

**AN ASSAULT ON  
THE ORIGIN OF LIFE**

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An Assault on the Origin of Life

## Special Issue 5

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# Primaeval Soup with "Spicy" Dumplings A New Recipe for Miller's Experiment

As the usual funding-driven hypotheses for the location of the Origin of Life rotate between the Black Smokers at the bottom of the Earth's oceans, the damp interstices in deeply-buried wet rocks, and even somewhere in Outer Space, the old idea of the Primaeval Soup has been sidelined somewhat.

Miller's original Experiment, involving the ideas of the composition of the Primaeval Soup, was based on the *then* current evidence for both the gases present in the ancient atmosphere and the then warm, shallow seas, increasingly laced with various run-offs from adjacent land areas. Yet, in spite of its remarkable outcomes, his experiment was said to be **inaccurately grounded** by critics, and condemned as a dead-end, because it was impossible to analyse anyway. So it was shelved as undevelopable, and forgotten! But, succeeding attempts by Miller himself, at assessing the validity of his ground, produced a second version of his Experiment, which was not widely known to the general public. That version took the many criticisms to heart, and brought in modifications, which situated his chosen location very close to an active volcano.

Of course, such conditions would NOT occur everywhere throughout the surface of the ancient Earth. Such conditions would be particular rather than general, but that would not invalidate them as the place(s) where Life could have started.

This adjustment was brought in to ensure that the (now local) conditions were as Miller was assuming, and of course, such proximity also ensured a special concentration of substances **constantly** being added to the local water by the regularly erupting volcano.

So Miller swapped his assumed everywhere-occurring general sample for a **particular** locality, and that had to be better, as it was not so demanding as a **generally** occurring situation.

NOTE: There is another very important aspect to all of this, which is rarely adequately addressed. Even if some of Miller's assumptions as to the necessary conditions were mistaken, that would NOT invalidate the most important aspect of his methodology. It was a **holistic experiment**, in which self-generated simultaneous and sequential processes, actually significantly altered the **context** to finally produce a totally transformed situation containing wholly new entities. Even with some errors as to its content, the experiment demonstrated HOW such miraculous results could happen. To condemn his type of experiment because of individual errors was stupid. It is equivalent to throwing out the baby with the dirty bathwater. It shelved THE most profound contribution to the problem!

To expect general world-wide conditions to be conducive to the Origin of Life was very unlikely (whatever they were), and was based on a gradualist/ progressive and pluralist idea of how it had occurred.

But, modern studies of **Emergences** indicate that they are the product of cumulative situations, which undermine and then precipitate, the total overthrow of any current Stability.

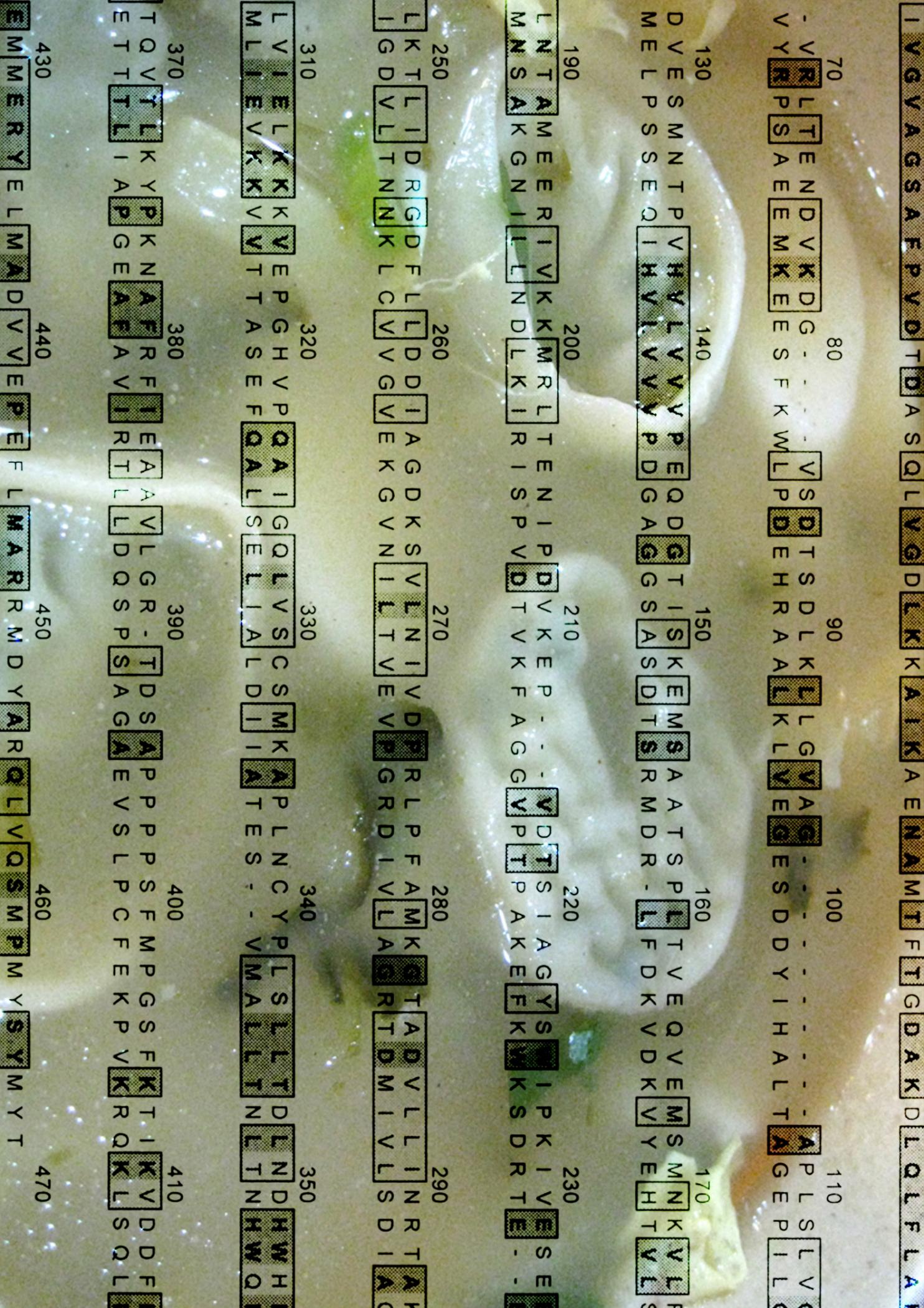
This phase of such an Interlude of dramatic Qualitative Change is somewhat counterintuitive, until we consider exactly what Stability is, how it appears, maintains itself, and how it deals with any alternative innovation.

It always attempts to ensure its survival by killing such innovations!

And such has to be a negative feedback situation, in which any changes **away** from that Stability, immediately elicit returning forces to maintain the current status quo.

What other way could general stability be ensured?

For Stability is not only a system of mutually conducive and complementary processes, but ALSO, and **essentially**, a system of strict, self-maintaining processes that inhibit, or even totally prohibit, all processes that oppose those of the current state.



A Stable Period **must be** intensely *conservative*, and there will be NO chance of a new, better and alternative system **ever** growing within the old system to finally overthrow it.

NOTE: In a social context then, there is the belief that Socialism could grow within Capitalism; to finally smoothly replace it is a myth.

The easiest things to detect, and those likely to replace any current Stability will always be an alternative and wholly new system of mutually conducive processes. So these will never be allowed to get going within a stable Level. Clearly, such a rule also explains why any subsequent Origin of Life could **never** occur on a World already suffused with an entrenched and dominant system of Living Things.

Perhaps surprisingly, the only things, which will NOT be wholly suppressed, will be the individual deleterious or dissociating processes. They will be inhibited to a certain extent, but they would NOT constitute the threat posed by a *structured alternative*. So, in the initial victory of the current Stable Level, such competing processes of any “attempting to be established” system will have been suppressed.

A form of **Natural Selection** will have brought this about (see *Truly Natural Selection* concerning Non-Living Selection by this author) - whereas the overheads for suppressing individual deleterious processes would not be worth the same weight, and would not be “selected” as equally essential for elimination.

NOTE: Consider a dictatorial social regime such as the Hitler regime in Germany. The real concentration of suppressive energy had to be against those advocating alternative regimes; the actions against criminal activities were never as high on the agenda.

So, an Emergence is initially the exact opposite of what you would expect. It is brought about by a cataclysm of dissociation as the many deleterious processes accumulate and finally pass an important threshold, and an inevitable avalanche of dissociation is precipitated. Now though this sounds as if it will inevitably continue into a descent into **total chaos** that does NOT turn out to be the case!

The crucial thing is that it is the conservative processes of the old stability will have been completely dismantled, and, for the first time since the creative phase of the last Emergence, a new creative phase becomes **inevitable!**

The victory of complementary and conducive processes over competing and deleterious processes becomes the dominant overall trend. **The Second Law of Thermodynamics** (which is a law within stability ONLY) is *replaced* by its very **opposite** – a law in which Order necessarily appears out of chaos.

Needless to say, as Order grows, so does the return of the Second Law, and a necessary oscillation between construction and dissolution occurs, but which involves an arising again with each creative swing, until a new, persisting stable Level finally appears. It is ONLY within this short creative phase that the entirely NEW ever appears!

Now, how does all this fit in with our discussion on Miller and the Origin of Life on Earth?

Well, his later version of the classic Experiment could only be the situation in a very special locality (including the volcano), and this might have been thought to be its FLAW.

Surely, the argument would go that special local conditions surrounded on all sides by very different, well-established and strongly conservative conditions could never survive?

Would it not be necessary for Life to be **extensive** to survive?

Well, the answer has to be, “Yes!”, but it doesn’t turn out to be a problem.

What undermines the *usual* conceptions of Emergence is the idea of progressive and gradual changes – which will necessarily *take time*. But such things cannot change the World! They would certainly be opposed by the prevailing and well-established forces of prior stability. That is, after all, how they came to be!

But Emergences are NOT gradual and progressive at all! They are initially cataclysmic and only thereafter revolutionary! The cataclysmic initial phase is an avalanche of destructive positive feedback, while the second

constructive phase is composed of avalanches of positive feedback of the NEW!

Processes such as conducive systems proliferate at a dramatic rate locally, where they can, but in doing so they begin the change that affects first the local area, and **then** the *general conditions*. The CONTEXT – the environment, is changed dramatically and very quickly, and this **Changes the Game!**

With the dissolution of the old processes of stability, accelerating new systems quickly spread and change the whole context too!

Such Events *have* to be local to get a foothold, but also have to be accelerating avalanches to establish a necessary NEW context too. Emergences start as local, and conquer the World!

(1,369 words)

## Addressing the Origin of Life on Earth! (Are Our Current Ideas and Methods Up to The Task?)

What are the main questions when addressing the Origin of Life on the Earth?

We have the usual range! They are, as you might expect, “*Where?*”, “*What?*”, “*How?*”, “*When?*”, and, of course, “*Why?*”

If we are really concerned with the actual Origin, and not the pre-requisite maturing of environmental conditions for Life, or its subsequent Evolution, we have to be very clear about these questions.

Indeed, throughout a long preoccupation with this area, it has become clear that the commonest errors have been that researchers have frequently substituted investigations concerned with either *prior* or *subsequent* developments, and left the actual Origin **unaddressed**, as if it would be trivial if these bracketing situations fully conquered first.

But, the exact opposite seems to be the case!

What they investigate will not, and indeed cannot, deliver the wherewithall to answer “*What happened in this crucial Turning Point Event?*”. So, let us attempt to remedy that by a careful, and sound consideration of these basic questions.

For example, “*What actually constituted First Life?*”

We could deliberately omit all the early stages in the process by insisting that the **Cell** must be involved to even be certain that Life had actually arrived. Or, in a similar way, it is often insisted that a primary constituent of First Life must be the presence and role of **DNA**.

But clearly, both of these are complex things and could not appear **directly** out of non-living processes.

**NO**, the *very first* Life will have been both simple and qualitatively unchanging, for anything subject to too much change, when alone in a hostile environment would simply NOT survive.. And such complex possibilities could only have come much later, and the earliest form would have been almost unrecognisable to us, with our present conceptions of what constitutes current Living Things. But a rough idea can be given by imagining a very simple version of a virus or bacterium.

Now, it therefore matters greatly **where** this Event must have happened, because many non-living, yet “organic-type” processes, and even systems of such processes, will certainly have *preceded* true Life, and it is too easy a simplification to see the whole spectrum of such things (including First Life itself) as an imperceptible **continuity!** (But as **Plagel** proved conclusively for *Species Change* in Evolution, it would also be true for *First Life* that it would have to involve a Single Event and NOT any incremental and continuous process.)

Indeed, the most common research into the Origin of Life is that which attempts to isolate what non-living organic processes could provide a virtual “**Staircase to Life**”, and many have spent their whole careers establishing such components (**Oparin** being a good example), and many still do.

Indeed, the same **Incrementalist Approach** as was used in the earliest form of *Natural Selection* in Evolution, and was also illegitimately extrapolated *backwards* into the pre-Life stages, and a very optimistic thesis was often inferred that “*If the full set of necessary non-living, but essential-to-Life processes, could exist together and persist, then Life would appear almost automatically*” Indeed, the exact same idea is used in Evolution as the process whereby all New species actually arose as mentioned above.

Now, with such a remit, it is interesting how the relative importance of the above mentioned basic questions is dramatically changed. In arriving theoretically at a “complete” collection of these supposedly necessary contributory processes, the question becomes **where** could such things both occur and co-exist quite naturally: the **Location** for the Origin of Life becomes paramount!

And we have had a series of suggestions as to the most-likely places for this to have occurred. The first was in the shallow, tropical seas of the early Earth (**The Primaeval Broth**). These were felt to provide the ideal spots for a series of sound reasons. First, there was the presence of **liquid water**. Water, being a chemically simple and common substance, could, in certain conditions, *persist* as a liquid, and could therefore dissolve a large variety of both elemental molecules and simple compounds. And with its inherent cycling in the processes of **evaporation** and **precipitation as Rain**, could continually bring, and indeed replenish via run off from the adjacent land, a whole range of soluble substances to enable many natural and continuing reactions to be always taking place there. Also, as a moving liquid force it could effectively also transport insoluble fragments down to a local sea.

Thereafter, with atmospheric winds, sea waves and currents the edge of the adjacent land could also be attacked by erosion to produce even more additions to this increasingly complex “Primaeval Broth”, especially if part of a much larger system, so that substances could be constantly brought in from very different conditions elsewhere, and for local products to also be distributed to widely different places too. Such things could make our locality more than a mere local oddity, but part of a potentially global system.

Perhaps the crucial component in this scenario would be the role of water when the area was local to recurring volcanism, where all sorts of exotic substances could also be included in the mix.

This collection of reasons seemed compelling, and as the subsequent early Evolution of Life was established beyond any doubt as being in the seas (by the early fossil record) the argument seemed conclusive!

NOTE: Also such a location was assumed by **Miller** when he set up his famous experiment to emulate the early Earth, by enclosing the known gases of the primaeval atmosphere and water in a sealed cycling system with evaporation, precipitation and even electrical discharges (lightning) so that after a week he was able to show that the system had produced *amino acids*.

But, perhaps surprisingly, it has recently been increasingly replaced by two other suggestions both emanating from the very same source – NASA, but currently comprising between them the almost universally agreed consensus.

The first of these was triggered by the discovery of “**black smokers**” – undersea volcanic vents issuing forth very hot water, containing all manner of dissolved volcanic components. These occurred at the very bottom of the major oceans (usually on the Mid-Oceans Ridges, where the Earth’s tectonic plates were moving apart). And what was remarkable was the amazing richness in Living Forms that was found there around these unusual features.

Absolutely NO sunlight could possibly reach these depths, so no photosynthesis could ever be present to furnish the bottommost elements in the necessary food chain, so that the whole basis had to be bacteria, which got their energy entirely from the “black smokers” in the form of both heat and certain chemicals. But there was (and still is) a major “fly in the ointment”, or should I say, “a crustacean in the mix”.

Much higher Life forms (including shrimps, crabs and even fish) were present. And at present NO either coherent or comprehensive account of how these could have *evolved* “down there” has been presented. And, of course, before any really critical thinking had even gotten started, it was clear that such phenomena would not be restricted to Planet Earth alone. Conveniently for space explorers, any planetary body, having the appropriate conditions, anywhere in the Universe, that had liquid water in the form of such seas, and also, of course, plate tectonic-type volcanism, could also provide similar conditions.

It was a very attractive prospect for funding-strapped NASA, who needed a very good reason to continue their exceedingly expensive Exploration of Space.

The Finding of Life may well be just such a “**good reason**”.

So, before any real (and let’s face it, *unavoidable*) criticism had begun, there was a vigorous constituency energetically pushing this alternative as “**the best bet**”!

The next possible source position was even more far-fetched - it was **Outer Space**! Various meteorites and comet fragments were found to contain organic substances including the deemed-necessary *amino acids*, which always seem to be absolutely essential to the first appearance of Life (remember Miller?). But whereas Miller’s Experiment was based upon detailed knowledge of the early Earth, these instances had absolutely zero in the way of supporting possible contributions and known active processes. The simple presence of *amino acids* within these materials was considered sufficient.

NOTE: This precise point was put forward by Professor Brain Cox in his *Wonders of the Universe* TV programme this very week.

So, even without *any* further detailed work, it could still be put forward that “Out there, beyond any possible contamination by Life on Earth, there were “the essential building blocks of Life”.

[For those interested in such things, this is, of course, a perfect example of the “*there exists a...*” type of argument, rather similar to the “*no smoke without fire*” and many other supposedly convincing perforated arguments.]

“**Space Exploration could certainly find further conclusive evidence, if we were out there looking, could it not?**” was the argument.

There has also been a wide range of “**extremophile**” forms of Life found in the most unlikely places on Earth, from volcanically poisonous pools, to deeply buried rocks, where clearly “primitive” Lifeforms still exist today, but again no real scenarios for them to be really be the actual places where Life first occurred have been developed. All merely strengthen the elbow of NASA to continue with its well-established activities elsewhere. So clearly, the question “*Where?*” has become dominant in such approaches.

Now, disentangling the various questions listed at the outset of this paper is, of course, somewhat arbitrary, for they do indeed affect one another very markedly: we cannot treat each one in isolation from all of the others! I have gone from an initial, *very* brief discussion of “*What?*” directly into a much more detailed addressing of “*Where?*”, and the same will be true of the other basic questions!

But, if we were to concentrate more extensively on “*What?*”, we have an immediate difficulty, or to be more accurate, a whole series of difficulties. The problem has to be that the earliest form of Life will have been such as to leave absolutely **NO fossils** of their bodily forms. Any evidence can only be indirect – what they *produced*, and still remains for example.

And additionally literally none of these originals would possibly continue to exist today unchanged.

NOTE: There is an important principle involved here!

Whenever something happens for the very first time ever, it is necessarily alone – separated from any closely related forms. Indeed, initially it actually survives because it has NO suitably developed competitors or predators, and its success is on a very different basis from later additions.

This means, for example, that a second successful Origin of Life, on the same basis as the First, is impossible after that was globally established. And the reason is that the new primitives would be immediately consumed by already existing Life by a whole variety of means, before it had even got started. And without that kind of competition, First Life would only be competing with the non-living entities in the World. So, some Events are NOT repeatable, for they invariably “Change the Game”.

Now, this means that early Life has to be treated very differently from all forms of Life alive today!

Let us consider **Stromatolites**! These seem to have existed unchanged for a vast period on the early Earth. No evolution of any note seemed to have occurred. Why was this?

Now, there are many lines of discussion possible here, including the obvious fact that these particular organisms (colonial collections of bacteria) do NOT constitute a phase in the **main line of development** of Life They are certainly a particularly *static side shoot*, which tells us mostly about how Oxygen may have come to transform our whole planet, with evidence from the **banded iron Shales** in early rock deposits, to the total transformation of the atmosphere. But they also throw light upon how organisms did not necessarily develop

apace in *variety*, even though they did in vast numbers of identical individuals.

Perhaps the question “*What?*” cannot be answered in detail at this stage, and our tacit assumption will have to be that they were some kind of bacteria or virus-like entities.

But there is a very do-able line of research possible in attempting to answer the question “*How?*”

The alternative to the incrementalist/gradualist thesis is that based upon the proven alternating phases of **Stability** and **Emergence**, which we find at every Level of present-day Reality that we investigate for the way that Qualitative Change occurs. Though changes can take place incrementally, they do not occur in isolation. All that exists does so as part of a **mutually affecting mix** of participants. But these are not *separable* parts, I must stress, but identifiable components that are wholly determined by their entire context, and cannot exist as such independently of these. So, development depends on that clearly **holistic** context, and, indeed, also affects the overall mix *in turn*. Now, suppose, as some certainly do, that though there is such an integrated Whole, it is constantly and incrementally changing in all its contributions to maintain a stable mix. But **that** is certainly incorrect! Indeed, all the various identifiable elements are NOT pulling in the same direction at all. Neither are they so randomly orientated that they maintain stability by effectively cancelling each other out.

What actually happens, and also reveals the unavoidable dangers of the usual *analytic* or *pluralist methodology*, is that changes, though they do elicit reciprocal changes elsewhere, can, and do, accumulate until they cause a cataclysmic avalanche of accelerating changes, which creates an entirely new Stability when it finally subsides. Such Events of major cataclysmic change are termed **Emergences**. NOT *emergencies*, I must emphasize, but interludes when wholly new things actually *emerge* for the first time ever.

Now, these were not believed to happen during most of Mankind’s attempts to understand his World. And many still do not accept that they do in that particular way, though they do accept them as irreversible calamities – that is *downhill* only! This latter position is, of course, that embodied in the famed **Second Law of Thermodynamics** and could be described as the inevitable descent from **Order to Chaos**, or indeed “*Rust never Sleeps!*” But, in spite of these reservations, certain revolutions in Reality can never be stuffed willy-nilly into such wholly negative forms. Clearly the most important of these has to be the currently under consideration **Origin of Life on Earth**. That was certainly an **Emergence!**

Now, if this is true, it should radically alter what we do in attempting to discover what actually happened when the very First Life came into existence for the first time.

We *know* that this happened: the question has to be “*How?*”

Clearly, a purely incrementalist, continuous development, which, *in passing*, became alive is pure rubbish! And to get anywhere with an **Emergent Origin of Life** means that we must first know what an **Emergence** really is!

Now, it certainly isn’t simple!

This researcher has spent most of his life addressing this question, and has only got to the point of publishing his **Theory of Emergences** towards the end of a long career. And what was revealed in this work has been breathtaking!

An Emergence is NOT a progressive switch caused by sufficient progressive components becoming available and finally blossoming into a new and higher form. On the contrary, such a revolution takes the initial form of a **complete catastrophe!** It is the demise of the formally long-existing prior **Stability** due to the victory of the Second Law-dissociative type processes. Or to put it more accurately, by the accumulation of detrimental processes that finally pull the situation down below a **minimum threshold**, and cause a veritable avalanche of dissociation. The classical Second Law result looks to be inevitable! The whole situation seems to be tumbling headlong towards complete **Chaos**. And, in a particular sense, this is indeed true!

But, what happens next is surprising! Let us clarify!

What has died in this calamity is *only* the prevailing **Stability**, NOT, it must be stressed, the normally existing productive processes, but ONLY those essential to the maintaining of the **prior Order!** *They* do indeed perish!

But, we must remember that it was these that were what was preventing any real Qualitative Changes, which were NOT part of the prevailing Order. In order to safeguard that Stability, these *integrated “policeman processes”* would constantly prevent any (even *embryo*) rival proto-systems from coming together to oppose the current regime.

Now, once these were gone, new and potentially infinite sets of possibilities began to come together into a variety of alternative proto-systems, which soon resolved into a **single embryo system**. For though initially there was nothing to stop them, this soon changed. The proto-system, which also integrated aggressive/defensive processes, would more easily outperform inhibited rivals and would soon dominate. And also any such embodiment of real Order, would also elicit the growth of Second Law type processes too. So out of Chaos both a new potentially dominant Order was being created *plus* the seeds of its ultimate demise. Why do you think that the cultures of Mankind always included the tale of the *Phoenix arising from the Flames of Destruction?*

But, this cannot be the place to deliver the whole of the detailed Theory of Emergences, but it **is** the place to suggest it, and, if true, this conception will definitely transform our research into exactly how Life did first emerge from purely inanimate processes. It was, after all, some sort of miracle (or Emergence?)

In addition, the whole dynamic of such Qualitative Changes must also be extrapolated *backwards* – before the Origin of Life, and again *forwards*, via Evolution, to the sequence of ever-greater Emergences, perhaps culminating in that of **Human Consciousness**. Indeed, this researcher had to establish a version of Natural Selection, which pertained *before* Life, to explain the gradual appearance of what, during the actual emergence of Life, would be essential in that world-transforming Event. They could **not** have caused it, which is the usual supposition, but they would be necessary when *other things* finally did cause it to occur.

NOTE: This idea is explained in the author’s paper *Truly Natural Selection* in the **SHAPE Journal** on the Internet.

Now perhaps a surprisingly important question is that which positions the Origin of Life **in Time** - indeed “*When did it occur?*” The first estimate was quite late in the History of the Earth, coming billions of years after the Earth first appeared, but current estimates put both the presence of liquid water (as oceans, or at least, seas) and Life itself very early on indeed. And this brings in perhaps **the** most important aspect of Time when considering Qualitative Change, namely **Tempo!**

It is clear that some form of Life appeared very early, but it certainly did not thereafter zoom away into a vast width of different forms, and this surprising interlude surely **has** to be adequately explained.

In a rather contradictory way, though we didn’t get any dramatic increase in width, we certainly got it in **vast proliferations** of a *single* form. There clearly were avalanches in the *number* of individuals in the given First Form. So we have great **conservatism in variety**, along with **proliferation in numbers** of individual entities.

And you have to keep this in mind when the first fragment of Life appeared, for it would indeed be very **simple** and entirely *alone* as a new form. It would have no competitors, and hence would expand very quickly in numbers until it reached the limits of its situations of possible persistence. It would not have, and, of course, could not have, ANY mechanisms for change, and certainly could not adjust to any change that happened to itself by accident, or that resulted in a non-conducive change in its environment.

But, it would certainly *dominate* in numbers. Indeed, at this crucial first step, it is hard to see how any changes of any sort could be accommodated. Indeed, one is more or less forced to consider that there were a whole series of these attempts, **all** of which failed at the first hurdle, and so, would not actually *count* in our category of First Life. But all such failures would not have been absolute: fragments of failed systems would litter the non-living mix, and contribute perhaps to the next attempt? Indeed, even after a real First Form became established and persisted, other later attempts would also fail, for they would have a competitor – our First Form, and would be in no position to persist in such an opposition. So, our **First Form** would persist alone for vast periods of time, expanding into new areas whenever the conditions were appropriate. And, as with many present-day computer simulations, the single form would dominate over vast areas, effectively conquering the whole World.

NOTE: The very remarkable build up of Oxygen in the Earth's atmosphere from literally zero to 20%, is not so remarkable if the World was dominated by Stromatolites, for example.

Indeed, though an unusual version, such a circumstance seems to be yet another example of Stability, which persists for exceptionally long periods. The necessary changes for things to finally terminate would take a great deal of time for Second Law type “parasitic/dissolutionary processes to grow in number sufficiently to finally undermine the stability and cause an avalanche of terminal changes. And, of course, such an Emergence *could* be externally precipitated by a dramatic, indeed calamitous, change in the surrounding non-living context. Some natural calamity may well have provided the necessary initial avalanche of dissociations that would enable the “new start” of the second, creative phase of an Emergence.

Finally, we have to consider seriously, “*Why did Life emerge at all?*”, and the only conceivable answer to this has to be that Life was a better, more efficient and quicker form within Reality than existing and purely non-living processes. It must have allowed much bigger changes than were possible when only uncoordinated Chemistry was involved. All avalanches of change in purely non-living circumstances are always **finite** and **short-lived**, and soon return the overall situation back to where it was before the entirely local cataclysm.

For Life to be different, it had to somehow maintain itself, and this would certainly involve resultant changes in the containing environment that would make it even more conducive rather than inhibitory to continuing proliferation. In particular, the early additions to our single form of Life would NOT be new forms, but various non-living parasitic processes that existed before, but now proliferated *because* Life was there! Thus, from the outset Second Law type processes would be developing, and in time could grow sufficiently to precipitate an *internally* caused avalanche of dissociation and another Emergence. Indeed, in these very early stages, it is hard to see how Life could possibly develop new Lifeforms without such a major crisis.

Now all these considerations will have to be addressed, and to do it rigorously and effectively is clearly a major undertaking. In attempting to address these many questions, this author has been forced to make many crucial diversions into areas of Theory not currently addressed.

In particular, this has included *The Processes and Productions of Abstraction*, the area of *Plurality and Holism in Scientific Theory and Methods*, and even a long investigation culminating in *The Theory of Emergences*. And perhaps the most surprising deliberations (and indeed the most difficult) have involved studies in Sub-Atomic Physics (the *Copenhagen Interpretation of Quantum Theory*) and even *Cosmology*!

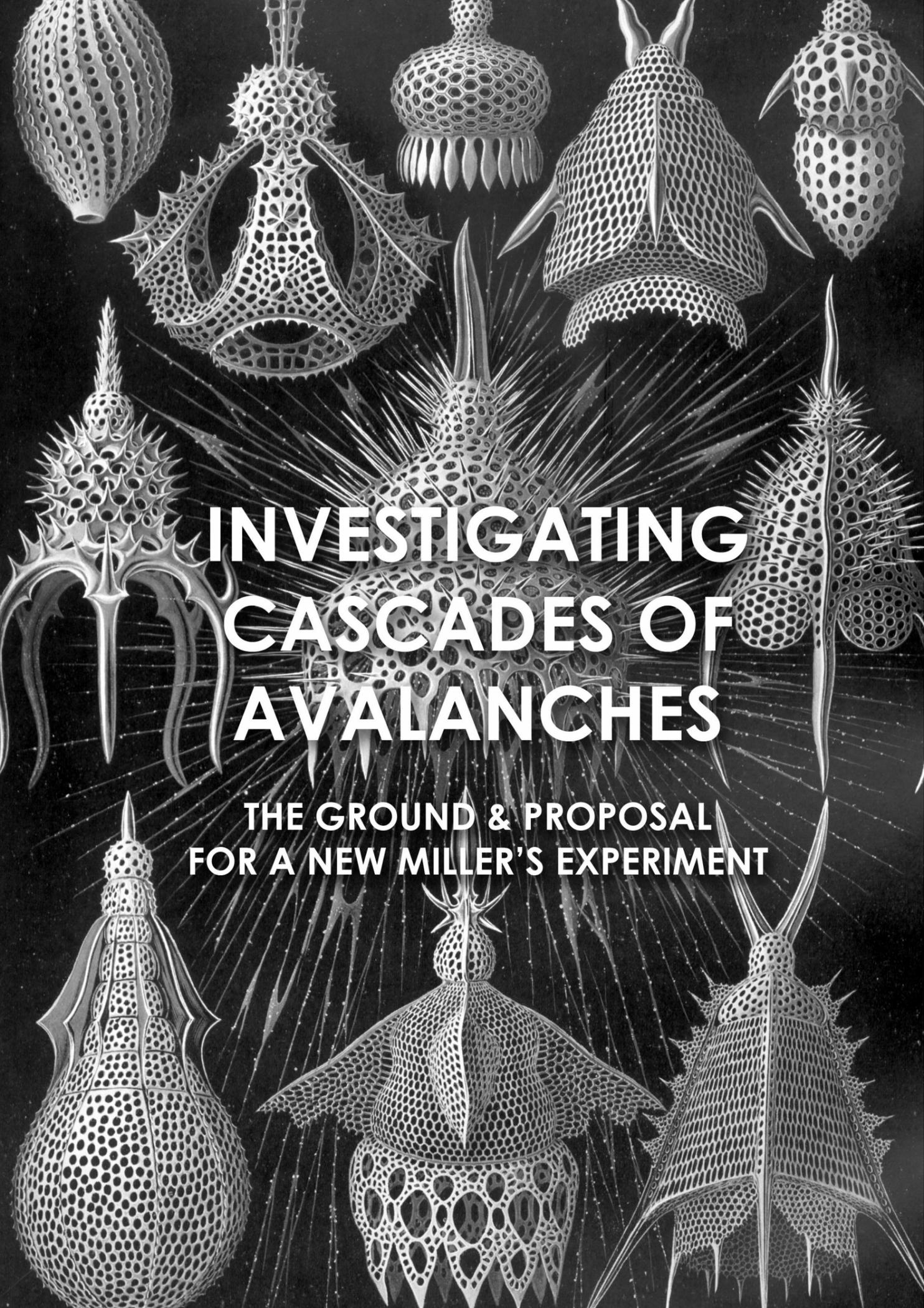
So, I must admit that my contributions upon the many questions concerned with the Origin of Life on Earth are nowhere near comprehensive. Indeed, they are more of a mapping of necessary routes rather than a set of determining revelations. But they are, I am sure, **essential**. They do not shy away from the crucial areas, and particularly do not suffer from the usual major flaw in most scientists – namely that they are rubbish at Philosophy!

The philosophical questions have been addressed, and by far the most important results have been a thorough-going critique of the usual philosophy and consequent methodology of present day Science, and this has at least pointed the way towards a truly Holistic Science, which, for the first time, will extend our understanding

of Change from the merely **quantitative** to the *qualitative*. Indeed, Science will embrace Development coherently and scientifically, which it has not done thus far, and will leave Equations to the Technologists.

**Jim Schofield March 2011**

(4,082 words)



# INVESTIGATING CASCADES OF AVALANCHES

## THE GROUND & PROPOSAL FOR A NEW MILLER'S EXPERIMENT

We commence with a rather long reformulation of the famous Miller Experiment, greatly changed and developed to enable the new version to deliver what the original could not - the possibility of the identification of the entities and processes, and their sequences and tempos, which ultimately delivered that fabulous result - amino acids! Though not written for the purpose for which it is being inserted here, it is a solid and worked-through attempt to develop Miller's entirely holistic effort to point the way to an entirely holistic methodology in science.

### Investigating Cascades of Avalanches *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 coordinated parts of complex and clearly “directed” systems.

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

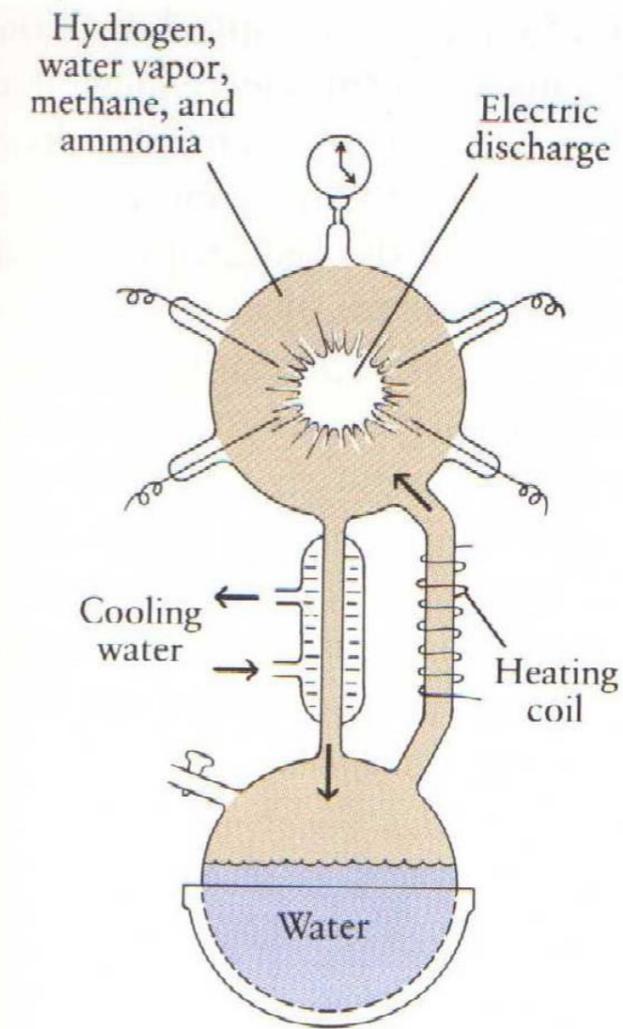
But, though the answers to such questions may be difficult to accept as feasible, they are not as incredible as an immaterial and all-powerful God, who has directed the whole process to his own designs. So, some sort of placeholder was the best that they could do.

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.

(912 words)



4-3 Miller's experiment. Conditions believed to have existed on the primitive earth were simulated in the apparatus diagrammed here. Methane ( $\text{CH}_4$ ) and ammonia ( $\text{NH}_3$ ) were continuously circulated between a lower “ocean,” which was heated, and an upper “atmosphere,” through which an electric discharge was transmitted. At the end of 24 hours, about half of the carbon originally present in the methane gas was converted to amino acids and other organic molecules. This was the first test of Oparin's hypothesis.

## 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!

Of course, 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!

(1,105 words)

## 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 reddy-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.

(966 words)

## 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 co-ordinated 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 Orogen 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.

(1,610 words)

## Investigating Cascades of Avalanches

(in a Holistic way?)

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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.

(1,610 words)

## 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 primaevial 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 reddy-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 reddy-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.

(1,497 words)

## 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, (Let's face it, there is NO Higg's boson) 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*.

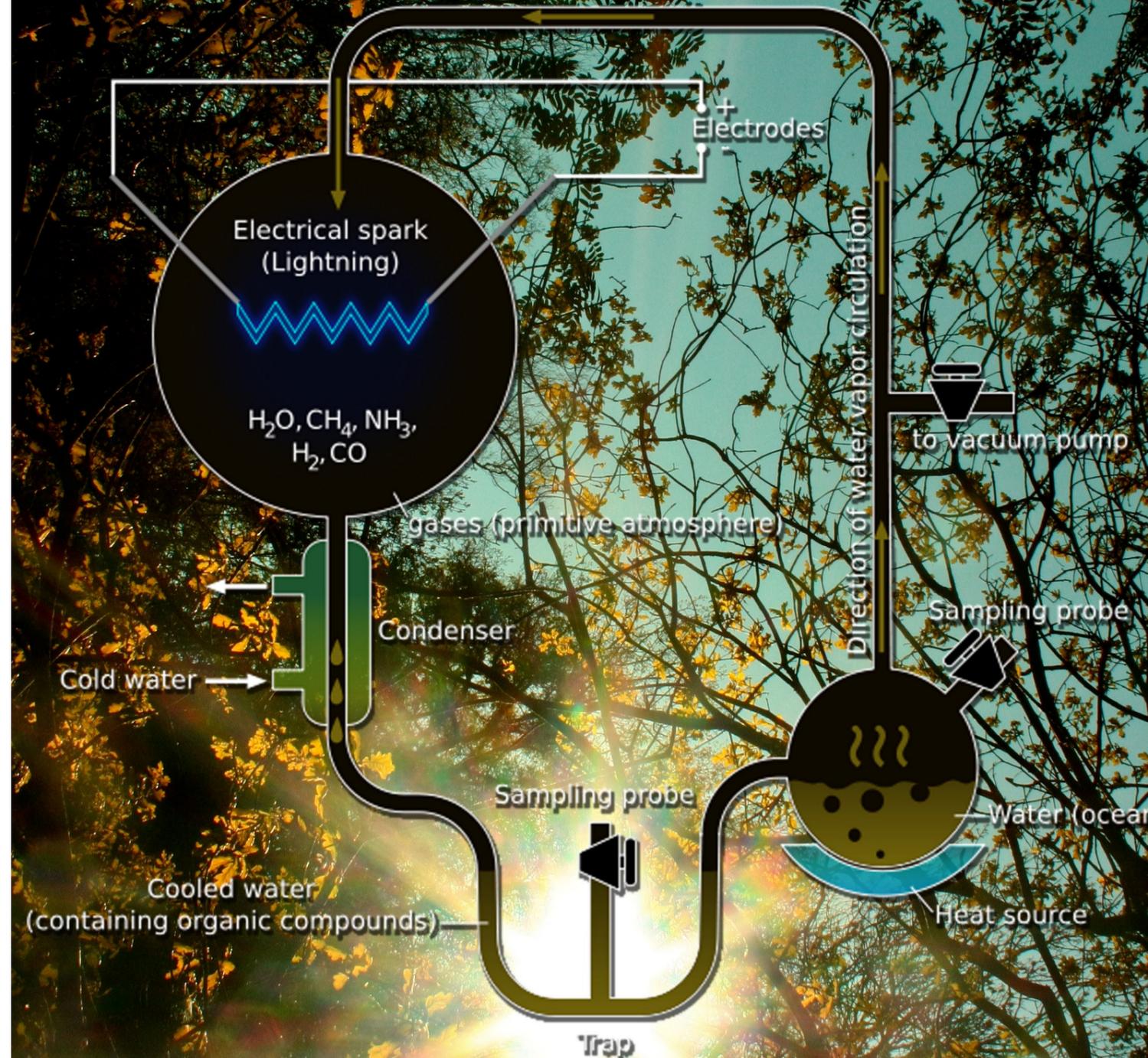
Now, I am aware that such an giant Experiment as is proposed here would be extremely expensive, AND that it would necessarily involve whole new experimental procedures to ensure that we will be measuring exactly what we need to measure, and think we are, measuring. But frankly, there is no comparison 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 corraling sections of it to exploit only these artificially arrived at fragments.

(880 words)



## *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 then 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.

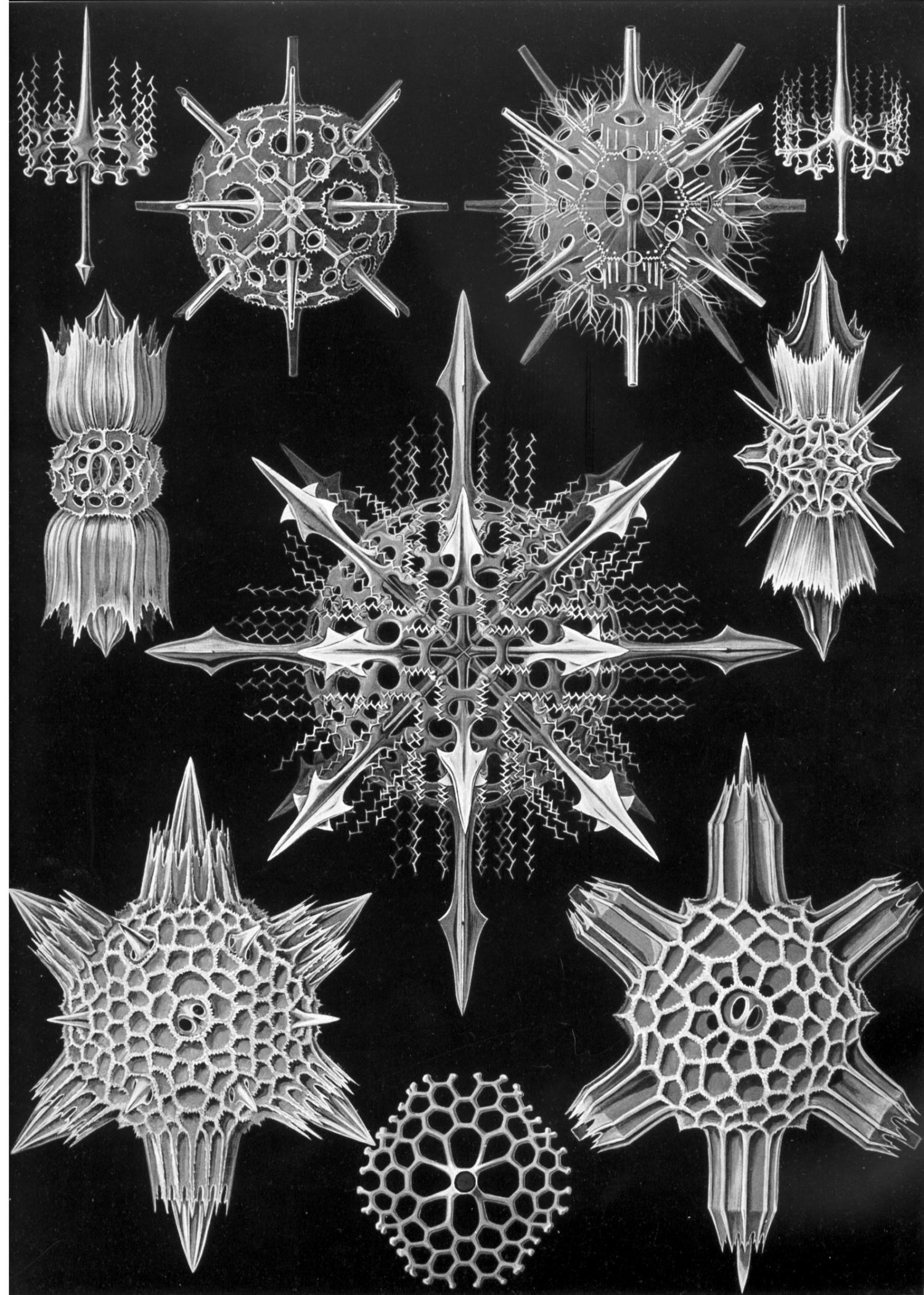
To achieve these additions a heating element and pumps would be necessary, that would take hot water from the included sump (the proto ocean) and direct it over various rocks that present a likely selection of mineral types as would be most common in the locality of volcanic eruptions.

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.

(1,522 words)



## **Announcement**

### ***A Series of Special Issues on the Origin of Life***

Addressing the questions involved in the Origin of Life on Earth is clearly not completed in this issue. Indeed as the necessary materials were being collated and others created in this assault, it soon became clear that even as an initial laying out of the arguments involved, it could not be delivered as a single comprehensive contribution.

For example, the mere statement that a holistic approach would be essential to get anywhere near to the actual occurrences in this crucial event, would not be sufficient for the simple reason that no agreed and well-understood holistic methodology as yet exists. A case would have to be made for such a major revolution in scientific philosophy and method - some sort of establishment of that new approach would be necessary.

In addition, the many diversions caused by vested interests and funding requirements would necessitate yet a different and extensive assault upon the question of *where* the Origin of Life most probably occurred. And perhaps most important of all has to be the dispelling of the many current and indeed doomed to failure approaches, which can be categorised as incremental, and divided into ONE; the assumption that you can build-up to Life via the accumulation of necessary non-living pre-requisite processes for life or TWO; the alternative which digs ever deeper into more and more primitive organisms until something like the form of the first life is revealed, and could then be explained.

There will, therefore, be at least three more Special issues following this on the subject, which can be seen as a mere glimpse of a possible future development in Science in the tradition of Darwin himself, who did not develop Natural Selection via equations, but by distinctly holist reasoning.