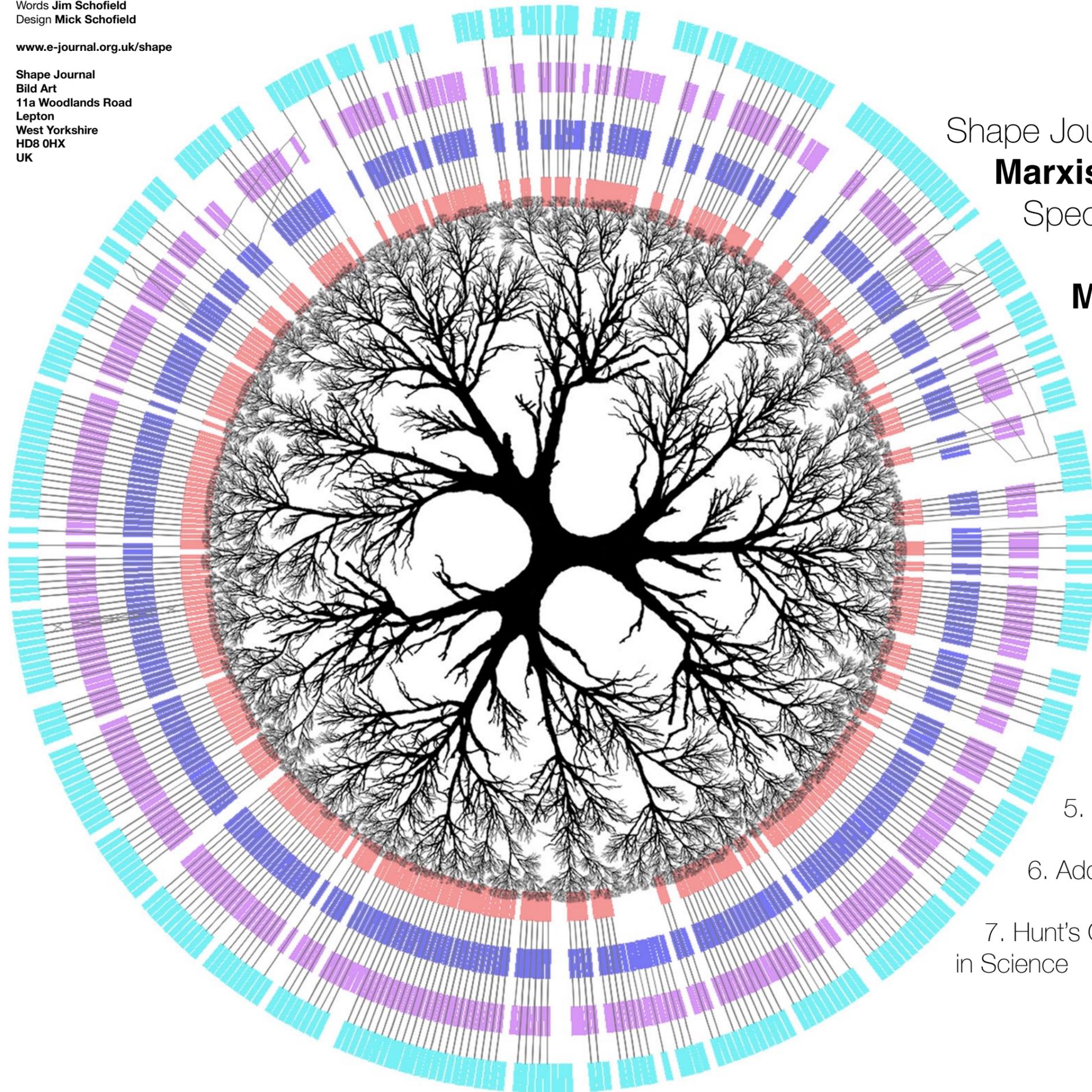


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Shape Journal
Marxism I
Special Issue 17

Miller's Experiment

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Introduction

A Special Series on Marxism

Welcome to the 17th Special Issue of the SHAPE Journal, the first in a new series on Marxism and Science.

The major difficulty in defining an agenda for the essential work of Marxists today is just that the necessary range is so vast, and yet any selectively biased content will undoubtedly have the same damaging effect as has been shown to be the case in the concentrations followed in the last period.

The work must be carried forward on all fronts. But, in merely saying that, such cannot, of itself, reconstruct the ground on which current Marxism is pursued: that could indeed remain exactly the same, but applied to a wider variety of areas. There is clearly more to it than mere range.

Indeed, there can be little doubt that the standpoint of Marx and Engels has been abandoned by current Marxist, even though they continue to strongly acclaim the virtues of those giants. Frankly current Marxists have abandoned Marxism, because they are simply not up to the task.

But, if so, how can such a Series re-establish the sound philosophical standpoint of the founders of Marxism. It clearly cannot be achieved by merely quoting selectively from those masters. The current practitioners have to do what Marx and Engels did, only more so, and in a much wider and more demanding set of areas.

For, as these philosophers showed, there is absolutely NO specialist area of human investigation that cannot profoundly benefit from the supreme holistic, philosophical standpoint of Marxism.

But how on earth can we redefine that, and ensure that it is indeed used as the point from which to view Reality in every possible respect? It is clear to this author, after a lifetime of participation in many different Sciences, and a worthwhile contribution in many of them, that the touchstone area to ensure that the correct approach is followed has to be Science, before almost anything else.

Now, this general area was widely ignored after the early Marxists, and indeed, in spite of the quite evident major crisis in Sub Atomic Physics that has now lasted for around a century, no one Marxist has been able to address this impasse, and currently many of the same ilk are queuing up to actually conform to the retreat that goes under the title of The Copenhagen Interpretation of Quantum Theory, and its consequent and wholly idealist developments.

The test piece for this required rejuvenation of Marxism has to be the Defeat of Copenhagen – totally and unrecoverably!

Now it wont be easy, for this “section” of Physics has turned away from explaining Reality to exploring a much more amenable World – that of Pure Form alone, the domain of the Mathematicians, which I insist on clearly identifying as Ideality!

Yet it is hard to depart from a definition of Science as The Study and Explanation of Reality in all its aspects, and hence it is not only inseparable from Philosophy, but would seem, at its best, to stand upon identical ground to Marxism as a philosophical standpoint. And though, in small areas, a new approach to Science, which is entirely holistic rather than pluralistic has begun to appear in a number of specialisms, they are totally uncoordinated.

No comprehensive methodology for a Holist Science has been developed or even admitted to be necessary.

The total abandonment of the holist idea behind Miller’s Experiment concerned with an investigation into the Origin of Life on Earth, shows just how indissolubly wedded to Plurality is the Science of Today. All the consequences of a pluralist standpoint dominate current Science, from Analysis based upon the separability of all contributing factors in any situation, right down to a causing hierarchy to the simplest of fundamental, immutable bases – Reductionism.

Indeed, the true Nature of Reality is denounced, to be replaced by the much more easily used pluralist and domain-based construction.

Yet, as this author has demonstrated, a modern version of Miller’s Experiment is entirely possible, using techniques already available, from pluralist science, but used to contribute to an entirely holistic core experiment.

Now the overall task outlined here is clearly much too big for a single Special Issue of SHAPE Journal, or even of an ambitious book. And it is certainly too big for a single individual to tackle either effectively or comprehensively. But, to establish this vital area will require specialists: scientists who are dissatisfied with the universally dominant pluralistic approach.

The author of this paper has been involved in Marxist politics all his adult life, but there were never enough scientists there. In spite of being a mathematician, a physicist and a biologist himself, his clear commitment to these disciplines was invariably dismissed as a deflection from the real issues. My political colleagues were mistaken! It is the responsibility of Marxists to include Science as the only other discipline possible to reveal vast tracts of Reality. To ignore Science, or even worse to merely follow its pluralist bias is unforgiveable.

A start must be made!

This new Series of Special Issues of the SHAPE Journal, will be totally dedicated to Marxism in Science.

The purpose will be to encourage many more to join in the effort and submit their own contributions.

The intention is to cover the following areas at a rate of 6 volumes of SHAPE per annum:

1. A Revised Version of Miller’s Experiment
2. The Theory of Emergences
3. An Alternative Marxist Cosmology
4. The Alternative to Copenhagen
5. A Holist Science
6. The Origin of Life on Earth
7. Not Absolute Truth, but Objective Content
8. Truly Natural Selection
9. Order and Chaos
10. What is Mathematics?
11. Form and Content
12. Stability & Revolution

These are intended to be interleaved with other Issues of the SHAPE Journal, appearing about every two months or so, and should therefore take two years for the complete cycle to be completed.

Jim Schofield January 2013

What Next for Marxism?

There is, without a doubt, a major problem for Marxists of today. The Golden Age typified by Marx and Engels, and later by Lenin and Trotsky has passed, and the betrayals of the Social Democrats, and then by the Stalinists have turned millions away from the political organisations that once had both the prestige of those major philosophers and the success of the Russian Revolution to validate their credentials.

Today mere theoryless-activism both dominates so-called “revolutionary politics” and guarantees absolutely no possibility of a conscious intervention in any arising revolutionary situation when it, as it must, invariably arrives and requires the necessary action.

The Arab Spring proves that comprehensively, as does the current World Crisis of Capitalism, and the evidently insoluble nature of the so-called Euro Crisis. And, in addition to the revolutionary Arab masses, the Greeks, the Portuguese and the Spanish are also on the streets, but where is the suitably-equipped revolutionary leadership to lead them to victory? And finally and crucially, where are the theorists developing either the Philosophy, the attitude to Science, or the necessary political analyses to make a real difference?

Since the early part of the 20th century in Physics there has been the most significant and damaging retreat in centuries with the victory of the Copenhagen Interpretation of Quantum Theory. Any competent Marxist theorist should find it essential and possible to demolish such a standpoint. Lenin at about that time in his *Materialism and Empirio Criticism*, and without any substantial grounding in Science, still took a correct and telling position with regard to the Positivists, who provided the basis for the following new stance in Physics. And yet what happens today?

Recently, I had to write in opposition to a self-professed “Marxist”, Pete Mason, who agreed with that idealist nonsense, and in doing so claimed to be making an important contribution to “Modern Marxism”. Whereas, of course, that could only be the case if he had been completely vanquishing that intrusion of out-and-out idealism into Science.

And continuing with other problems in current Science, where is the attempt to contribute to the key problem of the Origin of Life on Earth? Once again, many Marxists parrot the standpoint of the NASA scientists, instead of condemning their blatant self-seeking pragmatism, and instead apologize for that organisation’s need for constant and immense funding by agreeing with their hope-filled analyses. They even tail behind Brian Cox and the search for the fabled Higgs’ Boson with the Large Hadron Collider,

when they should be ripping the assumptions behind that line of research to shreds.

These failures demonstrate that what is said to be Marxism today is no such thing. And this is so evident that even clear liberal enemies feel the confidence to write articles affirming that Marxism is finally dead, and that the only recourse for the World is in what they define as Liberal Capitalism. Wow! (See the recent review entitled *An Apologist for Liberal Capitalism* on the SHAPE Blog)

The universality of approach of Marx and Engels has gone.

And yet Engels’ *The Part Played by Labour in the Transition from Ape to Man*, written in the 19th century, is only now being reflected in scientific theory (see *The Origins of Us* on the BBC with repeats on the EDEN TV channel and the recent review on the SHAPE Blog).

So what do we do?

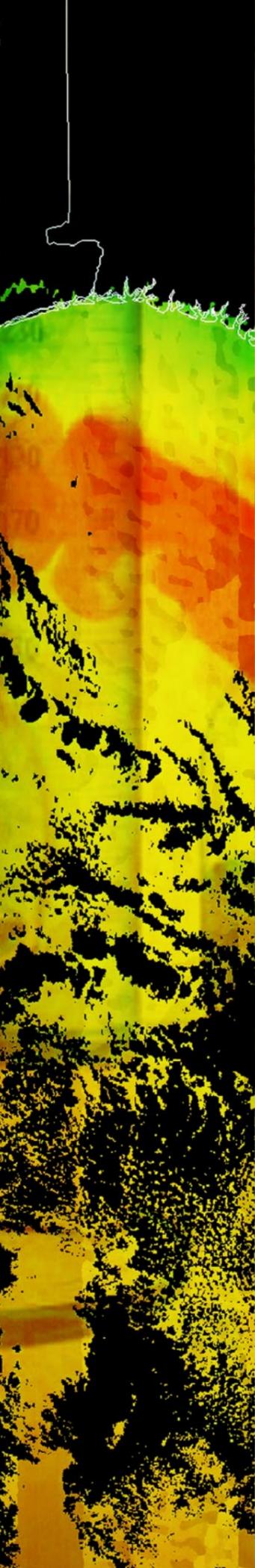
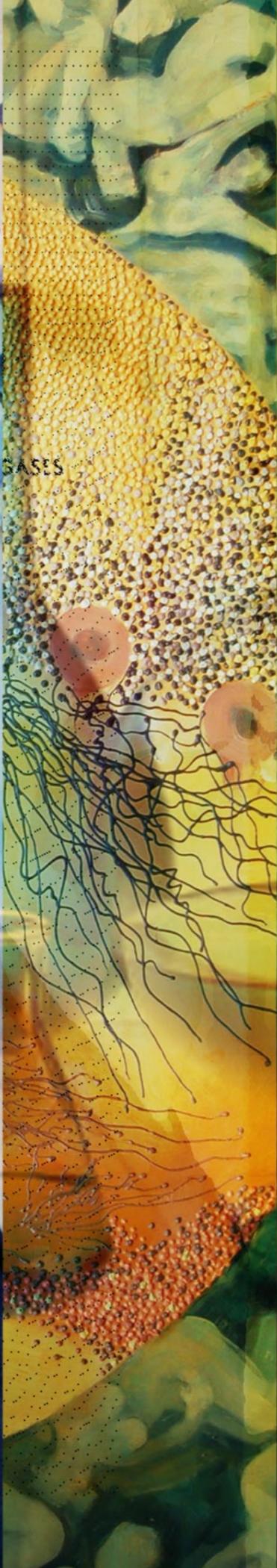
This Marxist, Jim Schofield, has established and written all the content for The SHAPE Journal, its Blog, and its YouTube channel for the last three years, but, clearly, no single individual can deliver what is so evidently required.

In 2010 this writer published a SHAPE Special on *The Theory of Emergences*, which attempted to deliver a description and explanation of the changes taking place in all revolutions, no matter where they took place. But, these are clearly voices in the wilderness, for though there are readers all over the World, there are as yet NO fellow contributors.

The concentration upon activist politics as the only arena for Marxism has most certainly emasculated it. Marxism is a Philosophy and not merely a political position, and certainly NOT a recipe for everyday activities.

The tackling of bourgeois Science and its further investigations into our clearly Holistic World in all its aspects must be one of many crucial and essential tasks. Without the defeat of what is happening in Science, there will be NO rejuvenation of Marxism. It is THE present day philosophical battleground.







The Holistic Trajectory of Change

Why was Miller's Experiment so important?

Why, in spite of it not leading to any wholly new and important front in Experimental Biology, did it nevertheless resound across the World as a profoundly significant event?

It was because a relatively unconstrained attempt to reconstruct the primaeval conditions in which Life must have first appeared from its immediately prior inanimate precursors, and that also actually worked, and delivered such exciting and relevant products. Indeed, via a very simple on-going cycle of isolated processes, involving, on good evidence, the likely available atmospherical gases, plus water and water vapour with heat and lightning, managed, all by itself, to generate amino acids.

Now this was simultaneously highly exciting, while also incapable of being explained in any way. Such complex organic molecules couldn't just "occur" directly from the components present. To get to such a result must have involved, not only many different and simultaneously acting processes, but these must also have driven the totally isolated environment through a series a game-changing transformations, with both dominances and diminutions, until at some point, in some odd corner the final process must have delivered that remarkable end point.

Amino acids are the building blocks of many crucial proteins in all known living things. Their production in so short a time period (one week) did not gel with the usual formula of innumerable chance happenings over truly vast periods of time. But such a miracle was also inexplicable, because what happened inside that sealed apparatus was totally unknown. All the usual methods of present day Science (based upon the Principle of Plurality) were not allowed in such an holistic experiment, and quite right too!

Clearly, the vital, yet unanswered question had to be, "How did such vital organic substances come into being?"

Yet the essential holistic nature of the experiment made the answering of that crucial question impossible to address. The very necessary isolation of the system prevented any monitoring and certainly no kind of analysis. The trajectory from the primary components sealed within the apparatus, all the way to the resultant amino acids was impossible to extract by any of the usual means employed in almost all other experiments. But, there can be no doubting that such is indeed the most important question generated by the experiment.

But, let us consider how such questions do get answered in most everyday scientific experiments. The standard

methodology, termed *pluralistic*, involves the essential farming of the conditions to a truly remarkable degree. A tailor-made Domain is always constructed (originally by trial and error, but ultimately on the basis of mounting evidence to so limit, and indeed constrain, the given circumstances of the experiment to guarantee that any once "only glimpsed" relation will be made both clear and capable of being extracted "whole" for further study.

And of course, that next phase was generally made possible by the quantitative nature over related variables of the data extracted, which could then be processed entirely formally and abstracted into an Equation.

Now, such a methodology is supremely interventionist in a whole series of ways, and undisputedly alters circumstances and suppresses as many contributing factors as possible to both isolate and reveal a particular "individual contribution".

The Principle on which this is developed is termed Plurality, and boils down to all such constituents being entirely separable – that is totally independent of their current context.

Clearly, this is a major assumption and certainly incorrect. It purposely rejects qualitative transformations for purely quantitative summation of contributions. It replaces development with mere complexity!

Such a methodology will allow the extraction of something, but it will NOT be exactly the same as it is in any of its real natural and concrete contexts. It will be an idealisation of all possible cases, and will never exist as such in unconstrained Reality-as-is.

Now, such a method is the exact opposite of Miller's. He instead strived to minimise to zero any deforming interventions. He required only the actual natural processes and sequential Phases to deliver without any man-devised farming. You can see the problem!

Now, though the alternative standpoint of Holism is very ancient in Mankind's development, it seems to be directly at odds with the usual scientific methods. It occurs in the Arts, and in Religion, but is totally excluded in most of Science. Yet there is no avoiding it in many vital natural processes, and if they are to be addressed then some ideas will have to be extracted from such hidden situations and tried out until recurring successes prove that the assumptions involved have real merit.

How, therefore, are we to tackle that kind of walled-off process, as carried out in Miller's Experiment?

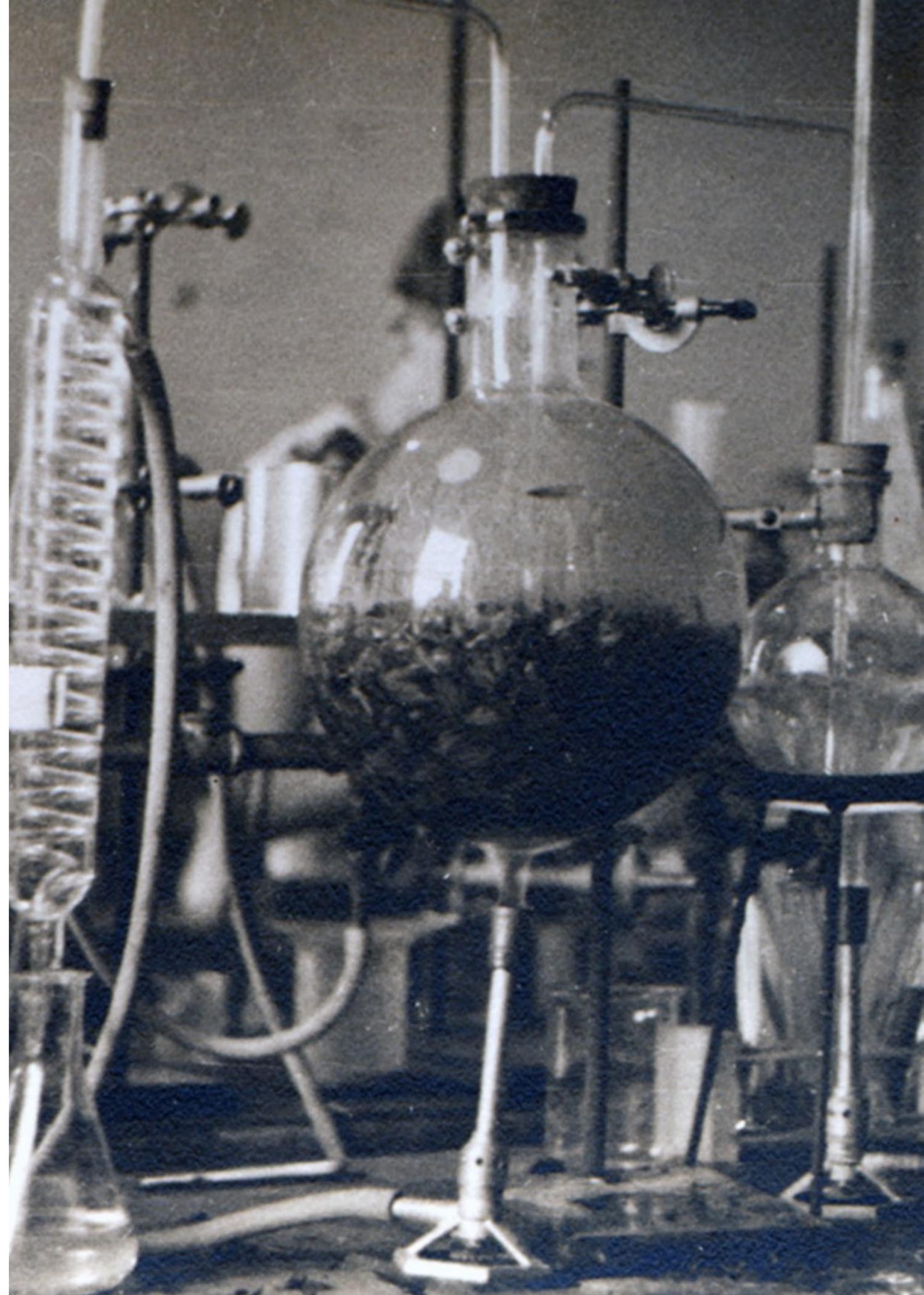
The answer may surprise you!

You have to consider the possible occurrences philosophically. You have to trawl thousands of such holistic situations, and attempt to extract general conclusions of what might be going on. NOT, it must be emphasized, as a mere sum of individual, separable contributions, but, on the contrary, as complex, mutually-modifying mixes of factors, all affecting one another to varying degrees, and also never remaining as some overall unchanging, random mix, but, on the contrary, arriving at situations that “break the symmetry”, and thereafter move the situation into a very different Phase after another.

After all, such things are happening all around us all of the time, and, most significantly of all, to ourselves, and to all evident Life everywhere. Clearly, these important features of Reality change profoundly at certain key events.

From fertilisation of the living egg, via many phases of pre-birth development, to the actual cataclysm of “being born”, then via infancy and childhood to adulthood, maturity, old age and death. And these trajectories are everywhere.

Indeed, we soon learn to see Analogies in many different areas of Reality, where evidently comparable phases of development could not be missed. Any such comparisons allowed us to begin to map similar things, processes and phases onto one another. We began to grasp change by analogy, and give identifiable phases in very different scenarios more general and indeed abstract names. And thinking about such resonances gradually became Philosophy.



Investigating Cascades of Avalanches (in a Holistic way?)

The Ground & Proposal for a New Miller's Experiment PAPER I

Let us consider the alternative to the usual Development by Chance, Incremental Change and Eons of Time Model that is usually used for explaining Emergent Events such as the Origin of Life on Earth.

The “impossible” route from totally inanimate processes all the way to the establishment of self-maintaining Life, is usually “explained” by the well-worn parable involving monkeys, typewriters and the Complete Works of Shakespeare, along with vast amounts of available Time, and the inevitable enormous helping of Pure Chance, is, of course, total rubbish! It explains no processes, and is a means of shelving this important question!

The “principle” involved seems to be that no matter how unlikely certain outcomes are, given enough time, even these will happen somewhere, somehow. When the religionists criticise this “explanation” they are quite correct. It is impossible! But, of course, that does not mean that their alternative holds any water either. It certainly doesn't!

But, the Random Chance version does provide a kind of placeholder for an as yet Unknown Process that must have somehow implanted some sort of “direction” into the quite natural and undirected processes involved, to move them to the almost unbelievable miracle of the Origin of Life. Now, “direction” is NOT the same as preordained “purpose”, of course.

It implies mainly that the odds against certain occurrences can be quite naturally shortened by a culmination of multiple and simultaneous changes making certain outcomes much more likely than they used to be. In other words changing circumstances changes probabilities! Now, addressing such things is much more easily said than done, especially as the methods available to Mankind have, for many Millennia, been entirely inappropriate to coping with fully holistic situations.

Our scientific methodologies, for example, have only been possible by treating the World pluralistically – that is dividing it into artificial Parts, which we subsequently treat as stable (indeed often immutable) entities, and apply systems (also predicated on the same sort of assumptions)

such as Formal Logic and Mathematics, to manipulate and analyze them.

The successes of this wholly lopsided methodology quite effectively hide its inadequacies, because they do deliver quite presentable and useable predictions, and hence allow the revealed relations to be successfully employed to predict and then achieve some required outcomes..

The magic of successful prediction has long been the real clincher in establishing any sort of methodology concerned with addressing Reality.

These methods are, however, totally inadequate when the World is dealt with as is – that is with absolutely NO Constraints and Controls at all but dealing directly with a truly holistic World. This we rarely even consider and the question of the Origin of Life on Earth CANNOT be addressed in any other way! Indeed, our usual pluralistic methods totally exclude the possibility of such an Event by their very nature.

Now, it is not just this single question that requires an holistic approach.

Already, science has had to deal with the subsequent Evolution of Life from its primitive beginnings to what exists today, and this includes everything all the way up to even Consciousness and Society.

All these questions will NEVER be solved by the usual pluralistic methods. The investigation of Reality is already well over-ripe for a truly holistic methodology, that will allow these questions to be addressed with some chance of answers being found.

The real questions are certainly about what can only be called direction and orchestration, wherein simple mechanistic processes can become co-ordinated parts of complex and clearly “directed” systems.

How does Reality build its own hierarchies and create its own directions?

But, though the answers to such questions may be

difficult to accept as feasible, they are not as incredible as an immaterial and all-powerful God, who has directed the whole process to his own designs. So, some sort of placeholder was the best that they could do.

The problems involved were greatly magnified by the universally accepted methodology of Mankind which had been developed in gradually addressing a general understanding of natural processes.

In a holist World, where everything affected everything else, Mankind could only proceed by both conceptually and physically simplifying situations to make them more amenable to study. They had conceived of Plurality – the Whole and the Part – which conceptually identified first Wholes, and then the component Parts, which seemed to constitute them. By applying the clearly shown properties of the Parts to phenomena, and judging their combined effects, some sort of explanation of the Whole was often possible.

The problem of the Parts themselves was “solved” by treating each one in turn as a “lesser Whole”, and giving it, and its Parts the same sort of treatment.

But, such a system was initially purely conceptual, and was frequently confounded by the actual actions of Reality itself.

Clearly, too many simultaneous processes were going on in unfettered Reality, so Mankind had to devise physical methods of study, which were conducive to the pluralist conception of things.

This was finally discovered, but only after the necessary Knowledge, and hence Control, was in the hands of Mankind, for this method involved extensive constraints on the area of Reality to be studied, so that most involved factors were held CONSTANT. This Experimental Method then worked, for it revealed relations between pairs of variables much more effectively than any of their previous studies involving only unfettered Reality.

Yet, as this author has demonstrated, a modern version of Miller's Experiment is entirely possible, using techniques already available, from pluralist science, but used to contribute to an entirely holistic core experiment.

Now the overall task outlined here is clearly much too big for a single Special Issue of SHAPE Journal, or even of an ambitious book. And it is certainly too big for a single individual to tackle either effectively or comprehensively. But, to establish this vital area will require specialists: scientists who are dissatisfied with the universally dominant pluralistic approach.

Investigating Cascades of Avalanches (in a Holistic way?)

The Ground & Proposal for a New Miller's Experiment PAPER II

Vast numbers of separate relations were discovered by this new scientific approach, but each was unavoidably predicated upon the tightly constrained conditions in which it was derived. Sadly, as you will have guessed, the initial assumption that all of these relations were actual component elements in Reality, was stymied when they were attempted to be USED.

They invariably failed when applied in unfettered Reality. A second realisation had to be arrived at, in which the conditions that had been required in deriving the relations were also seen to be essential when it was required to use them.

So instead of these scientific investigations delivering large numbers of component relations out of which Reality was constructed, the view had to be modified (at least by the people who were expected to use them, such as engineers), into “laws with “associated conditions”.

If a series of such laws were going to be necessary to produce some required outcome, then the technologists had to construct a series of ideal conditions – one for each law to be applied in sequences. (Only observe an oil refinery to see the full implications of this in real world situations of use).

Only, “Pure Theorists”, who didn’t do any “delivering” of required outcomes, could continue to imagine that the separate laws were “components”, and theorise accordingly!

As long as the replicated restriction of conditions was addressed for each and every law and its use, then the methodology was very successful, but it clearly had also led to a philosophical position, particularly on the part of non-doers and observers in general, who saw the whole of Reality as entirely composed of the derived relations, and turning the whole methodology around, produced a conception of the World as merely a complication of such component relations and entities. Indeed, as is the usual method of Pure Thinkers, they went even further and conceived that it would be possible to analyse each and every “thing” down to its basic fundamental Parts and their inter-relating laws.

With such a view the construction of everything could be organised, as soon as all the relations and the things they acted upon had been analysed down to their ultimate “parts” and “laws”.

If you think I am making this up, ask any modern physicist of their overall conception of the nature of Reality. Why do you think that they build Large Hadron Colliders? What are they looking for?

Now, there is yet another aspect of this view which must not be omitted.

As every single extracted relation depends on its own constrained context, as soon as that context is changed, the dependant relation will vanish!

Ofcourse, new experiments in the new circumstances, could again deliver appropriate relations, and hence predictable outcomes, but once more the “conceptual gloss” explained such impermanence as merely different laws, which were selectively revealed by the different circumstances. The one law hadn’t vanished to be replaced by a quite different one: BOTH laws were always present, but circumstances selected one rather than another for dominance in the given circumstances. The idea of them ALL as components was not considered to have been demolished by such seemingly damning evidence.

Such evidence was not allowed to undermine the Reductionist view – for that is what their avowed position is called.

The whole of Reality was STILL thought to be ultimately composed of the same fundamental elements and their fundamental laws of interaction..

Everything else was down to which combination of circumstances was present in each given area to produce its characteristic high-level and measured properties.

The approach coloured all attempted explanation, and papered over all contention and gaps, which, of course, by such a methodology, appeared absolutely everywhere. All such phenomena were put down to different mixes

of components, and merely shelved for filling in later by others using the usual means.

In time all problems were similarly treated and the attendant resolutions were expected to be delivered in time, when all such aberrations would be individually and appropriately investigated. But, of course, all these conceptions were, and still are, untrue!

Beyond the rigidly constrained Domains of Applicability, that were first constructed to allow our derivations, and later replicated for effective USE, the laws AND the “Parts” did not exist as such.

The world is not divisible in a pluralistic manner, but instead consists of a holistic mutually determining and always-changing nexus of transitory factors. So, the manipulations and juxta-positioning of multiple pluralistically engineered and extracted laws could not possibly deliver all extant phenomena at all. What was delivered were numbers of severely constrained circumstances delivering what was possible only in those circumstances, and the subsequent summations of these laws conceptually, and independent of their necessary and different contexts was, and still is, totally illegitimate.

While solutions could be found for their effective use in sequences of highly constrained sets of circumstances, their application to unfettered Reality was clearly illegitimate. Yet many inexplicable Events, such as the Origin of Life on Earth, HAD, without any doubt at all, happened a some point in the past.

The attempts to conceptually tackle this “miracle”, in terms of pluralistic laws, were bound to fail.

The model of “chance happenings” and “infinite time” was merely a placeholder explanation that was the only thing that could be thought of to explain it given the then current knowledge and methodology. It was, and is, of course, nonsense, but it temporarily put up a seemingly non-religious explanation of this event, that could be refined and improved at some later date. Its conceived of elements are not true, and its invention by pure chance is similarly pure speculation and indeed total rubbish!

The crucial probabilities which are banded about are actually not calculable. All probabilities work from already knowing the full set of possible outcomes, and by the assumption that they are all equally likely, calculating the chance of a single one occurring.

We certainly DO NOT know all the possibilities, and they would certainly NOT be equally likely. They would be changing by their determining individual and local contexts all the time.

The ideas involved were merely very simplified models, that could work in environments where such assumptions are legitimate (as in contained volumes of gas), but impossible in wider situations, which will most certainly NOT be so well mixed and generally predictable. They will both be full of different localities with different conditions AND be constantly changing anyway. The model in such circumstances is highly inappropriate and totally misleading. It is a conceptual frig!

Investigating Cascades of Avalanches (in a Holistic way?)

The Ground & Proposal for a New Miller's Experiment PAPER III

What has to be addressed in such cases, as those being considered here, is very different from the usual pluralist approach. Unfettered Reality does not naturally bring totally random productions, for if it did, all we would have is uniform chaos! The Second Law of Thermodynamics would be true, and the World would merely move from any vestiges of Order to successively more chaotic situations until NO FORM remained. Believe it or not, THAT is precisely the prediction of a final future for the entire Universe, by the pluralist Cosmologists of today!

Such scientists are not equipped to deliver the important processes in Reality, because their methodology PROHIBITS such explanations.

The ONLY way that things such as the Origin of Life on Earth can be addressed, is by considering exactly how totally unfettered Reality actually creates Form!

For that is certainly what happens in the Evolution of Reality. In contrast to the “descent into chaos” scenarios of Plurality, we actually have New Forms emerging, which transform their own producing situations, and in so doing, change the game entirely!

The Origin of Life is just such an Event. But though, without doubt, the most important one, it turns out to be only ONE of many such Emergences that have transformed Reality throughout its history.

Somehow, mixtures of processes can get into some forms of positive feedback situations, wherein an avalanche of Change can locally transform a the context. What was scarce, can become abundant, and, in special circumstances trigger yet another avalanche of positive feedback, in another direction of driven transformation.

Indeed, in crucially chaotic circumstances, it can happen that most situations can be close to their limits, and one avalanche of change can trigger another, and ultimately a whole sequence of such events in rapid succession which radically alter the whole situation into something not only very different but indeed also NEW!

All sorts of threshold situations can be passed, and a wholesale overturn of the relatively-stable, prior situation occurs and proceeds until some stability finally emerges. These remarkable Events are termed Emergences, and the Origin of Life is JUST such an epoch-making example of one of these.

Now it must be clear that such things could NEVER be arrived at by a strictly pluralist approach.

The whole basis of extracted pluralist science is engineered stability – the conscious and planned constraining of a situation, to allow a relation to be more easily found and measured. As a methodology, it nails its discoveries to a given floor in very constrained circumstances.

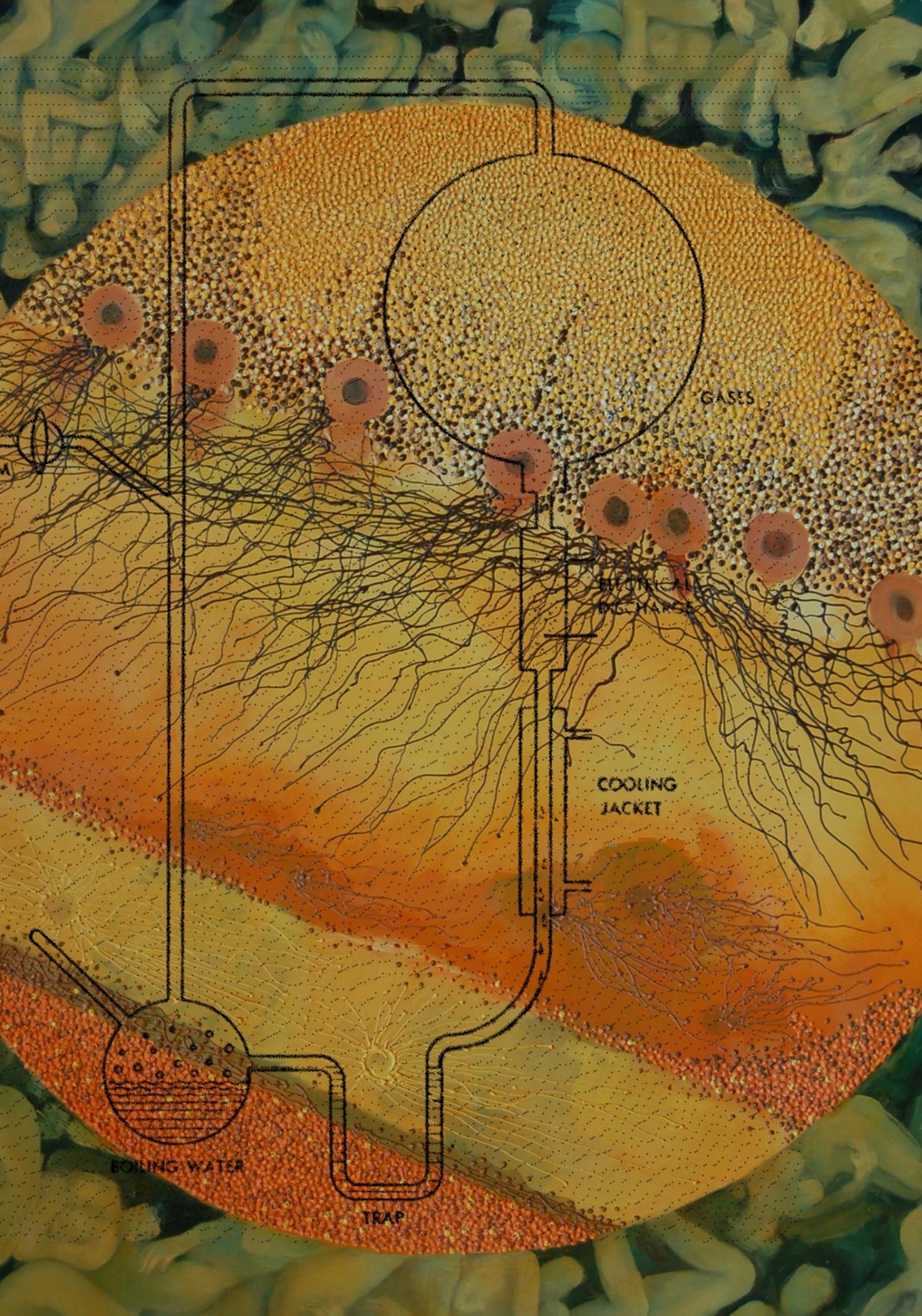
The gradual accumulation of crisis in unfettered Reality is impossible to model using this approach, primarily because the very factors undermining the situation are those NOT included in the derivation of the current relation. Thus the method's facilitating simplifications are also its greatest weaknesses when it comes to SUCH a kind of Change.

Though such events are conceivable, they are NOT constructible by pluralist means! They cannot be purposely made to happen, because the elements involved are not included.

Now, that is NOT to say that experiments cannot be conducted in unfettered Reality. They indeed can! But, the results can in such situations, more often than not, totally defy explanation. It is not clear exactly what is happening, when they are happening, in what order, or even what contributory elements are taking place simultaneously with other such elements.

All that can be said is that, in some nexus of Events (and the sequences happening within them) the final products, by unknown means, were X, Y, Z and W or whatever. Attempts to interpret such “experiments” amount to pure speculation, and are NOT pursued.

Yet there was a vital holistic experiment that deserved a much better treatment than it was given after its first, and profoundly revealing, demonstration.



It was, of course, the famed Miller’s Experiment.

Let us briefly describe the experiment.

Various prior investigations had dependably established what gases were present in the Earth’s primaeval atmosphere around the time of the Origin of Life. They were very different from the atmosphere of today, and were a mixture of those aggregated into the planet at the outset, and those added to the atmosphere as a result of much volcanic action (which also had been established in the record of the rocks laid down at that time).

Miller built an air-tight glass apparatus, to contain the mix of gases, and which attempted to model the most likely possible processes in that situation. He added a measure of liquid water, which by the added application of heat was turned partially into water vapour. And he arranged for electrical discharges within the system to deliver “lightening”. Finally he introduced a connected distillation system to turn water vapour back into liquid water, and a link to return it to its sink at the bottom of the apparatus.

He set his apparatus in motion merely by applying a small measure of continuous heat, and left the system to process.

After 24 hours he returned and was amazed to find that the water sink had turned a red-brown colour.

On analysing this liquid, he found that it contained several amino acids.

First he, and then the World when they heard about it, were totally amazed!

Amino acids are crucial within the metabolism of ALL living things, and they had here (somehow) been produced by a very simple apparatus modelling the primaeval atmosphere and the water cycle.

Well, you could play with the chemical formulae of all the substances that had been originally inserted in the apparatus, and see what possible reactions could have taken place, but any certain sequence of processes ending with the resultant amino acids could NOT be demonstrably produced.

Investigating Cascades of Avalanches (in a Holistic way?)

The Ground & Proposal for a New Miller’s Experiment PAPER IV

Miller’s crucial experiment was undoubtedly a holist experiment!

Obviously, many different and simultaneous things were happening AND, very importantly, not only provided new substances for further reactions, but played all sorts of encouraging and inhibitory roles, so that necessary conjunctions of substances were produced at the right times and with the right conditions for the next steps to be possible. Many stages would have come and gone and their roles would not now be evident.

Indeed, all the problems of observations, and even experiments, in a holistic environment were necessarily present here too, and in spite of the profound significance of the results, no-one could give a certain and useful sequence of what had been going on.

Amazingly, this magnificent experiment was ONLY used as an argument for the natural Origin of Life. Along with a whole set of other confirming experiments, they all became merely evidence, and none were pursued further and scientifically. (Indeed, there was a great deal of criticism and even dismissal of such experiments by those opposed to either the inferences being drawn, or, even more widespread, the “unscientific form” of the experiment!)

Of course, such a revelation could not be junked. A considerable group of scientists greatly applauded this first real evidence of a natural step towards the Origin of Life, while others asked “What next?”, and when nothing was forthcoming dismissed the experiment as proving nothing! Of course, BOTH groups were RIGHT! It did indeed point towards the Origin of Life, but it was of itself, totally insufficient to establish what had happened in this Emergence. Remember, at this time, MOST scientists still dismissed Emergences as figments of some peoples lurid imaginations.

Many more contributing experiments were carried out by various other scientists, perhaps the most important being those devised by the Russian Oparin, whose experiments with Sols & Gels revealed properties that were certainly, long after the establishment of Life, harnessed in single celled creatures such as the Amoeba.

But, once again, they turned out to be merely “moments” in an, as yet unrevealed, revolutionary process that MUST have been involved to actually precipitate the very First Life on Earth.

Indeed, it is clear that none of these experiments were actually vital elements within the Origin itself. They were what we should call necessary precursor processes, rather than creator processes actually causing the Origin. Thus, they had to have happened, in perhaps the way that they were regarded, but most, certainly, prior to the Origin of Life. They could in no way be said to have caused it.

Such experiments didn’t thereafter, and of themselves, lead anywhere.

Literally thousands of such processes must have occurred in the pre-Life period and similarly led nowhere.

The pluralists did, and still do, attempt to deliver a storyline in which all these came and went at various times, but in time, and entirely by Chance, came together, at the precise same moment, in a simultaneous “action” that precipitated Life itself: their simultaneous presence automatically generated the First Life.

Such a “theory” is, of course, utter rubbish, and for more than one reason.

First it implies that the Origin of Life was an entirely positive and inevitable forward-march, waiting only on the simultaneous presence of many quite normal processes to ease non-living Reality, quite gently, into the entirely new forms of Life itself. Such gradualist nonsense would clearly be not merely “unlikely”, but actually “impossible”! These “theorists” predicated their “theory” on probabilities and hence were certain that it only needed sufficient time for even the most unlikely conjunctions to occur, and hence produce Life.

I’m afraid that is nonsense! The Origin of Life on Earth was no automatic process, but a **Revolution**. No other form of change could establish Living Matter and its persistence against all the non-living and well-established processes conforming to the Second Law of Thermodynamics. For

Life to actually appear, the processes involved HAD to totally Change the Game – had to first effectively demolish all currently deleterious processes, bury the famed Second Law, and then protectively establish entirely new and safeguarded sets of processes, which would, as a coordinated set, totally change the dominating elements and even the dominating laws of the preceding regime. This could be NO gradually-reached and chance happening.

It could only be, initially at least, a catastrophe, which over a relatively short period of destructive chaos, thereafter began to resolve into a wholly New Level of Reality, which had never existed before.

Of course, any explanations with Chance as the cause, (indeed with probability as cause) can only be an excuse for having NO explanation. [Quantum physicists of the Copenhagen School please note!]

The “explanation” of Life by the chance coming together of many quite normal processes, is too laid back and imperceptible to produce anything as World-shattering as Life!

All such Emergences have to be cataclysms! You don't get such miracles via “pin-heads”, but only by prodigious leaps! And we must not forget that what persists in unfettered Reality, does so because the overall nexus of processes maintains a status quo including those elements. To even allow the wholly new, the old self-maintaining regime must be shattered! Life did not pop out of conducive corners, it emerged from a wholesale and general breakdown, and what actually caused the breakdown could be either intrinsic cumulative factors, or even externally caused calamity, but such gradually accumulating causes, would not be those for Life, but those for dissolution.

All Emergences in Reality have shown themselves to be, first and foremost, disasters!

Minor destructive processes, normally kept in check, begin to grow in significance due to general changes, and start to undermine the status quo. These can accumulate, until the old dominances and self-maintaining systems are actually overthrown. Obviously, the initial result is most certainly some kind of chaos with, instead of the usual suite of processes and their products, entirely New things are happening, at first to also disappear, but finally to dominate to produce new entities and their inter-relating laws too.

The current conception in Emergence Theory sees such Events as a whole series of calamities, each producing a short-lived, intermediate regime, only to be very quickly consumed in the next cataclysm. The final resolution, after a series of those, being a New and persisting Emergent

Level.

ONLY, by such an overthrow, have new systems any chance of establishing themselves as the new order. After all, each and every Level in Reality, must be a conducive set of processes and products, which as a system, perpetuate each other to the exclusion of contending others.

To make great, and entirely new, leaps forwards, requires the cataclysmic destruction of the old Level FIRST!

Students of Geology know of its evidence for the Evolution of Life, and are well aware of both disastrous cataclysms, AND adaptive radiations of colossal power and creativity.

Though hard to believe, at the time of the destruction of the Dinosaurs, (and much else) the mammals were all tiny subterranean mouse-like, insectivorous creatures, yet after the quite evident disastrous cataclysm, these have evolved into the whole range of beasts alive today – from whales to tigers, and elephants to human beings .

And many other such crises have since shown themselves to be of a similar nature, and with similar creative outcomes. Even the pluralist scientists tackling the Origin and subsequent Development of the Universe itself, cannot avoid similar Emergent Events at all stages of that fundamental process.

And, even after the Origin of Life, similarly momentous changes have been evident in the fossil record, and surround us NOW in the rocks beneath our feet! How on earth did Consciousness emerge?

Now, all of this, though still sketchy in this paper, is merely preparatory to a suggested Holistic Way forwards for Science.

Instead of the now universal pluralistic methodology of the current Scientific Method and its experimental methodology, we have to conceive of an alternative, which addresses unfettered Reality directly.

Various things have been tried already, wherein pluralist assumptions, methods and laws are brought together in an amalgam, and where crucial threshold parameters are used to trigger switches to other active laws as circumstances demand.

The largest computers on the planet have become necessary to use vast computer programs built on this kind of plan to predict the Weather. But, obviously, such systems can only be retrospective, so to identify threshold values and appropriate laws, it must mean that such changes have already happened in the past, and been factored into the prediction system.

In addition there can be NO holistic amalgamations. The order in which thresholds are tested, and how they can be changed by different circumstances is not at all cracked. It must be clear that thresholds are pragmatically arrived at frigs: the world isn't itself merely monitoring these parameters and switching on cue. That is how we attempt to pluralistically emulate what actually happens holistically. What the very best Weather Simulations deliver is the best predictions of future weather possible on the basis of past weather alone. And ALL simulations, whatever they are modelling, have exactly the same weaknesses.

But, as they say, "If I wanted to get there, I wouldn't have started from here!" We are locked into a methodology which gravely limits what we can do. The very methods that reveal dependable relations, also limit their application to ONLY identical circumstances. And when we look at holistic experiments such as that performed by Miller on the postulated Primaeval Atmosphere, we are at a loss to know how to extract the meaning contained therein.

Investigating Cascades of Avalanches (in a Holistic way?)

The Ground & Proposal for a New Miller's Experiment PAPER V

Clearly, to proceed beyond our current methodologies in Science, we have to consider how we can conduct and interpret fully Holistic experiments, and where we should start must be in a re-examination of Miller's vital Experiment, and devise how we could get the best out of a re-staging of that vital evidence, and a consequent sequence of similarly set up experiments demanded by what we reveal as we pursue this new line of research..

Let us muse about what must have been happening within his original apparatus, and hence what we might do to extract more, and indeed sequenced, information matching the actual phases in time that MUST have been occurring. Let us suppose that the cycle of evaporation, electrical discharge and precipitation within the rich mix of primaeval gases, a sequence of chemical changes took place, first in the atmosphere, and then subsequently in the water, and that these took place in specific locations and at specific and appropriate times. Everything certainly didn't happen everywhere and simultaneously throughout the system. The contents of both the atmosphere and the water would be patchy, and thorough mixings might be a great deal more limited than we might think. In addition, what occurred, in one phase and situation, could be just as easily undone in a succeeding time and place. But, also the products of various different simultaneous, but separate, processes could come together, and in conducive circumstances further react.

The whole apparatus, with heat applied in one area, and cold in another, kept the system in a dynamically changing and only incidentally mixed situation, and instead of involving only self-contained chemical processes, would certainly involve those that could be either greatly accelerated by catalysts, or drastically slowed down by inhibitors.

Such a system would necessarily be entirely holistic, and the very opposite of how we currently like our experiments to behave.

Yet, such systems DO NOT merely descend into chaos (as the Second Law insists). In contrast, all such holistic situations will tend to arrive at a state in which things settle down into some final system of processes. Order of some sort is more likely than chaos!

Ultimately then, a complex of conditions and conducive processes will be internally arrived at, and constituted the final system from a whole consequential series of short term states, each of which changed the original conditions to some greater or lesser extent.

Such a system was NOT from the outset either merely static, or merely cyclic. During the 24 hours of that initial run, a changing set of entities were both being produced, AND being selectively consumed, so that instead of the maintenance of the original conditions, we ended up with a very different result.

The water must have become the crucial medium, and transport system, for allowing juxta-positions to occur, and at the end of a complicated (and to us opaque set of) processes, we ended up with the very surprising set of amino acids, turning our once transparent liquid a dense red-brown colour.

We have to consider that not only did we have many simultaneous processes taking place (in true holistic fashion), but that the actual productions were themselves successively changing the game, so that within the apparatus their wasn't a single set of processes linking the original constituents to those finally produced, but a much more complex, simultaneous and mutually affecting (and even competing) set, which only finally resolved itself into the final stable and analysed situation.

Now, all of this will seem acceptable by most people, but their reaction will often go on to be, "what can we do about it? We have developed our very successful Pluralist Methodology for Science, how can we possibly deal differently with an Experiment such as this one?"

Well, maybe we can!

Somehow, the apparatus would have to be redesigned to allow ongoing analyses of the sequences of processes as they happened. Obviously the set up would have to be monitoring different things regularly against the passage of Time. The old "Stir thoroughly and wait for equilibrium before measuring anything, will certainly not do here!



Indeed, I cannot conceive of a design and measurement regime being effectively planned in advance, The only way of redesigning the Experiment, would have to be to start with the old system and introduce multiple measuring systems, for different substances, and these would be replicated in various places, and measured constantly. The whole purpose of such an initial experiment would be to modify it to facilitate understandable measuring. I could only conceive of this being a long, time-consuming process, with a great deal of “old fashioned” scientific discussion between every single one of its various incarnations. Re-designs would necessitate holistic ideas as to what was going on where and when, and then by imaginative re-designs, attempting to make our measurements more meaningful.

Indeed, I can see any serious researchers in one fruitful sequence of research actually changing the contents to attempt to isolate various component processes, before bringing everything back together to the original content and interpreting the considerable time-based data as to what was happening where, when and for what reasons.

The system would soon become extremely complex. The very necessity to take and analyse samples “on-the-fly” (without disturbing the internal processes and conditions) would present major problems. And these would be being taken regularly. Now because of the complexity of what might be occurring, it might well be absolutely necessary to change in some ways the regime of measurements as the Experiment proceeded. We might well have to “add-on” a series of strictly-pluralistic, analysis sub-sets of apparatus to merely detail what we have at various times and places.

Now, it is clear from our initial muse on what must be going on that localities will certainly play their part. Different things will be happening in different places due to different local conditions. Near the source of the applied heat there will be one unique locality. Within the centre of the atmosphere there will be another, and this will NOT be the same as that near the edges of the apparatus, or within the distillation unit, where temperatures will be much lower.

Perhaps THE most special locality will be exactly where the electrical discharge passes through the atmosphere, and yet again where it finally strikes the liquid or other parts of the apparatus. Near the surface of the water will be a different locality to any mid-level well mixed region, because the loss of high energy water molecules due to evaporation will certainly produce a lower temperature in that special layer, and the access there to substances with the atmosphere, which could be being continually dissolved in to the water, would mean that the densities there would be at their highest, and a density gradient would develop as agitation of the molecules would distribute them elsewhere within the liquid.

In addition, any distillation system would be not only re-distilling water back to its sink, but also any distillable other liquids formed by the various reactions having taken place.

Clearly, we already have many different things that will need to be identified and/or analysed, but they will almost certainly be different at different times, so the required analysis processes will have to be being regularly carried out at precisely labelled (and fairly frequent) times. Samples will need to be taken and immediately and totally isolated from the main apparatus for these purposes. And many of these required analytic processes will themselves be quite complex experiments, with considerable controls to HOLD the samples absolutely constant until they have been analysed, or separated into whole sets of identical samples requiring different analytical processes.

Indeed, when it comes to any produced liquids, they will need something like Fractionating Columns similar to those used in Oil Refineries.

Indeed, it cannot be stressed too much, that THIS is a dynamic, holistic Experiment, which will be surrounded by (necessarily) pluralistic analysis set-ups.

It will very soon be very like an oil refinery and for the same reasons. Oil refineries are as they are because they are pluralistic systems obeying pluralistically derived laws. The same conditions cannot be maintained throughout the system, because, as has been explained, different conditions will be required for each and every sub-process to ensure that it delivers exactly what is required for a following process.

All involved pluralistically derived equations will demand their own conditions for them to be predictable. That is unavoidable, and explains why oil refineries are so complicated.

The Modern Miller’s Experiment will be similar in many ways.

The crude oil to be processed in a refinery can be seen as a similar problem to our red-brown solution of amino acids, but instead of a steady system for production as in the refinery, we will have a system FOLLOWING a changing system, and regularly logging its changing contents throughout the system.

Investigating Cascades of Avalanches (in a Holistic way?)

The Ground & Proposal for a New Miller's Experiment PAPER VI

Now there do exist various possible analogues for these proposals for a new Miller's Experiment.

The most obvious set up are in the sources of data for Weather Forecasting, where a vast network of weather stations are regularly producing changing data, which must be communicated to some central place, where a Weather Simulation Program is regularly running using such constantly arriving data along with its accumulated and enormous stores of previous readings, and then dealt with via its constantly updated and adjusted programming.

These data are interpreted by this giant Predictor Program to extrapolate the current situation forwards (via a series of alternative probable developments) to deliver the best possible forecasts.

These are the biggest computers and biggest and most complex programs in the World. But they will be crude compared with our Miller's Experiment Set Up, because a great deal more is required from our inputs than mere quantitatively-measured data. Such measurables are fixed set in Weather Forecasting, but are being changed all the time in the Miller Set Up, and are then further increasing the possible number of ensuing processes that can ensue.

NOTE: Instead of wasting billions on the Large Hadron Collider, might it not be much more productive to build our refinery-like Miller's Experiment instead?

Now, such an undertaking, though already requiring quite prodigious amounts of kit, and non-interventionist sampling regimes at many points throughout the apparatus, is STILL only monitoring the limited holistic experiment as devised by Miller. And, as with the LHC, when you are constructing such a demanding set up, you DO NOT limit yourself to a single situation, no matter how dynamic.

Miller's Experiment would have been a sort of "steady-state" apparatus, where the ambient, overall temperatures would have been fairly constant, and the evaporation/distillation cycle a steady process.

But, once dynamic and regular monitoring systems were solved and delivering the required information for the scientists to interpret, it is obvious that the whole system could (and indeed would) be made subject to varying external as well as internal conditions, for necessary and separate, from-scratch runs.

For example, the ambient temperature could be varied: the amount of water within the system changed, and many other similar circumstances adjusted to see how they would still effect the processes involved in yet other from-scratch runs.

In addition, the basic original Miller version would have had ONLY the glass container and distillation unit as enclosures and thus supplying the surfaces available for condensation beyond and differently situated to the distillation unit.

It therefore seems reasonable to equip a version of Miller's Experiment with a whole series of different surfaces within the enclosure AND (knowing the sort of rocks, both volcanic and sedimentary that would have been present in different parts of the Earth at the times being emulated) there could be various insoluble solids put into the water, not to mention in addition soluble salts that would have been natural run offs from the ancient land surfaces.

Now, I can imagine the deafening chorus of response to these proposals that would condemn the whole approach suggested here.

If all these many and varied things would have to be researched, the consensus would be as it is now, for SEPARATE, highly controlled pluralist-type experiments to isolate each as a simple easily interpretable experiments. But, that would be missing the point entirely.

This would be a consciously HOLISTIC experiment. It would reject separate pluralistic experiments as OMITTING the very features that when present together with everything else DO result in outcomes that could NEVER occur in the usual separate and highly constrained forms. We are attempting to establish a new methodology to ELIMINATE the errors of the past methodology and

reveal what actually happens in unfettered Reality, in the most important and world-changing events in the history of Reality itself – The Emergences, and, of course, the most crucial of these, that which produced the very first Life anywhere.

Now, I am aware that such an giant Experiment as is proposed here would be extremely expensive, AND that it would necessarily involve whole new experimental procedures to ensure that we will be measuring exactly what we need to measure, and think we are, measuring. But frankly, there is no comparison between what the LHC and further manned trips to the Moon can deliver, and what would be possible by such experiments as I have been proposing here.

Not only would such research throw an entirely NEW light on our understanding of the Origin of Life on Earth, but it would also equip Mankind, for the first time, to turn away from purely pluralist methods, where what we investigate are man-devised and totally constrained mini-worlds, and instead begin the investigation of the much richer ground of an Holistic Science.

Instead of only doing what is possible within our constrainings of the World, we will begin to do what is possible in an UNCONSTRAINED real World.

Real Science would doubtless emerge, and Mankind would more and more know how to work WITH Reality, instead of merely corralling sections of it to exploit only these artificially arrived at fragments.

Holistic Experiments

PAPER I

The failure of Miller's original experiment to lead to a new holistic Science after all the positive furor when it was first reported, seems to have been due to two apparently insurmountable drawbacks.

First, no-one could soundly construct an explanatory narrative for what had been going on during the run of the experiment within the sealed apparatus, and secondly, and more importantly, the total dominance of Plurality in the conceptions of almost all scientists – both in how the World seemed to work, and in how it was possible to fruitfully investigate it. These considerations left them at a loss as to where to start on any alternative approach. So, nothing was done!

The advent of effective Control had led to a remarkable revolution in which the extensive and rigid limitations within experiments had become quite possible, and allowed formal quantitative relations to be fairly straightforwardly isolated, extracted and abstracted from each and every experiment so constrained.

In addition, when the same controls were repeated in the proposed areas of use, the relations held true, and quite accurately delivered reliable predictions as to precisely what would occur next!

These being the case, pluralistic investigation and subsequent prediction had advanced hand-in-hand, and a whole supporting philosophy had also been developed “to fit”, which seemed to make universal sense of all this new Knowledge and useable relations.

In addition, this “justifying ground” also promised a limitless future of similar developments which would make “anything possible”.

Ideas such as Reductionism and the “Laplacian-inspired” conception of possibly being able to work upwards from fundamental entities and their eternal laws to produce anything in “The World”, were generally accepted as the Full Truth.

These same bases, also greatly promoted the worth of Mathematics, which, though it had originally been a series of tricks to facilitate calculations, was increasingly considered to be the cause of all phenomena in the Real World.

The universal nature of all of its Forms was misinterpreted as the “Essence of all things”. And the possibility of Absolute Truth in the mathematical “world” was taken as being transferable to Reality wholesale!

Now, of course, there is NO Absolute Truth in the scientific descriptions and explanations of Reality. The quest for it has proved to be literally endless!

The possibility of such Truth in Mathematics is because that discipline exists in a separate World – the World of Pure Form alone, which I have termed Ideality.

NOTE: To those who condemn all talk of parallel Worlds, let me reassure them. I am NOT suggesting any such nonsense here.

The World of Mathematics is a severely cut-down extraction from Reality as a whole. All such Forms exist within Reality, but NOT in the way that they do in Ideality, for the purified and isolated Forms make that particular subset into a coherent fiction (the way that reality would be if all that exists there were Forms and Forms alone).

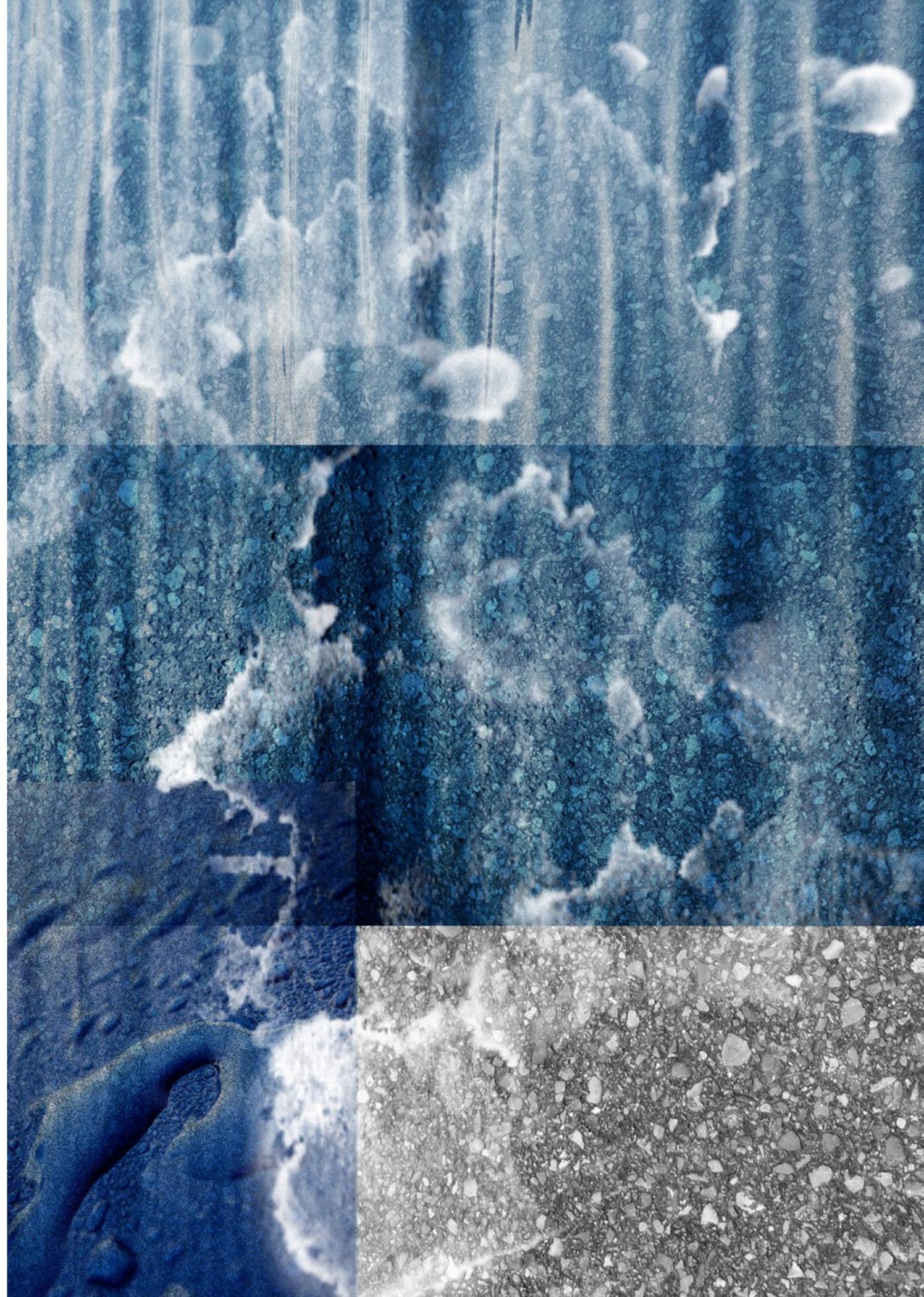
Forms can indeed make a coherent world. They have that property in isolation. But they do not behave in that way in Reality as a whole.

Consistency may be possible within that very small subset, but only because a purely formal approach throws away everything else as disposable. It is a distillation of Reality which purifies the contained Forms to nothing-but-Form, which when so processed, do stand as eternal, immutable patterns. They do NOT exist as such in Reality: there they are NOT eternal, but every time newly produced as part of an ever-changing and mutually determining mix.

NOTE: In an odd way the BBC TV programme entitled Fermat's Last Theorem (and the book of the same name by the programme maker) reveals my point brilliantly. The mathematician Wiles managed, after many years work, to prove Fermat's Last Theorem and shook the World of Mathematics. His achievement was incredible, and my initial reaction was to condemn his proof because he used mathematical fragments from everywhere, which had been developed for a very wide range of problems in Reality.

I denounced his effort as unprincipled eclecticism, but then I realised that I was wrong. I was wrong because Fermat's Last Theorem is NOT about the World at Large: it is solely about Mathematics as such. It is Number Theory, and as such was quite legitimate.

This realisation confirmed both sides. On the one hand Mathematics is a World consisting only of Pure Form, and as long as that is what is being considered all is perfectly well. On the other hand though, when scientists such as the subscribers to The Copenhagen Interpretation of Quantum



Theory INSIST that the mathematics drives the physical world, and is in fact its Essence, they are totally and utterly WRONG!

Now, the properties of this Ideal World are also very seductive to thinkers of all kinds. They only need paper and pencil to be able to address “any Forms whatsoever”. In addition, the principle of Plurality has underpinned a way of observing, describing and even investigating Reality, so that its extractions end up wholly in their subset World of Pure Form alone.

The whole methodology of scientific experiment and the formulation of Theory have been shrunk for many scientists of today until it is identical with mathematics alone.

In other words, the ways that they are carried out, makes it inevitable that the investigations are merely into Ideality, and NOT Reality.

Now, sadly for our “discoverers of Essence & Truth”, Reality cannot be so easily dispensed with. Indeed, it has proved to NOT be pluralistic, but entirely holistic in its real concrete nature, and the addressing of Change and Development, and latterly Evolution, has proved impossible to deal with by these truncated and clearly insufficient means.

What has happened when such questions insist on being addressed is somewhat surprising initially, but, on reflection, what is usually done about such things is understandable if INCORRECT!

Instead of developing in its entirety their pluralistic World, “in full”, which would surely enable them (by their own principles) to cope with anything, they admit that all the necessary comprehensive formulae are not yet to hand, and they must rummage about in their “bag of particular Forms”, and use each one in its appropriate place.

When confronted with the Weather, for example, they have developed a system based on key parameters, which are monitored to see if they exceed certain crucial thresholds. When they do, the users know immediately which of their known formulae to switch to, and by this stepping-stone approach approximate to the real situation. It is called simulation, and is encapsulated entirely in computer programs, which seem to seamlessly address all necessary switches automatically, whereas in truth, such programs are packed with such seams.

These Simulation programs are so popular that, for many so-called scientists, it has completely replaced physical Experiment. They do research with their own simulation programs, adjusting them where necessary by adding new key parameters and necessary switches of formula as evidence from Reality demands.

They, in what has become their general solution, lace their Ideal World formulae with real World evidence, which thus guides them across the torrent of change stone-by-stone!

But, of course, such a truly holistic part of Reality as the Weather can never be encapsulated by such means. Apart from it being basically a summation of artificially extracted eternal formulae (with switches where necessary), it is also entirely retrospective (and hence incomplete). It can only predict what has both happened before and been included as pluralistically derived extra clauses. The only other added condiment is that of pure speculation, which of itself can guarantee absolutely nothing.

Thus literally everything is stuffed into the inadequate box of Plurality and Ideality, and even clearly holistic Reality is force-fitted into such a completely pragmatic framework, which certainly could never predict anything new.

Now, the solution, which has to be an holistic approach to Science, seemed impossible to construct as a means to the extraction of individual truths and their elaboration into a coherent whole. In spite of its major shortcomings, the by now standard methodology of Science did at least give us an incrementally developable system.

Holism, on the other hand, seems to scupper itself from the outset by its universal influences and indeed determinations. Without these, ALL discoveries would be unavoidably incomplete and hence unreliable.

At least by means of rigid context controls the existing methods could be relied upon within those constraints as long as it was possible to maintain them. The dual measures of Plurality and Control were indeed useable.

Holism offered nothing!

“No system of investigating unfettered Reality seems possible!”, was the cry. And yet that seemingly unchallengeable statement is not actually true. Alongside the quantitative investigations based on Plurality, there has always been another strand to Science.

It was what we might call Explanatory Science, and it attempted to explain all things qualitatively in terms of their causes.

Indeed, though such attempts were never the Absolute Truth, they did, at their best, contain an important, and increasing, measure of objective content, and could be used to deal with situations well beyond the span of those available in a piecemeal fashion by pluralist, quantitative Science alone.

Explanatory Science, from the outset, tried to make coherent and comprehensive sense out of extended areas of Reality. Now, only such a scope could provide a meaningful ground for understanding Reality, which individual relations and equations could never alone supply.

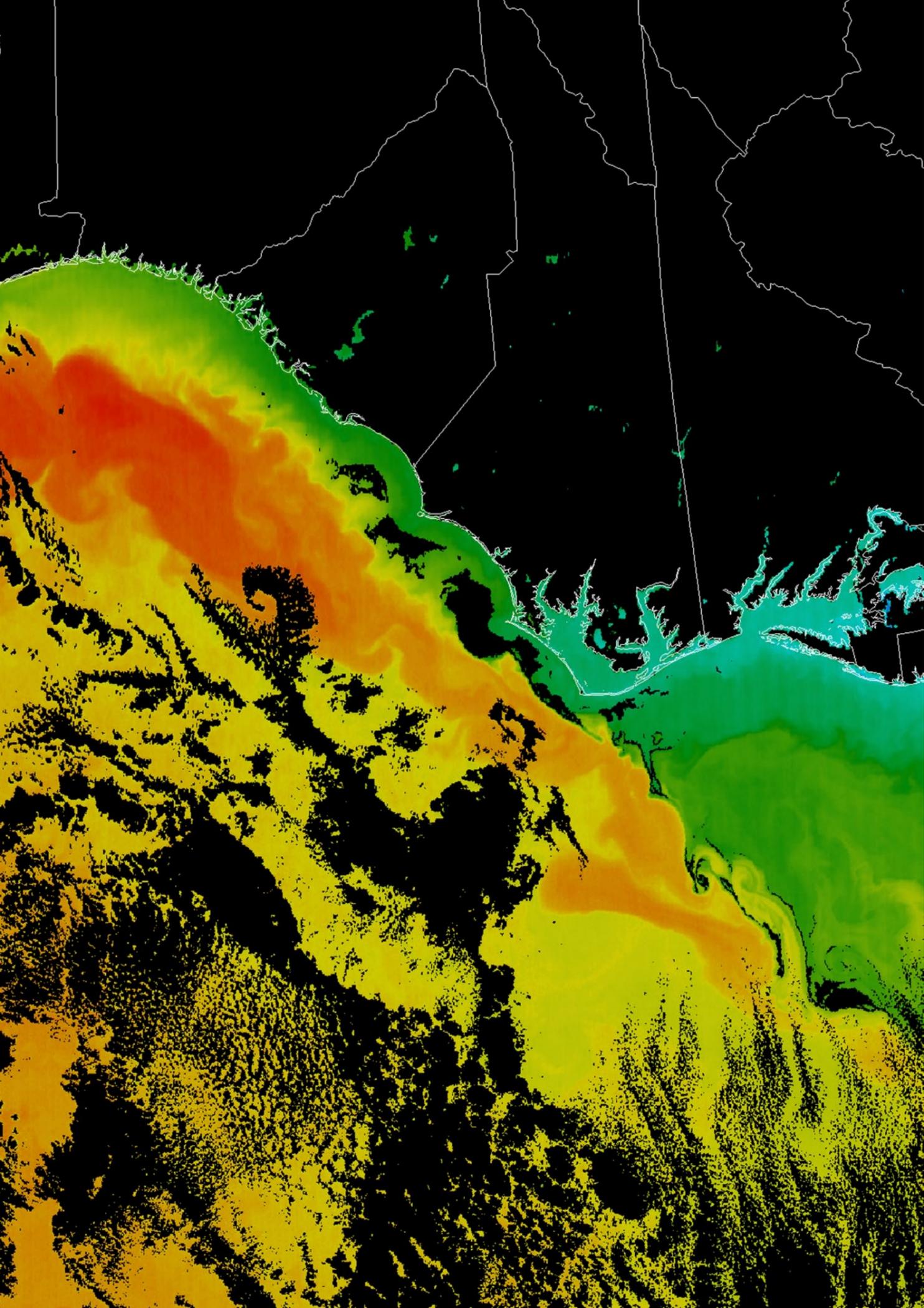
And, in spite of the shortcomings of pluralist Science, it did deliver separate relations and equations, and with the additional import of various aspects of its philosophy, had allowed Explanatory Science more data to work with, and a great deal of real Science was achieved.

It was, though, unashamedly speculative, and though it always contained that vital objective content, it was also unavoidably questionable in its speculative assumptions and details: it got things wrong, and constantly needed to be regularly corrected and improved.

But let us give Explanatory Science its full due! For example, the Phase Changes in all substances from Solid, to Liquid to Gas were explained in terms of the atoms from which they were all assumed to be constructed (along with their properties). The model that was developed from these ideas DID soundly explain these inter-phase transitions – things such as melting and boiling, freezing and condensing. While the same ideas could also cover evaporation, expansion and many others caused by the effects of available heat to such Phase arrangements.

Now, such things are important. Indeed, they delivered the ground of Science, in which the equations were merely the currants in the cake.

Only mathematicians fall in love with equations. Scientists fall in love with Explanations!



Holistic Experiments PAPER II

Indeed, this vital explanatory side of Science was its Essence, but also began its inevitable decline with the advent of pluralist equations along with the required control of circumstances.

But, we have to ask, “Could not the power of such Qualitative Explanations be somehow linked to those perfected in pluralist Science for them to deliver sufficient for the former to address even more problems?”

Above we have described a useful partnership of means and ground, but could not the qualitative and qualitative methods be also unified in experimental methodology too?

Recent deliberations on past experiments such as Miller’s Experiment, has suggested a possible way forwards. This Experiment involves an apparatus to emulate the processes in the primaeval atmosphere of the Earth, and was constructed and totally isolated from any outside effects, and set into a cyclic motion of its possible “weather” to reveal what would then ensue. The result was the surprising production of amino acids, nowadays only usually found in Living Things.

These musings have led to the suggestion of a re-staging of Miller’s Experiment, but to modify it greatly to allow a monitoring of what was going on throughout the period of its run.

The original, very straight-forward, and holistic experiment totally isolated from its surroundings, had been left to its own internal processes to see what it would produce. The new idea, however, was to surround that same core experiment with a whole group of pluralist analysis set-ups, specifically designed to identify what components were being produced at various different localities, at each and every stage throughout the duration of the experiment.

The clear limitations of such pluralist set ups in these new circumstances could actually become their greatest assets, for they would only be used to identify the various substances at various times. The real trajectory would be contained unaffected within the core experiment, and all these ancillaries would simply serve that situation by supplying what, where and when the new, crucial substances were appearing.

And the very control, that is the essential feature of pluralistic experiments, could here ensure that the diagnostic procedures could be totally isolated from the main experiment – not affecting it in any way. While it carried on along its holistic way, the diagnostic ancillaries

would be taking and analysing samples throughout that process. What were the main liabilities of pluralistic experiments would here be their necessary strengths.

Whereas the original “black box” holistic experiment, wherein exactly what was happening and when, would be unknown until the final product was analysed at the end, Here we could now have the clear recognition of stages within that overall process, identified by the production of NEW substances, and these individual stages would comprise their own set of resources.

In addition these stages would be revealed as a known sequence, and the knowledge of chemical reactions could be employed to explain each new stage in terms of its precursors and their inter-reactions.

In contrast to Computer Simulations, wherein everything is both pure mathematical equations, and their appropriate selection for use via threshold transgressions, we have an alternative where the central and crucial part remains a purely holistic situation, but a retinue of pluralist additions are the only rigidly constrained parts, as they must be to both do their job, and NOT interfere with the main experiment.

Indeed the whole thing at this level is a Physical Emulation, dealing in Reality.

Now, of course, the above is the thinnest of descriptions of what in actuality will be a long and arduous trek from basic conceptions to the design of a complete and appropriate experimental system.

There would have to have been a whole series of investigatory runs to find out what intermediate substances are involved. The actual set of diagnostic ancillaries will have to be determined by what is initially discovered by such trial and error runs: we will have to know what to look for, where to look, and when to look!

If carried out carefully and comprehensively, the final product of the completed New Miller’s Experiment will provide the scientists with a sequence of phases and the resources available in each, to produce each subsequent phase.

It is at that point that a final narrative of what was going on throughout the Experiment could be constructed. The pluralist components of the overall set up have been confined to mere diagnosis, while the real Science uses the Knowledge thus gained to try for a meaningful explanation of the Core Holistic Experiment!

Now, this is NOT completely new!

Before the perfecting of pluralist experimental techniques and pragmatic individual theories, the ONLY way to interpret any evidence, either from observation or from experiment was by a very similar two sided approach.

And, of course, at that time, it was bound to be mistaken in many particulars, so that no theory derived in this way was never absolutely correct.

But, nevertheless, Mankind’s understanding DID progress, and theories DID improve. Indeed, many of the most significant ideas came from such musings [How about the Origin of Species & Plate Tectonics?], which also had the advantage of being improvable! Explanation actually got closer to the truth all the time.

Now, of course, I am NOT suggesting we return to the “glories of the olden days” – NOT AT ALL!. But, I am insisting that the crucial errors of Plurality and Reductionism be removed from Centre Stage as merely pragmatic and locally useful techniques, and relegated to serving an insisted-upon holistic heart to all experimental investigations.

Now, you should all be demanding, “How can that be done? Surely it is impossible?” Well, perhaps it isn’t so impossible!

The author has recently devised a new Form for that famous Miller’s Experiment as roughly outlined above. The original Experiment had long ago established that amino acids could be produced via non-living processes on the primaeval Earth, and the new design was to trace the hidden trajectory of processes which ultimately delivered these vital, final results.

The new form surrounds his Core Experiment with a whole multitude of pluralistic, diagnostic experiments serving the main experiment by sampling and diagnosing component chemicals throughout the run from initial inanimate conditions, all the way to the production of the final amino acids.

These systems would be initialised, and then monitored, by a Control Program on a computer, and would be activated when and where they proved to be necessary, until a fairly complete sequence of sets of components was produced.

Experts in chemical processes would then attempt to weave a series of simultaneous causal threads through these stages and attempt an Explaining Narrative.

“So what!”, you might say, “That surely cannot be done for every situation can it?”

Maybe not! But it is the first step in addressing that most important area in the Evolution of Reality, in which pluralist Science has so far delivered zilch!

That area is Emergences!

From the Big Bang, through the Evolution of stars and galaxies, on to the formation of Worlds, the Origin of Life, and thence to Consciousness and even the creation and development of Human Societies, Emergences are what have made the Universe what it has become.

The New Miller’s Experiment will be the FIRST attempt to reveal the cascade of avalanches of positive feedback and major Qualitative and even Context Change, which are the undoubted content of all Emergences.

Holistic Science is not only possible, it is becoming absolutely essential!

Addendum to Earlier Suggestions for a New Miller’s Experiment

Since my earlier series of papers suggesting a new version of Miller’s famous experiment on the self-movement of inanimate matter to of-itself produce a series of amino acids in his specially designed holistic apparatus for modelling the primaeval “weather” of the Early Earth, other exciting possibilities and techniques have emerged entirely appropriate to such an investigation. And these new techniques will very greatly extend what information could be drawn from such a closed system, and hence allow of fact-directed speculation of what exactly will have been happening within the apparatus, and lead to improvements and well-founded theories.

Tim Hunt’s work on the division of cells within a fertilised egg, which won him the 2001 Nobel Prize for Biology, was featured on a recent BBC 4 TV programme in the series Beautiful Minds and described a wholly appropriate, and indeed holistic, experimental technique that would fit the planned new Miller’s Experiment like a tailored glove.

In Hunt’s work on the fertilised egg of a sea urchin, he required to know if there was a particular protein that could trigger cell divisions within the egg. So, via a series of time-based samples which could be taken with literally zero interference in the natural processes occurring there, he was able to study these as a caused sequence. By analysing the whole set via Gel Chromatography, he was able to display the complete time-based series alongside one another in the same order as taken, so the appearances and disappearances of particular proteins could be seen with some chance of relating them to what was the major happening within that fertilised egg – the repeated cell divisions. As he had hoped the set of proteins was not constant, and in particular one unknown protein seems to regularly appear and then disappear many times. He correctly guessed that this “magic” protein was his hoped-for agent of cell division, and its regular “coming and going” prompted him to name it Cyclin.

So, Hunt confirmed that his hypothesis about a cell division agent was correct, but he had also shown clearly one way of dealing with holistic change in Reality-as-it-is!

Now, this veritable fanfare for his achievement is by no means “over the top”, for what he did could not be more distinct from the most widespread and generally considered “best” way of conducting scientific experiments. In most of Science the expected methodology “insists” that most of the factors involved in a particular “event” must be held firmly constant, so as to reveal what have been chosen as the most likely candidates for driving significant quantitative relations that actually cause Reality to behave as it does.

Without such extensive controls experiments for centuries had never been able to consistently rely upon their extracted results, and this form of Domain erection and maintenance had proved to actually deliver repeatable and reliable relations.

When such a Domain had been constructed, the values of the independent variable (totally under direct control) could be stepped through, while at each value measuring that of the chosen dependant variable.

This sort of technique does get results, but it does not necessarily reveal one of many strands present in unfettered Reality (i.e. without all these constraints). Indeed, to get the predictability required, the technologist has to replicate the exact same Domain that was erected for the experiment which revealed the required relation. If this was not done the relation would usually fail!

But, as it is clearly necessary to contrast these methods properly, we must also add, that even with all these insisted-upon conditions, such a technique would still give different results unless a whole set were purposely taken and then averaged. Sets of results were necessary to eliminate all minor mutually contending factors too.

But we haven’t finished yet! This “classic” methodology was considered completely sound on the basis of the assumption of a pluralist World. That is a World composed of multiple separate and independent factors which merely “add up” to give the complexity that we see. The inference of this assumption is that any relation isolated, extracted and abstracted within a rigidly defined Domain, exists in exactly the same form in Reality-as-is. This just isn’t true!

This assumption of the Whole and the Part (Plurality), if traced through, level to level to level, as their principle of Reductionism insists is totally legitimate, actually never pertains for long. It is a purely local rule!

Ask any biologist, if he thinks that what he has discovered by such methods is independent (read eternal) and he will laugh out loud.

Dealing all the time with Life, such scientists know that relations, rules and even Laws are not the disembodied “drivers” of Reality (that would be Idealism and not Science), but actually the particular products of Reality in given circumstances.

Now this perhaps too-extended detour has been absolutely

necessary, because all Science is not ONLY produced to help technologists deliver particular outcomes. Science has a much more important role than that! For it attempts to both understand and explain Reality: Its primary job is “disinterested” and infinite, not pragmatic and limited.

For example, what was Hunt dealing with? Was it a mammoth organised and controlled set up like the Large Hadron Collider? Of course not! He was dealing with something much more complex and wonderful. He was dealing with the fertilised egg as it is when produced by a living sea urchin. Once the living sperm had been inserted into the egg, nature (all by itself) took its own course, and what Hunt had to do was regularly sample what was going on WITHOUT changing those unfettered natural processes. And this he did!

It is, of course, par for the course for biologists such as Hunt. But we must also be clear that it was a fairly limited objective, which was, more or less, directed by the prevailing consensus of Protein Chemistry, which in classical vein expected the secrets of Life to be revealed by such investigations alone!

Nevertheless, Hunt’s work was a significant beginning to an absolutely necessary Holistic Science Methodology.

Clearly, similar methods to those he was employing could be used in the proposed new version of Miller’s Experiment, as sequential, timed sampling and analysis at various crucial points throughout the apparatus without disturbing the holistic (if artificial) system.

But other possible additions to that experiment are also now imperative, after an avalanche of NASA funded research into extremophiles (particularly those that might also be found in space!). The favourite current candidates are those that inhabit the Black Smokers in our oceans’ Mid Oceans Ridges, which pour forth hot water laced with many dissolved minerals and hence replace the Sun as the primary supplier of energy to the Lifeforms which are found to live there. Now whether they are right in moving the original location for the Origin of Life on Earth from the shallow, warm waters of the early seas powered by the Sun to isolated pinpricks of Life in the ocean depths is another question, but at either location such volcanic contributions are certain to be significant. The older and alternative notion also now includes a contribution by volcanism, particularly as it delivered such a wealth of dissolved minerals, and with sun-driven superficial ocean currents there would also be a far wider range of contributions arriving at the crucial locations.

Hence we must somehow add this element to Miller’s Experiment! And apart from the new contributions, such an addition would also provide a series of new locations within the apparatus where the same sort of time-based sampling could be instituted.

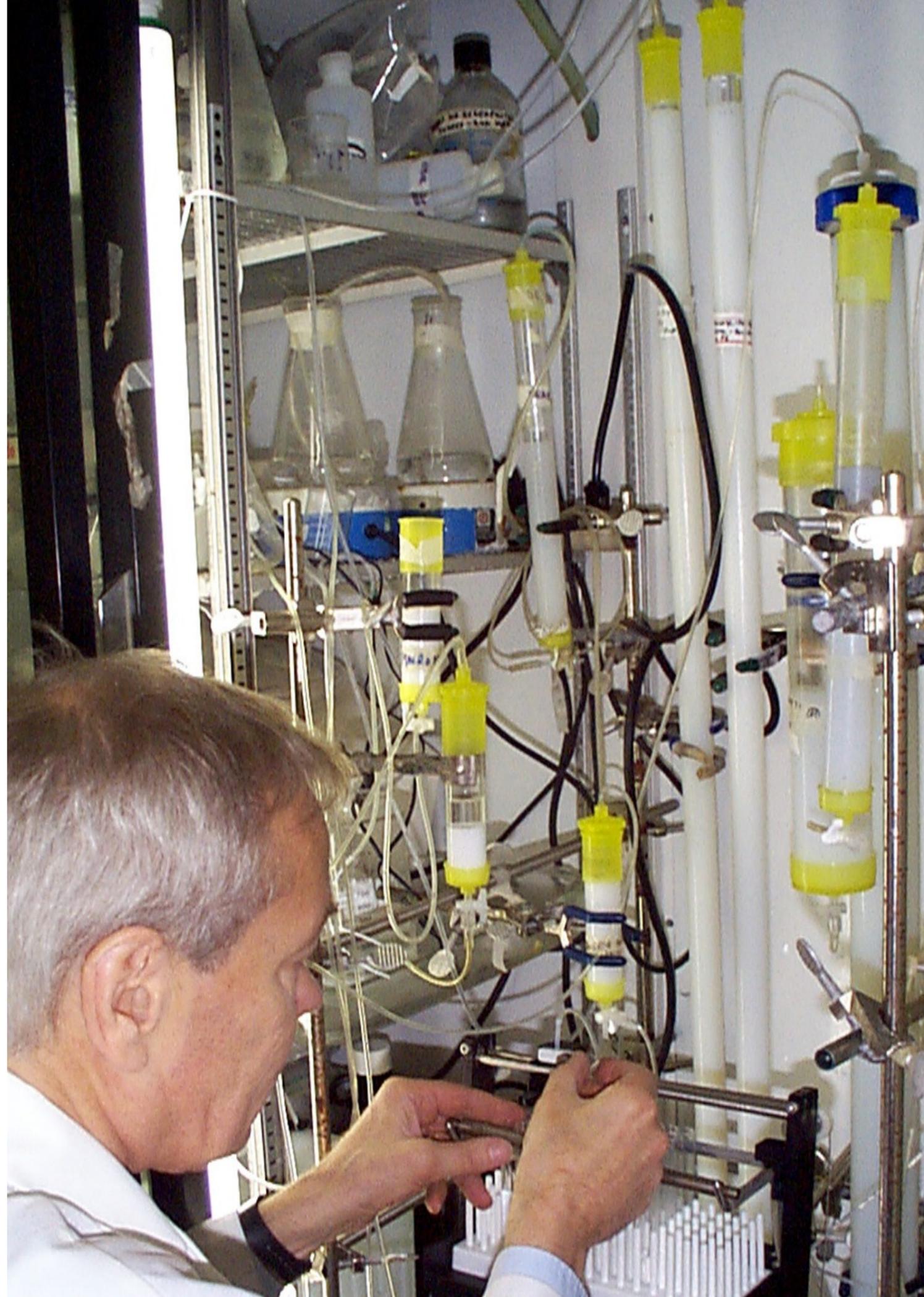
It, therefore, becomes necessary to carry out the extra sampling in a very careful way, which cannot contaminate the enclosed environment and its self generated internal processes.

To achieve these additions a heating element and pumps would be necessary, that would take hot water from the included sump (the proto ocean) and direct it over various rocks that present a likely selection of mineral types as would be most common in the locality of volcanic eruptions.

Along with the additions listed elsewhere, these new improvements will present a holistic scientist with a great and complex model of key regions of the early Earth, to run as Miller did, but without having to wait to the end of the experiment to carry out the analyses. And, as a “model”, the experimenter will be able to make changes, which Hunt with his sea urchins could not do.

This means that initially many runs will be purely exploratory (as they pretend to do in computer simulations, but in these terms incomparably more real), which will be treated wholly as diagnostic investigations to help to regularly redesign the experiment until it could deliver many appropriate time-based streams, which could be displayed (à la Hunt) to hopefully reveal even more crucial evidence for what was going on, and precisely when!

NOTE: The references to the proposed New Miller’s Experiment are not by any means comprehensive in this paper. To get that information the reader is directed to the major papers by this author on that extensive subject.





Hunt's Contribution to a Holistic Methodology in Science

Hunt's discovery of *cyclin* was clearly not the only situation in which Hunt's methodology could be used. If he had pursued his objective using strictly pluralistic methods, he might still have discovered cyclin, but it is highly unlikely. The difference in the two approaches is crucial, for whereas the pluralist route involves extensive and rigorously controlled local conditions to reveal a targeted objective, by suppressing all others, it also removes things away from Reality-As-Is into a tailor-made locality or Domain, wherein as many "affecting" factors as possible have been removed, leaving only a chosen couple to investigate.

Such impositions upon the living and reproducing cell, which had to be Hunt's area of study, would disable its multifarious and simultaneous processes, which alone bring the cell to its crisis point when cyclin is produced. Removing that real and complex system, would also remove the possibility of the required outcome being achieved and investigated. You would be investigating something else.

Now the holistic alternative takes account of all this, for only it attempts to study the real situation exactly as it occurs. But, it also, of course, often makes any real analytical gains impossible, for heretofore most holistic experiments were totally opaque as to what was going on. In order not to affect the real complex of processes, most holistic experiments so protect the actuality, so that nothing of the internal activities is even visible, and all that is achieved is a final result when the analyses of what has been produced can be finally carried out. How it occurred is still totally hidden, and the only method open to researchers was speculation.

So Pluralistic Science, though ideal in many situations, is almost entirely useless when dealing with Living Things. It has always been clear that Life is most definitely entirely holistic, and pluralistic methods will simply kill what we are at pains to reveal as living processes. It is like studying Life by dissecting dead organisms. Something can be gained, but real living process is unobtainable.

Miller's famous experiment was a remarkable achievement in that he knew what he had to do to get any sort of real results, but in delivering the correct conditions, he also cut himself off from what was actually going on within his apparatus.

But, in an important sense, Hunt had learned the lessons of Miller's unavoidable failure. He not only used a strictly holistic, non-interventionist method, but used the natural living processes of his subject to quite normally and

naturally compensate for any sample that he took, and, in addition, made sure that he revealed the timings and tempos of processes as they happened, by taking samples at regular intervals for analysis. He also used Gel Chromatography to produce analysis, which could be laid out in the exact order in which they had occurred in the living organism. On inspection of his results, Hunt was able to see exactly what was going on (or at least what was present) at the very times when cells divided – the protein cyclin was temporarily produced, which evidently played a role in this crucial process.

Taken together Hunt's techniques could be applied to a New and revealing Miller's experiment.

This would maintain its holistic approach, but would attempt to surround it with analytic sub experiments designed to sample without changing situations at many points throughout the physical extent of the experiment, and also throughout its temporal existence: times and places for what was being produced could be extracted without changing its overall trajectory and results.

It would then be feasible to begin to get a handle on what was going on throughout that event. Clearly, what had happened within Miller's set up was NOT a single process. It must have involved whole sequences of processes, many happening simultaneously, and various sequential stages would have occurred. It would only be towards the end of this holistic orchestration that the final amino acids could possibly have been produced.

Now, we have to be clear that to achieve what we have to in such a situation could not be more different to the usual pluralist methodology.

In the usual methodology, the idea is to more and more successfully isolate a particular relation acting at a particular time and context. Each experiment, chasing the separate components in a system will therefore be very different for each objective. Each will be optimised to deliver a particular relation, where all other factors have been removed or suppressed.

In the end the scientists have in their hands a whole set of such relations, every one totally predicated upon its own carefully designed Domain. At first sight the integration of these into a coordinated system seems impossible, but a handy principle "saves the day".

It is assumed that each extracted relation is independent of its context (so we say it is separable). So what was found

in a particular defined and constructed and maintained Domain, will occur exactly as such in Reality-as-is! Thus the confused situation that we see in unfettered Reality is assumed to be that way merely because of Complication: the many relations deliver a “summed effect”. This crucial assumption meant that scientists could continue with their pluralist methods with the final objective of revealing all, after which any particular phenomenon could be both explained and produced. NO, it couldn’t!

What is behind such an assumption is the belief that the relations so extracted are primary and the observed results are secondary: it is essentially determinist. But it says nothing about development and the creation of the New. It is about re-mix only. It cannot ever explain the New.

Such creations are always inexplicable and unpredictable. And that is perfectly true, if your methods are pluralistic. To really explain Reality, not only in stable localities, but, in general and crucially in its development, then Plurality is useless. For that you need to address Reality holistically. Laws do not produce Reality. Reality produces the Laws!

Now clearly, Hunt’s results did point the way to a new methodology in Science. It addressed the holistic nature of living Reality and attempted to reveal both its tempo and multi-stranded trajectory. But, it was a special case, and for more general use it would need a great deal of amplification, and certainly a new approach. Reality had to be taken as is, but it had to be opened up: its inner workings had to be revealed, and Hunt’s techniques along with the use of separated pluralist analytic techniques could ultimately deliver the goods. And of course, the proof of the pudding is in the eating, so the evident place to start has to be the re-design of Miller’s Experiment.

And Hunt’s way of interpreting what he revealed showed that a cyclic process of hypotheses, redesigns, and further modifications of the experiment, could indeed gradually reveal the likely inner workings that happened at each successive stage.

Hunt noticed the exact correlations between the appearance and disappearance of cyclin and the division of a particular cell. He could then, with separate analysis of cyclin and the variations in other substances around these changes, suggest the possible processes involved.

Questions could be asked about what was the state of cells immediately prior to the appearance of cyclin, and what happened thereafter. Clearly the cyclin was not only produced when required, but also removed when it would cause problems. The area of study was in relatively constant qualitative development and change, and in both subtle, yet powerful control by means of particular enzymes.

NOTE: But we must pause here and consider what exactly the cyclin caused to happen!

Instead of the single cell, absorbing nutrients and growing in size, some sort of major crisis was brewing, in which a simple continuation of those processes was impossible. The cyclin was at least a part of that change which totally halted the usual processes and instead switched activity to an almost opposite process: instead of maintenance-as-is, the processes were set in train to radically prepare the whole cell for a total split. Everything had to be re-organised and replicated to ultimately deliver TWO full sets where one had existed before, PLUS the divisive processes to enact that split! All energy would be diverted into these essential preparations and the converting processes. While all the usual processes were wholly suspended, the cell undergoes a revolutionary reorganisation, which finally results in the cell dividing into two. I will not detail what is going on in all parts and particularly in the controlling nucleus, but I’m sure informed readers will know what kind of revolution this transformation involves. And yet it seems to have been triggered by the production of cyclin!

Now, I am not competent to take this technical discussion any further. That is a job for the specialists in this field. My task is to consider the implications of Hunt’s developments, and how they could be applied in ever-wider areas to revolutionise scientific methodology. Suffice it to say that the overturn would finally come to completion. Two cells would exist where one existed before, and the cyclin would disappear from the situation.

Hunt had delivered the first holistic methodology for following the trajectory of development of a fertilised egg, it revealed cycling processes with significant revolutionary results at each stage. Wholly viable cells were produced, which themselves could do what their parent cell could do (at least in the short term). So truly, holistic biologists being presented with Hunt’s work could indeed carry-it-on!

Now, Hunt’s method was predicated upon an ideal situation for his method to work easily. That would certainly not always be the case. For in re-vamping Miller’s Experiment with Hunt’s methodology in mind, the problem of sampling without interference would be much more difficult than for Hunt. And the problem of sampling would have to be applied in an extensive series of very different areas within a new design of the apparatus, which would have to do TWO (not necessarily compatible) things.

The first would be to not interfere with the natural processes of the situation being studied, and the second would require careful design to facilitate sample taking at crucial sites where significant processes might well occur at some particular times during the whole experiment. Indeed it would never be like an experiment in a test tube.

The sites for particular processes would certainly be distributed throughout the system, and would only occur when everything necessary was available at that site. So, for the right things to be monitored at the right times, the first essential requirement would have to be a planned pathway, which the processes would have to be directed through. Now such a physical route is clearly not easy to devise before we know what is going to be happening. Clearly, the initial design will be hypothetical, and results will NOT deliver the answers we are finally seeking, but will indeed allow significant revelations of omissions, and lead to the redesign of the system to improve the extent and relationships of the sampling sites. And this will inevitably lead to careful re-arrangements to ensure that ALL the significant processes are taking place where we can sample them. The directing of flows will be crucial, as will the rates of these flows, but after a whole series of these modifications the researchers will be presented with time-sequenced data from a series of sites throughout the apparatus.

It is clear that the very first pass will seem to deliver totally unintelligible results. What else could they be if the rates of sampling and the sites are totally inappropriate?

NOTE: a whole world of significant qualitative changes can be missed, by many of the techniques beloved of pluralist scientists. (For example averages could deliver zeros where significant oscillations are occurring.). But finally, after a mammoth amount of study and modifications, streams of data could be available which could be made some sort of sense of.

Also the sampling and testing would surely involve complete sub experiments in themselves – specially designed to be totally isolated from, and hence have zero affect on the main experiment, but nevertheless being capable in such conditions to reveal what was being produced and when it was occurring.

And, of course, the timing side of all this would be crucial. Not only would analyses at specially designed sites involve regular samples being taken at precise moments, but also the rates of sampling might have to be different as process followed process, and the tempos of change might well alter radically.

Thus the New Holistic Experimental Methodology would certainly NOT be the usual isolation, control, maintenance, extraction and finally abstraction of the pluralist experimental method, but it would necessarily involve a long gestation period, in which all these factors would have to be perfected to deliver what was actually going on, as multiple, simultaneous strands. Such experiments (and their rich multi-stranded results) would be as different to pluralist methods as Cheese is from Chalk.

And the dynamics involved would be crucial. NO LONGER the stir thoroughly and wait for equilibrium of the pluralist method. What was to be attempted now was to monitor Reality-as-is and on-the-fly as it actually developed.

My favourite analogue for this change is the work by chemists and mathematicians into Chemical Reaction Fronts in Undisturbed Liquids. Prior to their work, the “stir thoroughly imperative” guaranteed that the actual dynamics of reaction would be totally lost in a majorly and energetically mixed situation. By insisting on the exact opposite – absolutely NO disturbance whatsoever, and using oscillating reactions with differently coloured resources and products, they were able to reveal that these reaction fronts naturally followed Toroidal Scroll formations.

So you see what could be revealed! The dead meat of Pluralist Science would be replaced by the Living Animal of Holistic Science.

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