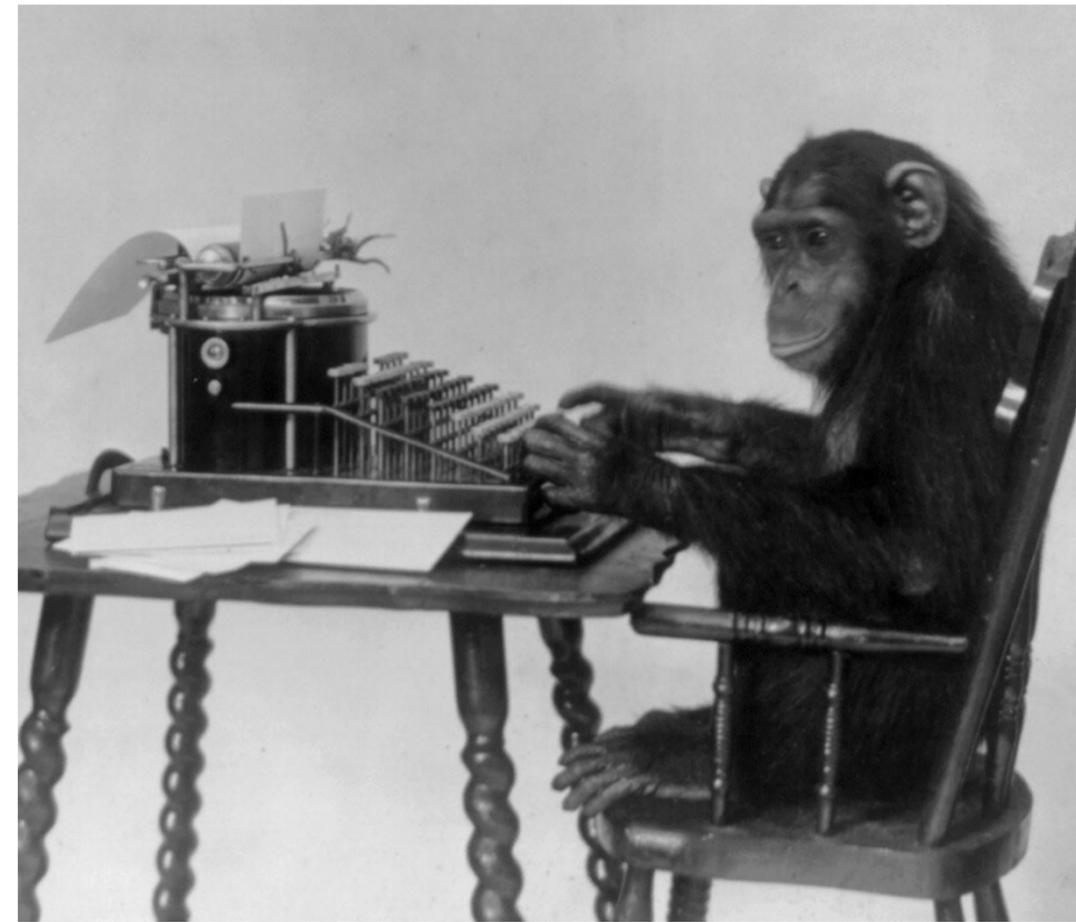
And the same excuse for an explanation is even used for periods of rapid evolutionary change as in Adaptive Radiations, when multiple and different developments take place over a very short time period and in many diverse directions. The role of mutations is clearly established, but making the “effecting ones” totally the result of random chance is NOT. The usual form of Natural Selection has random mutations, wherein the bad ones perish, while the good ones lead to progress. Such a simplification takes no account of the reaction of complex organisms TO such damage, and any accident repair or removal process, which could not only destroy irretrievably damaging changes, but could also modify, mollify or adapt less useless mutations to at least quiescence within the organism’s crucial genetic materials, and sometimes could involve the adoption to new undamaging processes which Natural Selection

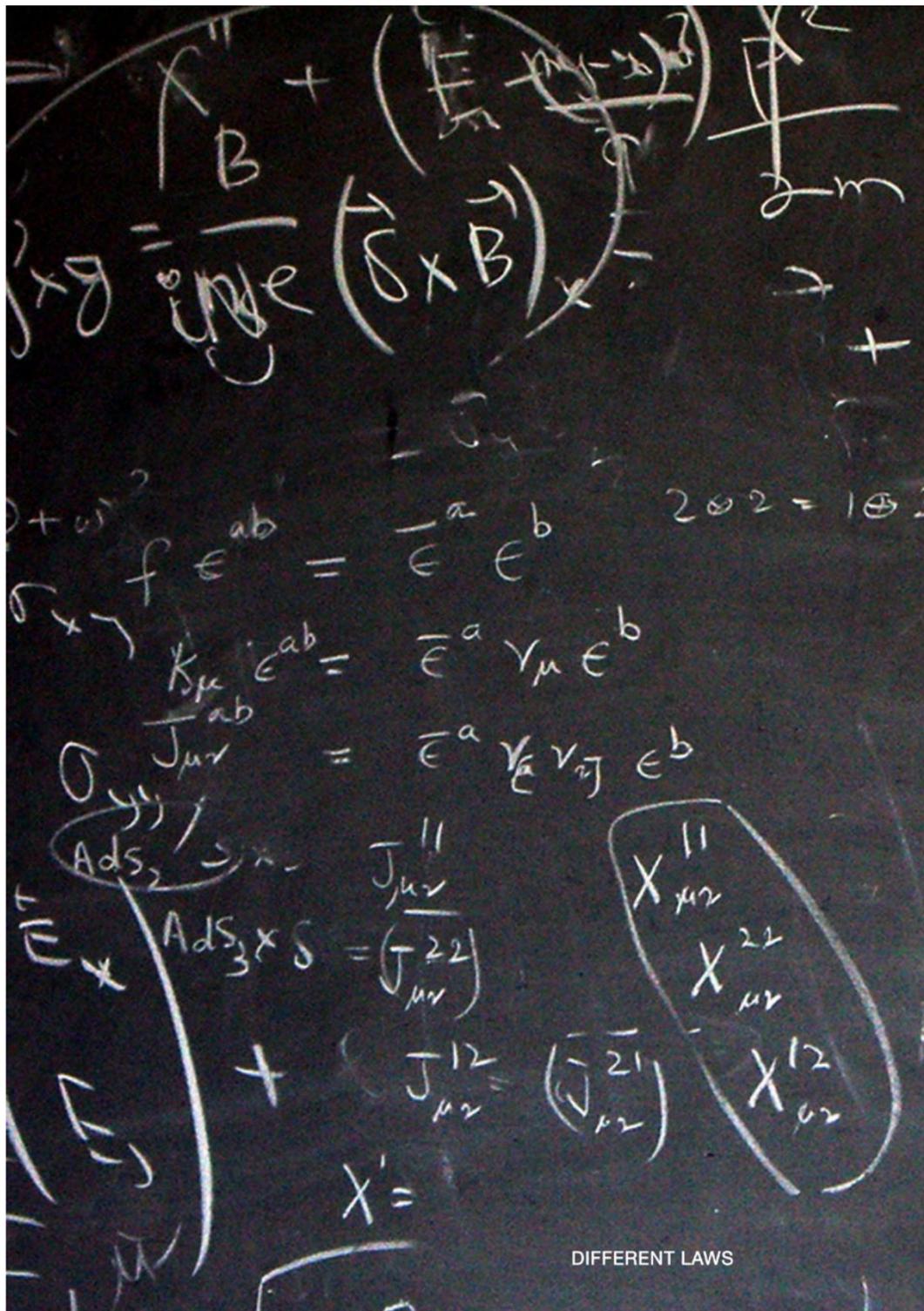
might later find positive. The nature of Reality is seen as purely one of complexity, whereas it is surely involves a whole series of checks and balances too, without which there could be NO stability. Even the genetic material system cannot be merely a set of blueprints. It MUST also involve a whole system of “tenders” of the health and usefulness of the system, which maintain it. How else could such a system evolve and persist of itself, never mind its effect on the phenotype.

To use Random Chance and Probabilities as causes are wholly inadmissible!

It is an apology for having NO detailed explanation. The whole methodology is pernicious and its 20th Century aberration in Sub-Atomic Physics cannot be denied. The Copenhagen School’s interpretation of Quantum Theory, and the abandonment of Explanation is entirely based on the pluralist philosophy, and makes everything at that level the product of pluralistically derived equations and NOISE or as they would put it Probability! Making Random Noise the cause of development is profoundly mistaken and rests upon it being conceived as a contributing factor. It displays total ignorance about Stability versus Progress. It makes Change inevitable, mechanistic and wholly incremental. The real situation is very different!

As the Second Law demonstrates, such mechanisms are, in the end, wholly deleterious and towards dissolution and decay, (and they do indeed occur). But they are NOT the processes which lead to the wholly New (and viable). Elsewhere I have been researching the inner trajectories of destruction and creation within the short crucial period Events known as Emergences, and there the processes of Qualitative Change are becoming evident. But though “randomness” plays its part, it is not as is usually assumed. To get anywhere with “Progress” we have to determine what Stability is, why it occurs, how it is maintained, and finally why it will be inevitably overturned. Random Noise is a crude placeholder for these vital processes, which must be (and are) being addressed.





Different Laws

Are all Laws Part of a Single All-Inclusive Regime for Reality?

We are more and more being presented with circumstances in which the laws that are said to be acting there are different to those that pertain in our everyday experiences. Some may be acceptable at a pinch, because they are positioned in other Universes in unseeable “dimensions”, but that is not the limit of their occurrences. We are also informed that different laws may even apply in some almost inaccessible corners of our own Universe, and certainly in rare and extreme conditions here. Indeed, the consensus Cosmology of the Big Bang talks of a “time” before Space itself existed, and certainly one “before Matter”, and the laws that they propose for these exceptional circumstances are not what we are now used to. Indeed, the most famous physics experiment in the world at the moment – The Large Hadron Collider actually expects to reveal the “Higgs Boson”, which we are told, played a role in the original creation of Matter soon after the onset of the Big Bang.

Now the surprising thing about all this is that it does not tally with the assumptions about our world that have underlain the whole development of Science over many centuries. Perhaps the most universally agreed principle is that of Reductionism, which infers that every phenomenon can be explained in terms of its Parts, which in turn can be similarly explained, all the way down to fundamental particles and basic laws. So the question is therefore posed, “Were all those assumptions wrong?”

Now, to answer this question we must look more closely at the current Big Bang Theory. From its assumptions there seem to have been from the very beginning a veritable evolution of laws, because the universe itself has undergone a continuous development of its content from the outset. We are, in this Theory, presented with a clear and episodically revolutionary evolution of the actual entities and even Elements that constitute concrete Reality.

Starting with a tiny minimalist set, we are told of the “first appearance” of first one elementary particle, and then another, through a succession of new, and bigger, added particles, and this all to occur before the first Atom was formed. Indeed, the vast majority of chemical Elements (indeed all above Helium) are supposed to have originated in Stars which took hundreds of millions of years to first appear, so it is clear that the supposed Early Universe was very different from what exists today.

We are also presented with the very Early Universe, in which there was initially zero Matter of any kind, but only vast amounts of some archaic form of Pure Energy. Clearly no Protons, neutrons or even electrons were then present. So clearly you can't have the laws pertaining to such entities before they even came to exist. (Just as there could be no laws of Living Things before the very first Life appeared on Earth). There is even a very early interlude when the Universe was supposed to have expanded “faster than the speed of Light”, in what is called Inflation.

Now I could go on, but I am aware that there is a ready response to these points. Basically, it is that all these laws “existed” from the beginning, but had not then had the necessary entities and conditions on which they could act. They were, in effect, waiting in the wings for their later, required “stage entry”. Of course such a position puts its believers firmly into one camp and no other: that camp is Idealism. It cannot be anything else, because, stated as it has been here, the laws are made primary – existing even before there was anything for them to act upon, indeed as some sort of ready-to-go, disembodied Order (The Word of God?).

But scientists have always been Materialists, in that it is assumed that it is in concrete Reality, and its existence and activity, that all laws are generated. The alternative is

that it is the laws that make concrete Reality!

Now, all these suggestions (particularly about other Dimensions and Universes) are invariably throw-away lines, but by their very overt mentioning, they allow of things “beyond our ken” to be allowed in, and these then help to fill all uncomfortable gaps. But they also place all these alternatives well out of our reach, and, it must be said, help to further justify increased funding for ventures into Space and many other “gateways into the unknown”.

Yet, different Worlds exist here and now, right in front of our noses, and are also clearly totally accessible, and though we play lip-service to them all being developments of the exact same concrete ground, we do not, and perhaps cannot, bridge the explanatory gulfs between them.

Which Worlds am I talking about? Well, the most obvious is Life itself.

It is no good expecting a physicist to show how it is merely an elaboration of the same basic entities and laws as are sufficient in his subject, because they just aren't, and they can't deal with Life in any way at all!

Life is another World, with its own entities and laws, none of which has been shown to automatically develop from prior laws in non-living Matter. And Life is not alone! In the evolution of Life itself, many a revolutionary change has produced another wholly new World atop the first, most basic emanation of Life, and try as we might, we have been unable to bridge a single gap in explanation.

Now, this has not been because Mankind is useless at such tasks. It is because such transitions are beyond our current means and methods by which we investigate the more commonplace and stable aspects of our World.

These originations of wholly new Worlds occur in profound transition Events which have occurred at every level from the origins of our Universe to Human Thinking. They are very special, wholly revolutionary transformations called Emergences. And there are reasons for them presenting researchers with veritable Black Holes when it comes to explaining them. This is because Emergences are by no means ordered changes of a predictable nature, but instead cataclysms of a very special kind, and can only be understood in terms of the

dissolution of the old, and the originating and creative constructions of the new.

Indeed, the latest Theory of Emergences is totally different from the usual attempts at explaining such revolutionary developments. For such do not occur without a veritable initial catastrophe to precipitate the whole process. And this initial event has to be so devastating that the previously existing stable Level, after an increasing number of crucial undermining sub-events, eventually passes a major threshold and collapses into an avalanche of dissolution, wholly dismantling any prior stability completely. Within the aegis of the New, we find that the Old has vanished completely!

All previous “banker” entities and “determining” variables of that prior Level completely disappear, and it appears that the situation can only end in absolute chaos! But that surprisingly never happens!

Indeed, Stability is always a very conservative situation, which persists not because of its contained “fruitful and productive processes”, but mainly due to its organising inhibitions and controlling processes, which strongly act against all qualitative changes of whatever type, and hence maintain the Level “as-it-is”.

The initial cataclysm therefore is significant in that its main victims turn out to be precisely these controlling and maintaining processes, which have been finally and irretrievably undermined, and which cause a total collapse of the overall system.

But what results is not totally random noise! On the contrary, it contains the most productive and potential-filled mix of prior processes, from the whole of its historical past, BUT crucially without any still existing system of inhibitions and control.

Anything is now possible! Only within such an unrestricted nexus of activity can “Truly Natural Selection” occur – where mutually conducive processes are encouraged to proliferate at the expense of others and new proto-systems begin to appear. Only in such circumstances does real progress happen!

And happen it does!

Out of the seeming Nadir of Dissolution, these mutually conducive processes are “naturally selected” to ally with

one another and greatly increase at the expense of less well endowed competitors for the same resources. Very quickly (in geological terms) these develop into new systems, which also include their own inhibitory and controlling elements. Only with sufficient of these latter elements will there be any possibility of a New Level not only arising but also persisting, and that is a very big ask! Indeed, such a system cannot appear that easily. Many such initial proto-Levels never persist. They fairly quickly subside under the same dismantling processes as destroyed the previous Level. The Second Law of Thermodynamics is not dead, and regularly scuppers each and every nascent Level before it can become established.

Now this oscillation between construction and dissolution could conceivably go on for ever, but it doesn't! To understand why, let us consider just how profound this emergent interlude has been so far.

It has dismantled the previous stability in which a vast clutch of seemingly eternal laws both pertained and persisted. Indeed, the reason that they did so was due to the processes that maintained the system by acting against all qualitative changes. With these maintaining features gone, the processes also seem to have vanished. But they don't entirely disappear. They still remain, no longer as part of a co-ordinated system, but now as mere unconnected and uncoordinated fragments. They appear to be either undetectable or even totally absent. The dominant entities which we measured to discover underlying relations seem also to have bitten the dust. We can't even find them!

The stable mix from which we were able to isolate, extract and abstract our favoured relations has gone! And clearly our tenet of Reductionism has gone too! If the laws and their elements are no longer available, how can we bridge the “causes-gap” between prior and new Levels? We can't! Reductionism always terminates at such Emergence Events, and our previously secure assumptions also bite the dust!

But though the best that seems possible is a continuing oscillation between new proto-Levels and their inevitable dissolution, which is NOT what occurs.

Indeed, each newly-emergent proto-Level gets a bit higher, and lasts a bit longer, than the last, as new inhibitory, protecting and controlling processes are selected and included. Finally this process passes its

own key-threshold and the final Level in the series gets established as a new and persisting, stable Level.

Now, the above account is by no means a full, worked through establishment of the Theory of Emergences, and their final, consequent Levels, but the included description had to be at least briefly explained for the actual central purpose of this paper. Which, is, of course, to show why gaps between Levels seem unbridgeable, and why our basic tenets of traceable causality, Reductionism and Plurality (The Whole and the Part) break down at such revolutionary Events? Indeed, the only theatre for the study of our assumptions and basic mistakes has to be the detailed study of Emergences! And it can be done!

Not only in the crucial events in Science such as Darwin's Origin of Species and Wegener's Plate Tectonics, but even in social change. Revolutions can be natural occurrences, but cases such as the Russian Revolution were not simply natural events alone. They were intervened in, and directed by a group of revolutionaries, who had inherited the study of Emergent Change from Hegel, Marx and their followers to equip themselves to actually understanding this kind of emergent change and to intervene to direct it to a revolutionary outcome, rather than another failed proto-Level.

Now, returning to our main discussion about Law, we must be clear that there are two types of law.

The first type attempts to explain why things happen the way that they do – such as those explaining the relations between atoms in a molecule, or in an extended solid (perhaps in the rigidly orchestrated form of a crystal, for example), involving various types of chemical bond and attractive forces. Such detailed explanatory models can even say why at higher energies these bonds are broken and reformed into lesser types of relation as in a liquid, and then still further with even more energy into almost free-flying particles that constitute a gas.

The second type of law requires a rigidly controlled and maintained Domain, which constructs an unnatural piece of Reality in which quantitative relations between artificially isolated variables can be both easily seen, and then extracted as quantitative laws.

And these two are very different!

Indeed, it is eminently conceivable that the quantitative laws can also be abstracted to represent universal patterns, which can be seen in a multitude of different circumstances, yet as abstracted generalities they can also be gathered together in a special World of their own termed Ideality – which is defined as a World of Pure Form alone.

Now, surely this must mean that these laws are actually laws pertaining only to Form alone – Laws of the World of Ideality, rather than of the concrete World of Reality? Now, being able to isolate (in Domains), extract and then abstract these relations as pure Form in equations, means that they are NOT the laws which make Reality what it is, if they are not sufficient in such contexts. They must, on the contrary, be universal quantitative laws which fit so perfectly into Ideality those absolutely true theorems and proofs can be strung together into an extensive and complete system such as in Euclidean Geometry. No laws of Reality have such properties: they adhere only to Form!

Now, of course, there will be the expected chorus of condemnation of such statements.

“How can such fictions be maintained when we have built our world using these laws, and clearly we daily extract such laws everywhere in Reality?” Well, Form is about pattern, and there is no doubt that patterns exist everywhere in Reality. That is NOT the question here. The question is whether these patterns determine Reality, rather than Reality determining the patterns! Formal laws do reflect real relations in Reality, but they have been modified to allow easy access and extraction, and are then deified as separate and independent components within Reality, and that they certainly are not! These Forms are never as they actually are in Reality, but how we have made them accessible when farmed in carefully contrived and maintained Domains. And crucially, the side-step which makes these laws primary, forgets that they are universal and hence appear in widely different areas of Reality. Are we to believe that these forms produce all these distinct areas where they pertain, even though they all have different outcomes? Surely Form is much more accurately seen as disembodied pattern alone, and hence as always eternal, and hence as such would be the same everywhere and at all times.

If all this is true, we must have many of our scientists mixing them up, as if they are exactly the same, yet at

the same time precipitating a continuing fight between those who consider concrete scientific Laws as primary, and those who consider Formal Laws as primary.

But remember, Form is a description and never an explanation.

To say this phenomenon is as it is because such and such a Form pertains is not an explanation. It is merely a description in terms of universal Forms.

The next question cannot be avoided. “But, what makes it have a given Form?”

The answer to that can never be found in Mathematics. It requires a scientific explanation!

Now, both types of law, when present in Reality are rarely overt or easily determined. It is clear that Reality may have periods of stability, but it also has crucial interludes of qualitative change – the times when things actually change their nature substantially, and with this transformation, not only do scientific laws get replaced, but these take the form of entirely new laws, underivable from what went before. We cannot equate laws of inanimate matter with those of Living Things: they are most certainly of quite a different order. Yet, though our collection of Forms can be added-to they, being about shape, and not about cause, can still remain members of that world of Pure Form alone – Ideality.

Now, though this is not a treatise on Emergence; it simply cannot be avoided in such a discussion, and we must recognise a third form of law, which only occurs within such revolutionary events as Emergences. Our usual laws are for use in stable circumstances, where tomorrow will be much like today in terms of its acting laws. But an Emergence totally overturns the system into something containing wholly new things, properties and relations. They may “end up” in a new period of stability where something similar to our old laws will prevail, but what about the transition – the revolutionary changes themselves? Can we encapsulate them in our usual type of laws?

You know the answer! It is “No!” Think about it!

You will require, for example, to know the laws which moved inanimate matter to become Life. You will need the laws which transformed sensory-motor responses into consciousness. You will require to know what laws

were involved in the invention of Language, and of course many others depending on which Emergence you are attempting to explain.

Of course, such formal or even mechanistically explanatory laws DO NOT EXIST in the same way. They are about multiple, simultaneous, conducive or contending, sequenced or cyclic processes and the establishment of systems! And clearly, by this I do not mean mere complexity! The kind of things that are happening must produce systems that persist continually. Life does not permit gaps and re-creations! So the system must contain elaborate systems of defensive maintenance. In other words, these are holistic situations with a holistic set of laws which require each other, and produce a joint new Level – Life! And our wonderful invention of Plurality (The Whole and the Part) is wholly inadequate in such systems. Our usual laws simply will not do!

NOTE: There is another kind of law which is neither of the two above. It is, of course, the famed Second Law of Thermodynamics, which insists that natural processes are always and necessarily from Order to Chaos. Now, such a law begets the question, “Well, what provided the Order which this law dismantles?”

Can you guess where the answer is to be found? You are right! It can be found only within the processes of an Emergence, wherein the exact opposite is possible. Indeed, it turns out that only in a situation of totally unfettered chaos can the process Chaos into Order even occur. To find how this works will require a look at this author’s Theory of Emergences.

Inner Truths

The Dynamism of an Emergence?

In the current series of papers on attempting to define a Holistic Science, I have touched upon what appears to be perhaps a surprising sequence of avalanches that are at the heart the process of Change in every Emergence.

NOTE: Readers requiring a much fuller description and discussion of these remarkable Events will have to read about them elsewhere, both in my own papers and those of many others.

What is clear, however, is that such Revolutions of Change do indeed occur and MUST be investigated if Qualitative Change, as distinct from Quantitative Change, is to be seriously addressed.

But, these “avalanches” are, as yet, only mere conceptual models for what seems to be happening within these world-changing Events. These major turnovers must be fairly complex and dramatic processes, for what emerges at their conclusions are not only very different to what was the situation prior to these Events, but also it has become very clear that they cannot be derived from those precursors in any currently known way.

The Emergence is at present still very much a Black Box, in which colossal changes and creations transform things so dramatically that they can only then be conceived of, and investigated, at an entirely new, and higher Level. Therefore Emergences must be both cataclysmic and complex, and the only natural overturns, with such dramatic properties, that occur elsewhere in Reality are avalanches. So, we must start with something similar to these as a sort of component in the transformations. A sequence of these, each one causing the next, could indeed very quickly bury all connections from the precursor situation to the newly created Level.

[See Pirsig’s idea of the “independence of Levels”, and the role of what he called quality, in his books Zen and the Art of Motorcycle Maintenance and Lila.]

Clearly, prior to any such Revolution, there must be established its necessary Ground.

And this will seem to contain a whole group of well-established and relatively stable entities, properties, relations and “laws”. But these must also be gradually being undermined by a number of increasingly significant processes that were previously (and correctly) considered as negligible and hence ignored. Under the special circumstances of an Emergence-in-the-making, however, these will increase in significance and begin to undermine the dominant processes of the status quo: a revolution will be brewing!

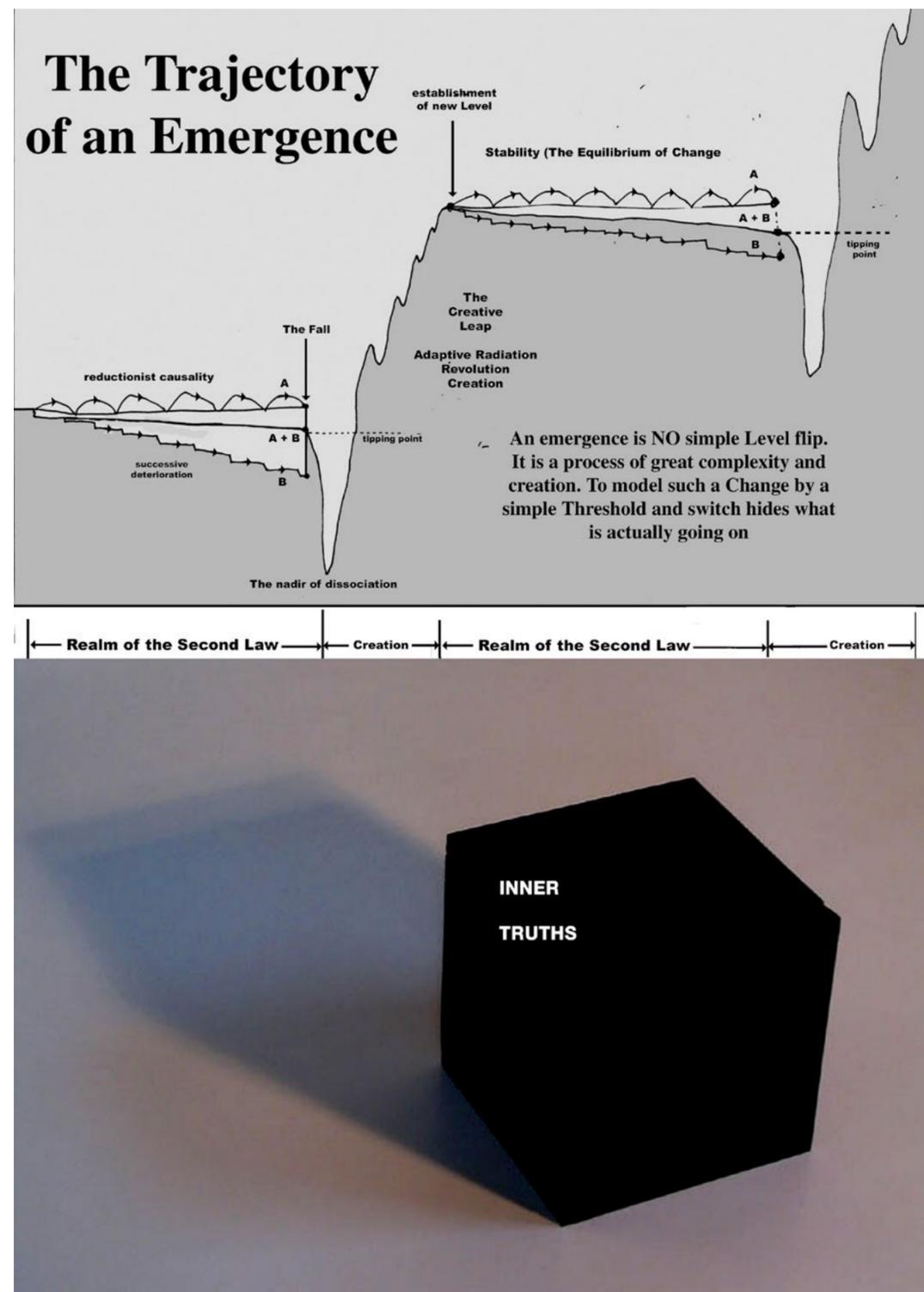
But, it would be incorrect to see these interlopers as merely “taking over” and replacing the previously stable situation. That would be impossible! The very persistence of the previous Level was possible because of the inter-relationships of its dominant processes which had in the past established themselves as a continuing and self-maintaining, stable system. The disruptive and separate processes beginning to challenge that stability would not possess the inter-relationships that would be necessary for the replacement of one stability with another.

But they could destroy it!

In fact, something very different to a straight replacement would be much closer to the truth.

These growing elements would never, as such, have been the bases for a New Order, but only the reasons for a major system dissolution.

The well established equilibrium – the self-maintaining stability of the old order, is by these growing processes, undermined to such an extent that a tipping point is reached and passed, and things career into some sort of Positive Feedback avalanche of major Change. Indeed, though there would have to be a first such event, its effect would be to “break” the combined stability, and would inevitably push other sub-systems over their individual



break-points too. An environment of avalanches would doubtless ensue, and seem to be heading irrevocably towards total chaos and dissolution.

But, to understand the nature of what was being demolished, and (very importantly) how it itself was originally established, we must consider first how the latter occurred! In a totally holist World, with everything affecting everything else, how on earth did some sort of order coalesce out of the more logical outcome of completely random chaos?

There must have been natural processes in which order grew out of chaos and resulted in a system which was still holistic, but which was self maintaining and inherently (if temporarily) stable.

Now, such a system NEVER fits into Formal Logic!

Not only is everything affecting everything else, but in addition some sort of stability has been temporarily established, while at the same time the seeds of its own destruction have been allowed to continue (if temporarily somewhat constrained), so as not to get out of hand.

The trajectory of such a system cannot be understood in normal everyday terms. For, we would expect it, once achieved, to persist for ever. But that is never the case! Reality is not a given Set of Things, it is an evolving system! This means that it changes itself, and thus makes its own ground, continuously! In such systems, we have neither total random chaos nor permanent order, but a series of periods of relative stability, punctuated by short, and self-caused interludes of major cataclysmic Change. And these alternating Phases are not necessarily triggered from without: they are more often than not intrinsic to the system evolving of itself alone.

So returning to our avalanches of destruction in the first stage of an Emergence, we see that the famed Second Law of Thermodynamics would seem to be establishing its universally-agreed precedence, and the World would naturally seem to be heading for maximum disorder.

Now, it must be evident that such a cataclysm does NOT gel well with any Notions of Incremental Progress, wherein small “naturally selected” changes accumulate to deliver development. (Such as are rife in crude conceptions of Evolution) On the contrary, however it was established, the situation prior to an Emergence, was

one of interlocking and mutually supporting negative feedback situations, which kept things more or less as they were.

Though changes did happen, and even accrue, they were not so much the “demands of a nascent New World”, as the incipient, potential destructors of the Old regime. The initial model for the precipitation of an Emergence therefore must be wholly and generally destructive – a kind of Armageddon would describe it rather accurately.

But the Second Law of Thermodynamics is NOT the basic law that it is claimed to be. It is a Law of the inevitable dissolution of temporary and natural, or even of contrived, stability. It was conceived of in our pluralistically modified World, where all achievements required appropriate artificial local environments to be even remotely possible, and hence all made-stable scenarios were bound to dissociate if they couldn't be constantly maintained. It was a Law born of the Industrial Revolution, and saw the underlying threat of insidious Rust in all our erections.

But is only one side of a Natural Process!

In Reality, stable overall situations will inevitably be overturned, but such “philosophical Words of Wisdom” are not nearly enough! They are a prejudice arising out of our (that is Mankind's) man-made stabilities, and which are seen as Nature's Law counter-posing Mankind's imposed order to achieve his aims.

But, the World existed before Man, and even before Life. And apart from its catastrophes, it also, and always, Evolved! Reality was a self-building system. It was not mere dissolution. Quite the reverse, in fact! To have a Dissolution Law like the Second Law of Thermodynamics, you HAD to have Order to destroy. Where would that order come from? If there was ONLY dissolution, you would have to invent God to deliver an initially maximally ordered Reality, which would simply run-down, obeying the Second Law, until everything was absolutely total chaos. Alternatively, there would have to be another, creative process too – a process which naturally moved things towards Order: a process which selected mutually conducive processes in preference to mutually contending ones, so that the movement was towards increasing Order, and the opposite of what we see in the Second Law.

A version of this must surely have been present in the very existence and development of Living Things, which we term the Evolution of Life, but in addition, it must have always been happening even before Life had appeared. The actual first emergence of Life must be the most profound proof of the existence of such an ordering process within Reality. Is not Life more ordered than non Life?

Now, these are general arguments, meant to focus our attention on Emergences. If they hold water, there must be this opposite of the Second Law, which is the engine of the Evolution of Reality. And, just as the Second Law is not the only story, so it must be with this necessary Law of Increasing Order.

The almost religious belief in “Progress” is as much a prejudice as the belief in an unstoppable drive to Total Disorder. Clearly BOTH are in action, and together govern the trajectory of all Qualitative Change that constitutes changing Reality AS IS!

And we have discovered that Events must occur in order to encapsulate both in every episodic Revolution.

It starts with an undermining of the status quo, which ultimately causes an acceleration into a cataclysm of destructive, positive feedback. The system is successively dismantled, and seems to be heading for Total Disorder. But that never happens!

The built-in constraints of the old Stability were not only maintaining the then current status quo, they were also inhibiting any Innovatory Changes too. They were a defensive barrier to ALL change. They both maintain the status quo, AND prevent anything dramatically new as well. Thus, in order to get significant progress, it could only have any chance of happening, if the inhibitory bonds of the status quo are shattered, and the results of the Second Law then allows the Law of Increasing Order to come into its own. To allow the latter to get a grip, the Old order would HAVE to have been destroyed.

An Emergence cannot be a Single Event!

It has to be TWO Events, back-to-back, and the first enabling the second! It is the death of the Old Order, via the increase in contending and disruptive processes, which can accelerate to a complete overturn of the whole appletart, and allow the coming to prominence

of its complete opposite. That drive is a natural and inevitable process, which ends the prior stabilities. But, in so doing, the shackles of the Order are broken, and in the new, general turmoil, the possibilities of what processes can occur are greatly multiplied. NOT, it must be emphasized, merely the possibilities of progress, but the total range of all possibilities.

And when this occurs, the Natural Laws of Selection become dominant (like Darwin's version, but pre-Life) – this means that conducive, mutually-supporting processes will do better and be greatly augmented. And they will grow in number at the expense of the other mutually-contending processes. From chaos, positive feedbacks can facilitate the dominance of these processes, and enable the establishment of locally conducive environments, in which the various processes support one another, even to the extent of forming conducive chains and even cycles. This line of development, no longer inhibited by a still existing and self-maintaining order, can only be facilitated by the circumstances, and hence the dominant direction of the changes MUST be towards increasing Order.

NOTE: We are NOT talking here about simultaneous, ever-present processes here, but a necessary sequence! The processes of dissolution were necessary in order to create the appropriate conditions for the processes of creation. They were the products of the particular conjunction of multiple underlying processes and current conditions, and were precipitated at a higher level. Only when the generated conditions were sufficient, was a new dominant law created, due to the emerging, new conjunction of processes and conditions, (in a sense, the two Laws operate in very different circumstances, each produced by the action of the other). The simplistic idea of Holism, which has everything affecting everything else simultaneously, is a first order, lower level extraction from Reality.

It is NOT the whole story!

For, if it was, NO Form would be evident – only chaos! Whereas in true holistic Reality, Form appears everywhere, and is generated always by particular conjunctions of factors. It is not, as some believe, essential or primary in any way. On the contrary, Form is totally dependant on what temporarily creates it within ever-moving, ever-changing Reality.

Now, from these ideas, it is clear that Emergences are THE most important interludes in the development of Reality. And, as with Geology, we, on recognising these Events, notice first the incremental, everyday processes. Why is this so? It is because they are immediately evident. We saw them everywhere, and settled on the main principle of Geology, which is – the past was constructed out of the self-same processes that we see all around us even today.

But also, as in Geology, we found that these immediately evident and everyday processes were by no means the full story. Evidence for dramatic, indeed cataclysmic changes were being unearthed more and more, and geologists began to talk in terms of widespread volcanism, Orogenies (mountain building), and even cosmic collisions which precipitated major changes.

Indeed, it was also these same scientists who first found, and correctly interpreted, the fossils that proved the existence of long extinct animals and even plants. And these showed changes throughout that were so significant that the history of the Earth had to be divided into Geological Eras, with mostly well defined boundaries. Later, it was clear that some of these boundaries were the result of cataclysmic changes. Initially, these were seen as global calamities – mass extinctions, and so they were. But, each always led to new explosions of Life in new directions. The term Adaptive Radiation was devised to cover amazingly fast speciation, and finally, in the 20th century, Wegener's idea of Plate Tectonics was proved correct, and a changing background with both incremental AND cataclysmic phases was linked to our changing World. Of course, the most significant change of all – much more important than the geological eras was that of the Origin of Life on Earth.

So, in the same way, in our awareness of Emergent Events, we first noticed their incremental outcomes, so that the Events were accordingly seen mainly in their productive mode. But, of course, we began to see the other side of the coin too. Every Emergence was NOT only the creative second phase, it also required an initial cataclysmic phase, indeed a whole sequence of such destructive cataclysms, which not only proved to be necessary to dismantle the constraining effects of the prior stability, but to also destroy and actually remove any trace of the very entities, properties, relations and Laws which we always considered to be vital links in a continuous, reductionist chain of causality. They

couldn't be any such thing because they then no longer even existed. They had been temporary manifestations of that prior stable interlude. They actually were the order distilled into that stability – actually a conflux of all elements in a genuinely holistic way. They were NOT really existing entities: they were temporary Forms, and we could handle them as such, and to a limited extent, also find causes for them.

But, their temporary nature meant that they could NOT persist across an Emergence. This being so, our belief in universal reductionism was demolished too. NO continuous chain of linked causalities was available all the way back the immutable basic units and laws. Nor could we, as we all do to this day, consider that such links exist back to the Origin of the Universe. The whole “History of the Universe, from the Big Bang to today, is NOT a reductionist continuity. Innumerable Emergences have occurred throughout this period and at each one the entities, their properties and their laws of interaction, would vanish, and be replaced by a whole new set after each and every Emergence.

We are, if all this is confirmed, looking at the wreck of Old Science: the end of many, many assumptions and particularly of both plurality and reductionism as principles.

So, in suggesting a new direction for Science, we are not merely “adding” a new “layer”, totally and evidently dependant on those that have gone before, but we are demolishing most of the old, dearly-held beliefs, which have formed the Ground for our accepted form of Science for millennia.

The Study of Emergences will transform Science. It is not the “one or two outstanding problems”, to quote Hilbert speaking of his World of Mathematics, but, for the very same reasons that he was wrong, such a conception of Emergences would also be wrong. The study is necessary to re-ground Science, or perhaps more accurately to actually properly ground Science for the first time to match the holistic universe.

A Necessary Addendum: Guaranteed Progress?

In spite of the necessity of revealing the evolving processes of development in Reality, we must NOT simplify this into a naturally ever-upwards slope of unremitting Progress. Even with the two Phases of an Emergence, the initial destructive Phase seems to be always more than-made up for by the second, creative Phase. It is easy to consider that things always happen in this way with an overall result of “guaranteed Progress”. But that is not always true!

Directly retrievable catastrophes are NOT the only kind.

If the Sun became a Supernova, and destroyed Planet Earth, all the billions of years of progress situated here would be destroyed in an instant, and the local conditions would be re-wound almost all the way back to the conditions prior to the formation of the Solar System. Cosmological catastrophes are much harder and slower to heal!

The tempo of such the then subsequent events would, of course, be desperately slow.

Now, though our cosmologists delight in informing us that we are made of star-dust, (by which they mean that the necessary elements for our appearance in the Cosmos would have been impossible without, first the processes of star formation, then that of their phased continuance via higher order versions of Nuclear Fusion, and finally via their deaths as Supernovae. It is only via ALL of these stages that the heavier elements necessary for planets and for Life are produced.

Obviously, we can conceptually shrink such a process, and compare it with the Phases of an Emergence, but they are on a very different scale, and at a vastly different tempo. There are catastrophes that are almost irretrievable, and on a smaller scale similar events which do result in a large retrenchment, which can take eons (and quite different paths) to overcome, and then even pass, the previous high. There are examples in the history of Mankind, wherein a large retrenchment can put back advances by centuries – even millennia.

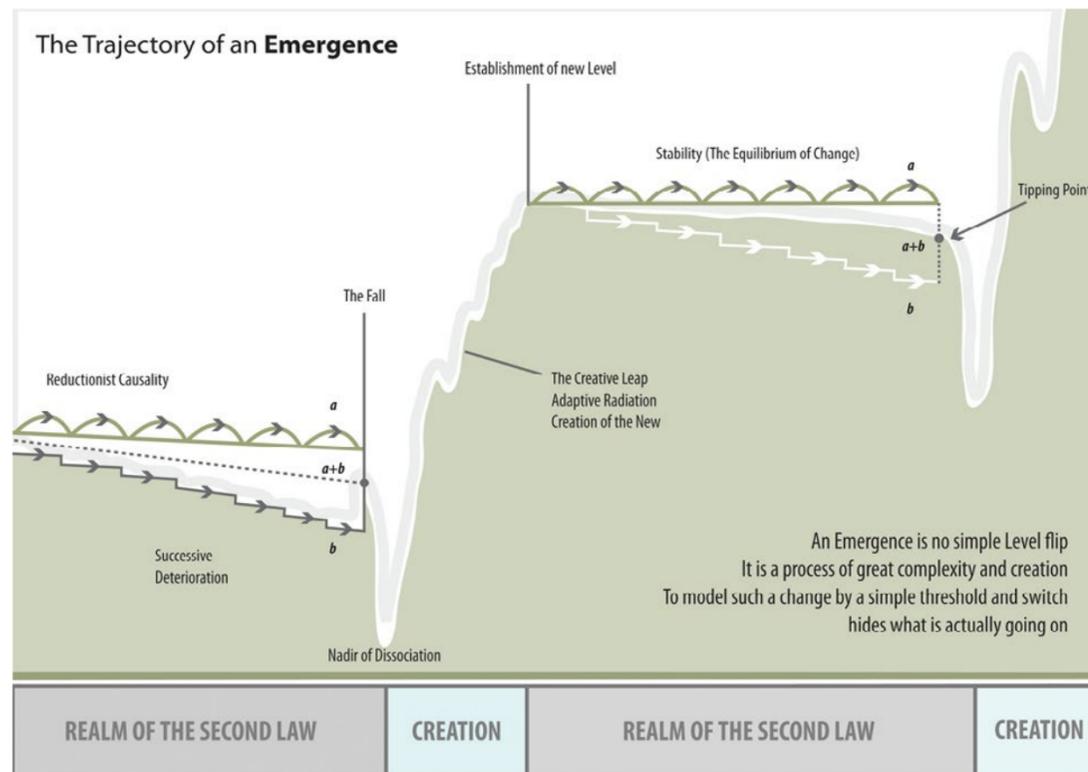
A currently popular theory in American palaeontology puts forward that the first Human Beings in America were from Europe, and that their Clovis culture in flint knapping, was almost identical to that which had occurred only in Europe. But, these early Americans were somehow totally wiped out, and all traces of the Clovis culture in following deposits vanished. By this theory, it was not until a new wave of humans, tens of thousands of years later, entered America from Siberia, that Mankind was able to re-populate the continent. And the culture of these people had clearly NO relationship to the Clovis culture, and NO intervening forms have been discovered.

It is clear that they were NOT the same people.

Such waves of hominid migration (even of different species) are well evidenced in Europe, with the well established Neanderthals arriving long before the first Homo sapiens wave appeared.

[And the Neanderthals became extinct, with no possibility of a comeback].

So, we must temper our dash to permanent Progress with a very real dose of major calamities, which certainly paused and often halted the march of creation and progress in the evolution of Reality. Of course, the present almost total pessimism of “Twenty ways to Kill a Planet”, and “Our Certain Demise!” are also nonsense in the opposite sense.



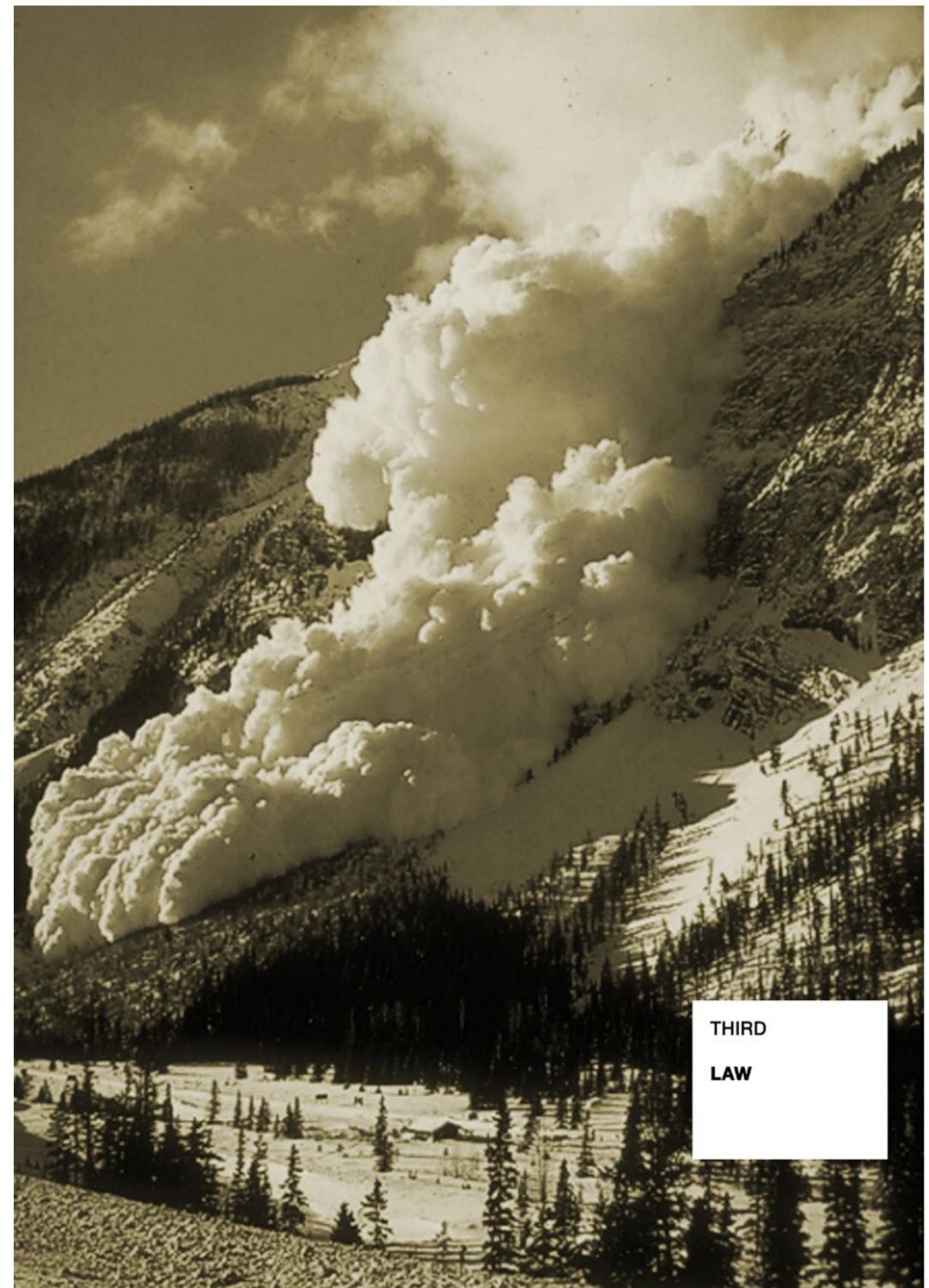
The Third Law

In the previous paper, *Inner Truths*, I brought in this diagram showing the Trajectory of an Emergence, and as this paper is an immediate follow up to that, I have included it here to from the outset. In considering what is actually happening during an Emergence, we arrived at a counter-law to the Second Law of Thermodynamics. In contrast to its drive to disorder, the new opposing Law seemed to embody a drive to order. Now these are clearly total opposites, and initially it is hard to see how they could both arise from the same ground. How could they ever be true simultaneously?

Now, these are quite reasonable complaints, but we must see that they are viewed from the basis of certain assumptions that we have about the nature of Reality. Elsewhere (and even here when relevant) I have contrasted Holism with the currently consensus Plurality position

in Science – which is Plurality. And now from that standpoint, such contradictory Laws would certainly run entirely counter to its “banker” Reductionism. But even if we abandon that position and assume that all of us are committed to seeing the World as a definitely holist situation, we can still be unclear as to what that means, and two opposite Laws from the same situation still seem totally untenable.

There are many ways of constructing Holism, and apart from the simplest, which merely sees everything affecting everything else, there are a whole group of possibly important riders! One assumption sees all processes as of equal weights so that the obvious result is either that they cancel each other out, or alternatively that they lead to a kind of permanent total randomness.



**THIRD
LAW**

Now, Holism as it certainly exists in Reality at large is not so easily encapsulated. Yet Understanding is still possible in a holistic World, and that is because all contributing factors are NOT of equal weight: they don't either entirely cancel out or result in evenly-directed, random motions and effects. On the contrary, in all carefully studied real-world cases, dominances do emerge, and all other contributions make decidedly minor contributions. They have been knocked into the long grass by strongly growing major processes., and though still present and indeed active, they are NOT evident or even seemingly significant. Such Holism, at first glance, looks exactly how we would expect a pluralist World to look.

Put a wall round a piece of it, and we can, and do, treat it as entirely pluralistic. But that is not its true nature.

Instead of some multi-process, all-directions, all-effects, and simultaneously-acting system, we have to see it as a self-moving, self-maintaining and self-developing system. And that is very different! It is not re-mix but creation that characterises this Nature. Reality seen this way is produced by itself and is also its own ground.

In changing itself, it changes the conditions for what comes next, and though the idea of everything affecting everything else is basically true, it is never a mere summation of equal contributions. Certain features always become relatively dominant, and give a given phase its current character, but even then the under-layer of less dominant processes is still chugging away and can, and in time always will, become challenging to the overall, and currently dominant, status quo.

Now, when such a temporarily stable system is first established, it is nothing like a process totally governed by a single Law or equation. Each and every stabilising victory is mutually determined by the full mix of contributions, and the controlling possibilities of the various dominant strands. All these characterise the solution – for now!

And, even within a currently “stable” system, there are constantly opposing processes still happening, and what occurs is some sort of new mix of the dominant and the minor opposing forces, so simple laws DO NOT precisely predict, as in a pluralist system. The opposing forces qualify and change the new stability, even if the same dominances continue to rule the roost. (We use summations and averages to reveal the dominant

relations) And, as you will already have guessed, no particular stability is anything but temporary, and in time the stable state will be first undermined, and then certainly completely overturned. There are NO permanent equilibriums, because Change is incessant!

To get a handle on such a holistic system, we have to think in terms of both these Phases - Stability, (when the Level persists) and then Emergence (when the Level is overthrown). Holism within a single permanent Level is NOT what happens in Reality. Multiple factors all affecting and even opposing one another are present, but they are not of equal weight. This makes Reality (even within a given Level) a continually moving target, changing all the time as it moves. And as such a system, it will contain bottom up causalities, but also top down causalities. It is NOT a set of uniformly-distributed, purely random features at all. Indeed, it is also very uneven from place to place and thus develops what can only be called partially self-produced localities. The nature of their dependence on the overall system is vital for what then ensues, and if such localities begin to increasingly undermine the overall stability and dominances, a revolution can be precipitated!

So, such a system has localities and dominances, which can and do both grow and decline.

But, in a holistic system, ideas like sequential Reductionism don't fit at all well. Indeed, perhaps the most difficult part of Reality's holism is that nothing is eternal, or even constant. It re-makes itself continually, sometimes in minor increments, and occasionally in cataclysms. And what in one period and one locality can be clearly dominant and providing the ground for everything else there, it will in time only decline to be much less dominant, and will actually finally cease to exist!

Now, there is a widely favoured version of holism, which has everything always present, and merely changing in the significance (magnitude) of their diverse contributions. With this version, nothing actually dies! Everything always survives but can be so vestigial as to be totally invisible. But, it is still around, and is always available to play a very different role in a later Phase. And this idea is clearly conceptually very easy!

The evident constantly rolling change can at certain times merely promote once unknown processes into

prominence. They may seem to come magically from nowhere. But, with this view they were always present, and merely come to the fore at the expense of others, which themselves decline and even seem to vanish, but have merely slipped into vestigial invisibility. You can see the advantages of such a conception!

Indeed, in one form or another, it is always being promoted, mainly because it torpedoes you ever having to explain the creation of the entirely new. For everything has always been present!

NOTE: I am reminded of Lenin's jibing of what he called the “Worm's Eye View” of Wundt, who definitely subscribed to this position, even when considering Consciousness

For all you have to justify with such a standpoint is promotion and demotion.

But it is indeed a get-out, and untenable for those attempting to actually understand anything.

So, with this preamble out of the way, let us tackle our two contradictory Laws! For they then, in our version of Holism, become products of different conditions at different times and/or in different places!

The Second Law is active in relatively stable circumstances. It is the effect of counter-posing processes that are initially completely swamped by those that together constitute the stability of the current Level. These dominant factors tend to suppress all change, whether destructive or progressive.

They are conservative, but, as well as maintaining a coherent system, they are still continually changing. The dominant system does not wholly suppress all opposing processes, and these can build up until they can pass a crucial tipping point, and thereafter precipitate a complete collapse of the system of stability. If only the Second Law was present with nothing to oppose it, then the result could be nothing but totally random chaos.

But we must remember that the Level dominances not only actually enabled the current Level at its birth, and policed its maintenance against dissolution, but also opposed all kinds of change. And this latter feature meant that any NEW possible laws were also stopped from growing in contribution. With the demise of the system, however, any constructive, organising, or

progressive possibilities are also no longer suppressed, and in various localities conducive pairs, or even sets, of processes can begin to proliferate at the expense of mutually contending alternatives. This development is surely one towards increasing order, but can only happen when the dominant, anti-change constraints are no longer in charge.

So, the Second Law had changed the situation to one in which a drive to order becomes possible. It had produced the ground for its opposite!

Now, we could treat such situations in a very pragmatic way!

We could, once more, merely (and crudely) switch modes and change the laws we apply (indeed, exactly as they do in computer simulations), but that would merely be a pragmatic frig. We know when to switch (when a threshold is passed). We know what to switch to, and even how to apply the new law, but we do not know why!

What initially enabled the Second Law was precisely the crystallisation of a self-maintaining, new Level with its own dominances.

The ball keeps rolling, and any newly emerging embryo systems of such stability will be counter-posed by a re-energising of the Second Law, until it once again subsides, having done its job, and a new creative drive again commences. The system thus oscillates under the alternate actions of the two laws.

But, it doesn't do so for ever! Indeed, the ladder upwards of successive new sub-systems of relative stability are merely possibilities, and most will not be up to the job of establishing and maintaining a New Level. They will be defeated by an immediately resurgent Second Law.

But, after each oscillation, the recurring effect of the Second Law becomes less able to undo all that had been constructed, and the next upward drive quickly reasserts itself and takes things further. The effects of these two opposing Laws finally begin to cancel each other out and the amplitude of the oscillations gets smaller until they cease altogether leaving a new and persisting Level of significant, though relative, stability.

So, let us attempt to address this decreasing (let us say damped) oscillation of the two alternating and opposing

laws, and explain why it doesn't just oscillate with equal amplitudes for ever.

There must be a THIRD LAW involved!

Without it the quite evident sequence of higher and higher Levels could not happen. In effect, this law allows the creationist side to win for a longer period in each oscillation, and thus establish a new and definitely higher Level than from where this Emergence started. Some ideas as to what is occurring have been outlined above.

What do you think?

NOTE: Hofstadter, and many others, are always talking about meta-this or meta-that, and what they are referring to is quite legitimate. Languages used to describe languages in general, would be termed meta-languages, while Hegel's "Thinking about Thinking" might well be termed meta-thinking (if he didn't define Philosophy that way).

What they had realised was that these were more than merely categories, and do, in fact reflect a layering in Reality, as well as our way of dealing with it.

The discussions in this paper, though still very elementary, also recognise hierarchies of laws, which only become possible by the emergence of higher Levels. And, crucially, many of these laws are top-down! The rigidly pluralist position can only see bottom-up causality, which explains why its adherents are constantly driven downwards to more and more basic entities and laws, until they must hit the bottommost rung.

They have to have fundamental entities and immutable, basic laws on which EVERYTHING is based.

A holist perspective brings in what was, and is, impossible via Plurality. It realises that the whole Process is inter-related in all directions, and it rejects straight-through Reductionism as an invention when applied to everything and all Levels.

Only Holism sees the Emergence of the entirely New, and also sees how the new higher Levels can affect those which are lower.

There can be NO Control in a totally pluralist World – only a determinist and complicating explanation for anything.

Control implies top-down, and it allows stabilities to establish themselves.

With Plurality Stability is a principle! With Holism it is a consequence!

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