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**THE
KEY EVENT**



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Editorial

The Key Event

Welcome to issue 25 of the **SHAPE Journal**.

This edition marks a change in both layout and overall method for this author, and as such requires a few explanatory words here. They are not about the content so much as how that content redefines its presentation.

The question being considered is the essential touchstone for a necessary and truly profound change in scientific method, for it cannot be addressed by the usual standpoint and methodology, which has remained essentially the same for several centuries.

Tragically, its clear inadequacies, revealed towards the end of the 19th century and the beginning of the 20th within Physics, did not lead to this necessary and indeed revolutionary change, but instead precipitated the wholesale retreat, which became The Copenhagen Interpretation of Quantum Theory.

For this change, in order to retain a “coherent” approach, rejected Explanation (Theory) as illusory, and pragmatically reverted to Prediction (and its means - Equation) as Science’s sole purpose.

This retrenchment has now lasted 100 years, and shows no signs of ending.

Thus, those who consider that the Explanation of Phenomena to be Science’s ever-improvable essence, must find answers to the philosophical and methodological impasse that has resulted in this devastating retreat.

And, there are many real world examples, which can be investigated to begin to get a handle upon Significant Qualitative Change – Revolutions in all areas of study.

Now, such researches are already being pursued, but only by a very few practitioners, and such papers as this must attempt to recruit ever more colleagues to this vital task.

Thus, this paper will change the usual form, and will attempt to make illustrative links with other work in the area by special included panels, usually involving a picture or diagram, and an indication of where this can be looked up to pursue that particular line.

Clearly, this cries out for hyperlinks and relational databases web-wide, but differs in that the present available software does NOT involve adjustment either in the sending paper, or in the “sent-to” paper. So, that is too independent of any cross paper intentions, and that doesn’t always help.

So, such use is not implemented here. It is, instead, beginning to find a way, which will hopefully transform the means to fit particular content.

What you will find here is, of course, only a first step.

Jim Schofield June 2012



The Emergence of Life

Where was the Cradle or Nursery of Life?

THIS seems a sound and worthwhile question, but on closer inspection it betrays a surprising set of assumptions embedded within it, which focus attention away from the real question.

The words “cradle” and “nursery” are surely entirely inappropriate in this context! In normal usage, we associate them with already-living, young animals in process of their earliest developments, and hence requiring concerned and conscious care.

How could they possibly be the right words for the actual emergence of the initial barest trace of Life within an entirely non-living and uncaring environment? (Who on earth could be looking after them?)

And the question “Where?”, seems similarly odd, as if the actual process was known and just the right conditions would ensure its happening successfully.

All these betray the wrong suppositions entirely!

Well, there are reasons for the form of that initial question! It takes that form because the actual Origin Event is never ever actually addressed as such: it is considered much too magical to be straightforwardly

tackled. The crucial avalanche of processes, which took non-living entities and their normal non-living (mostly chemical) processes, and in a rapid cataclysm of qualitative changes, produced an entity, which signalled a wholly new ingredient, which had never appeared before: an ingredient that structured its immediate environment into its own substance and proliferated by a wholly new, remarkable set of processes.

Addressing that was always considered much too difficult, and some much less revolutionary alternative without a frank admission of the miracle that was certainly involved, had to be assumed instead.

The changeover is considered, instead, as a merely a part in a continuous, natural process from beginning to end – from entirely non-living to First Life.

NOTE: Even my hero David Attenborough in his TV series called First Life, made this same assumption: that the first living thing was the result of an enormous series of tiny incremental changes that added up to a new Form of matter, called Life, and continued thereafter as Evolution.

Indeed, such a transformation by quantity alone is nonsense, and the involved methodology of Stability can never explain such miracles.

But, if that continual incrementalist assumption underlies studies in this important area, the question does get changed into “What were the ideal chance conditions for this continuous and inevitable process to be able to carry through to completion, and indeed where would we find it all happening?”

So, when eagerly wanting the real explanations for this amazing and revolutionary Event, we get instead arguments about Black Smokers at the bottom of the oceans, or shallow pools in tropic seas, and even the most empty of all –“from somewhere else in Space!”

Now, it is no accident that the real questions remain unanswered. Indeed, such is the norm, and has been so for a very long time.

In “pulling themselves up by their own bootlaces” Mankind had first to get some sort of handhold on the Real World, and this was achieved by concentrating on the simplest and most clearly evident relations that could be found.

Mankind sensibly chose Stability as their area for study. When things changed miraculously into something quite different, that was never amenable to study: those events were for magic and Gods to arrange.

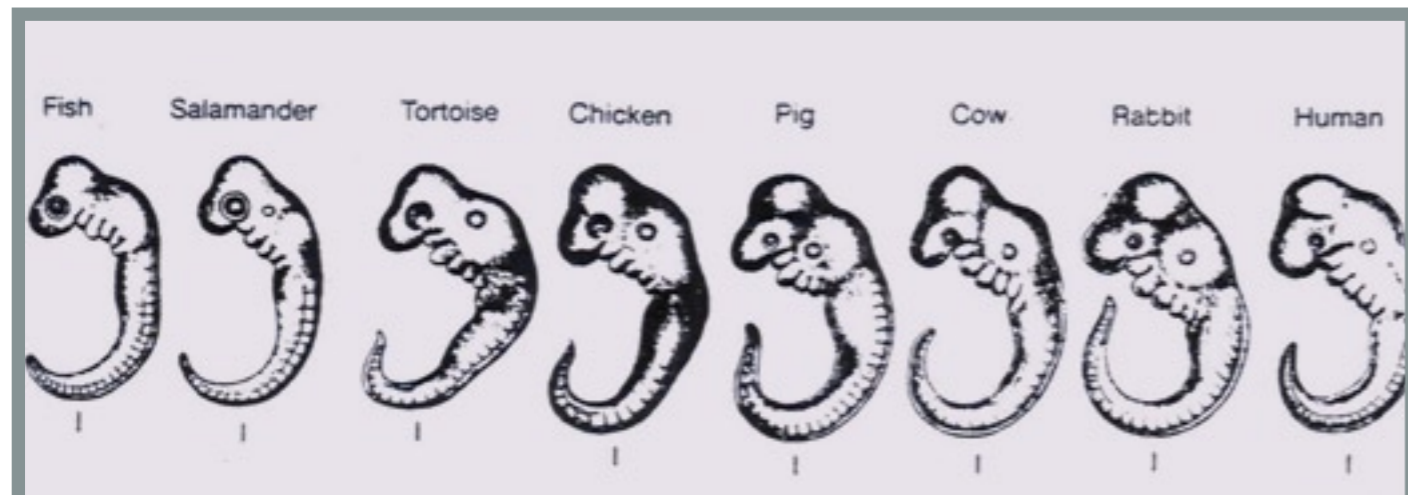
But, other changes gave the impression of being

both continuous, and even predictable, so these were the obvious places to start. Indeed, most things were considered to be naturally unchanging in their essential natures, and had been so since they were formed by the supernatural Hand of God. And also, most such changes that could be easily observed were not changes in their nature, but merely in the size or quantity of some property or another.

So, all attention was focussed upon such things, and even after the development of those studies matured into Science, that basic approach remained: only the religious and the philosophers continued to address Qualitative Changes.

Now, this also meant that there could be NO single discipline applicable to everything! For, though these were always incremental, quantitative changes to be studied and extracted into relations and equations, the arrival at one of these unsolvable transformations marked a dead halt to the usual methods. It marked a boundary to that particular set of studies.

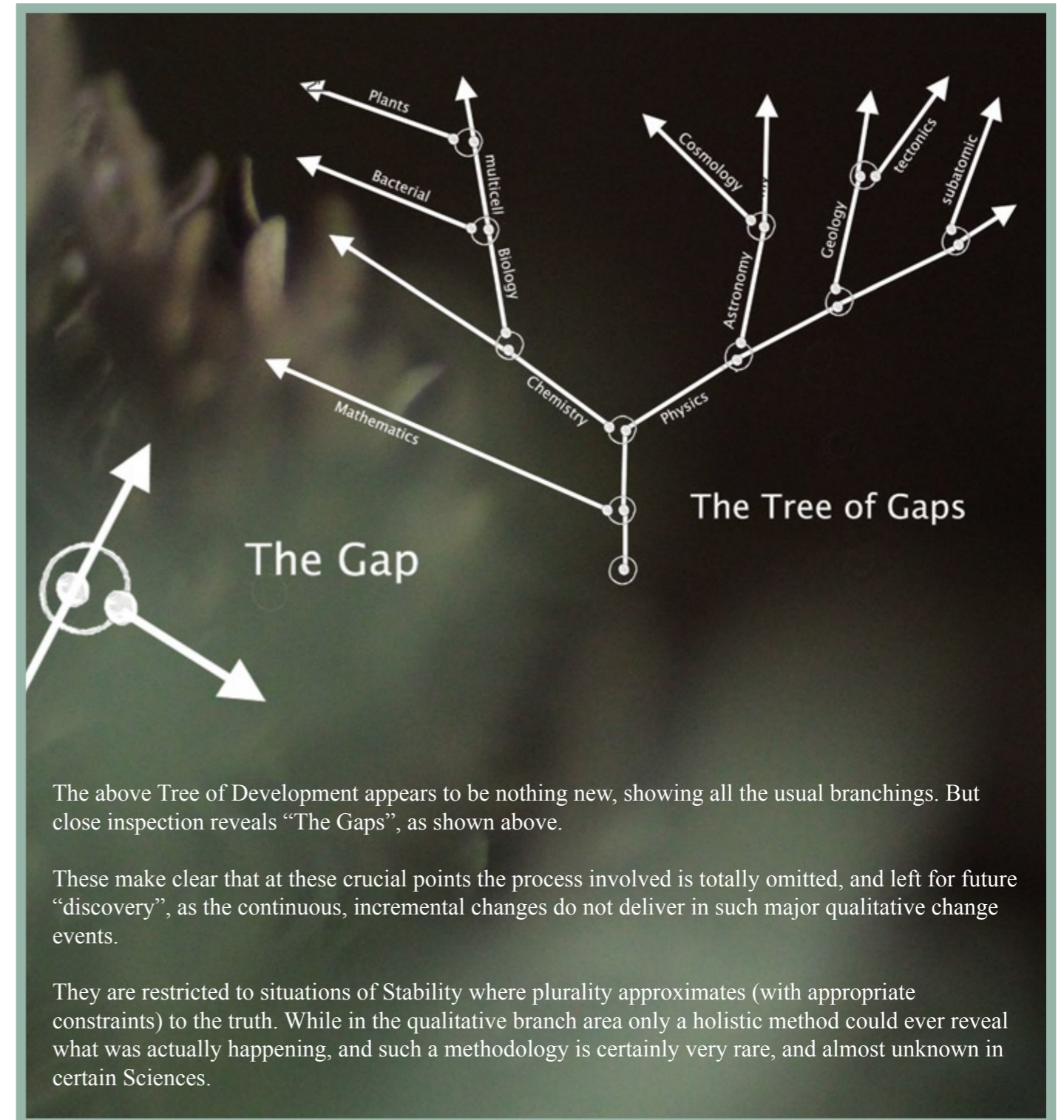
Yet, if the actual transformation was skipped over, and the new situation so produced was studied in the exact-same, quantitative way, the onwards march could surprisingly be resumed once again. It would just have to be a New Science – like Biology for example!



The Myth of Incremental Evolution

The image is included because it was always used to support the incrementalist standpoint in Evolution – in other words the sequence was considered to be an unbroken continuity of incremental and quantitative steps, which led at various points to new species. It was supposed to both prove common ancestry and incremental development in a single diagram..

But, in truth, though correctly showing the great similarities between what were in full expression of their determining genetic code, vastly different organisms, could also be quite correctly criticised for “skating over” the crucial, and almost miraculous steps that must have occurred to initiate wholly new development paths at every new species.



Now, this changing horses in mid-stream became the accepted way of dealing with such situations, though once traversed into to the safe opposite bank, the maelstrom was always avoided like the plague thereafter.

Now, the gap-to-Life was not the only case where such difficulties were encountered. As researches became ever wider these boundaries began to proliferate, and more and more “disciplines” were labelled and studied by specialist scientists of that area, and studied in their own terms. There was a truly vast increase in these separate areas.

NOTE: Now, we must not get diverted by examples of clearly physical relations, occurring inside some living entity. That is not disputed, nor is it significant! Such

things are everywhere, but their existence does NOT prove a continuity between non-living Physics studies and living Biology studies. It only proves the quite evident co-existence of these two realms.

The crucial process is the production of a new realm from the old realm, which thereafter developed its own rich World. The actual transformation Event is what matters here. Do you know how it occurred? Of course you don’t! No one has cracked it “yet” because no one actually addresses it. And those who profess to study the Origin of Life, in fact don’t do that!

They may study the necessary precursors, or the supposedly ideal circumstances, or even the process of evolution once it had occurred. But no one tackles the

actual transforming Event itself.

Instead, this gets hidden as the one unattended step in an innumerable number of other “incremental changes”. In climbing the staircase of development the missing “treads” are just skipped over, to carry on regardless!

Everyone thought that one day the gaps would be bridged, but no one has addressed a single one.

Even Darwin’s magnificent achievement conformed to the above described incrementalist approach, though he did bury forever the myths of “Eternal as God made them” ideas of constancy.

It thus becomes easy to explain why even the best scientists were still religious for centuries.

Each aspect of their worldview had its place – Science was for the unchanging (i.e. qualitatively constant) aspects of the World that was to be studied in great detail, while Religion was for the seemingly unanswerable, qualitative changes that had to be the province of a supernatural God.

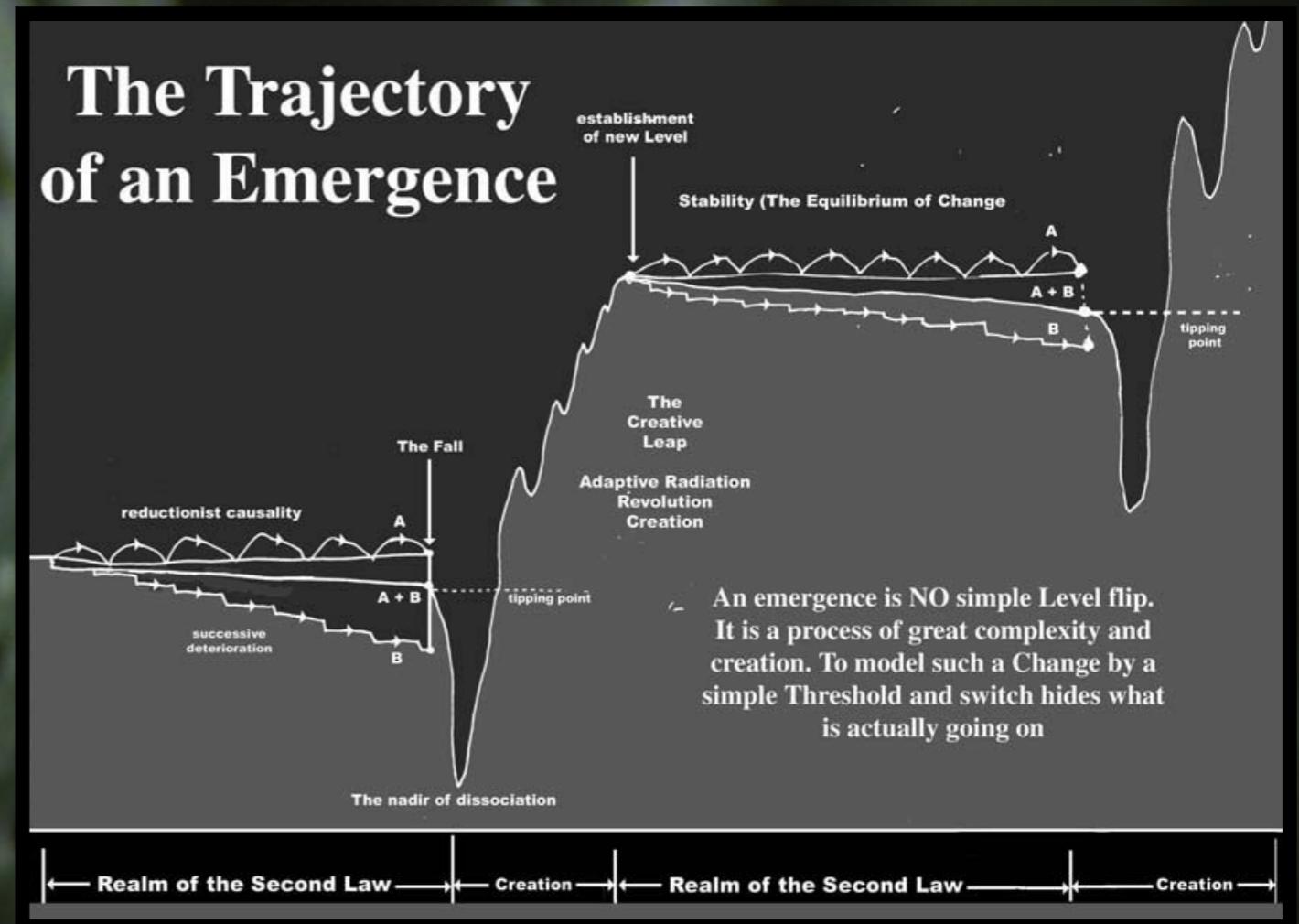
But, of course, this could not go on indefinitely! The constancy of species, for example, began to be challenged by increasing and significant evidence. Darwin’s voyage on The Beagle brought him up against isolated groups of animals, which were very different to those well-known ones from more easily reached and continuous areas of land. And, all of these new organisms were, at the same time, evidently closely related to one another!

The fauna of the Galapagos Islands posed the right questions, and Darwin could not but consider them and their possible “evolution”.

Yet, these emergences of new species from old species were NOT the most profound, and though they may breach the “constancy of God’s Designs”, but they could be conceived of as achieved entirely by tiny (seemingly inconsequential) changes, which could “add-up” to a significant wholly new creation. Any singular switch to a new species was still not dared to be addressed. All species were thereafter considered to be naturally changing, literally all the time and bit-by-bit, into something else. But, though that conception was a good deal better than the “forever constant” idea, it was neither actually true! Nor indeed sufficient.

Even evidently related species later turned out to be genetically separate and incompatible in any sort of reproduction: when a species appeared, it was immediately wholly separate from all members of the original species from which it came. Inter species crosses were either totally impossible, or if by some chance they did produce offspring, those were in turn incapable of further reproduction. The question was, of course, “Why did this always occur?”

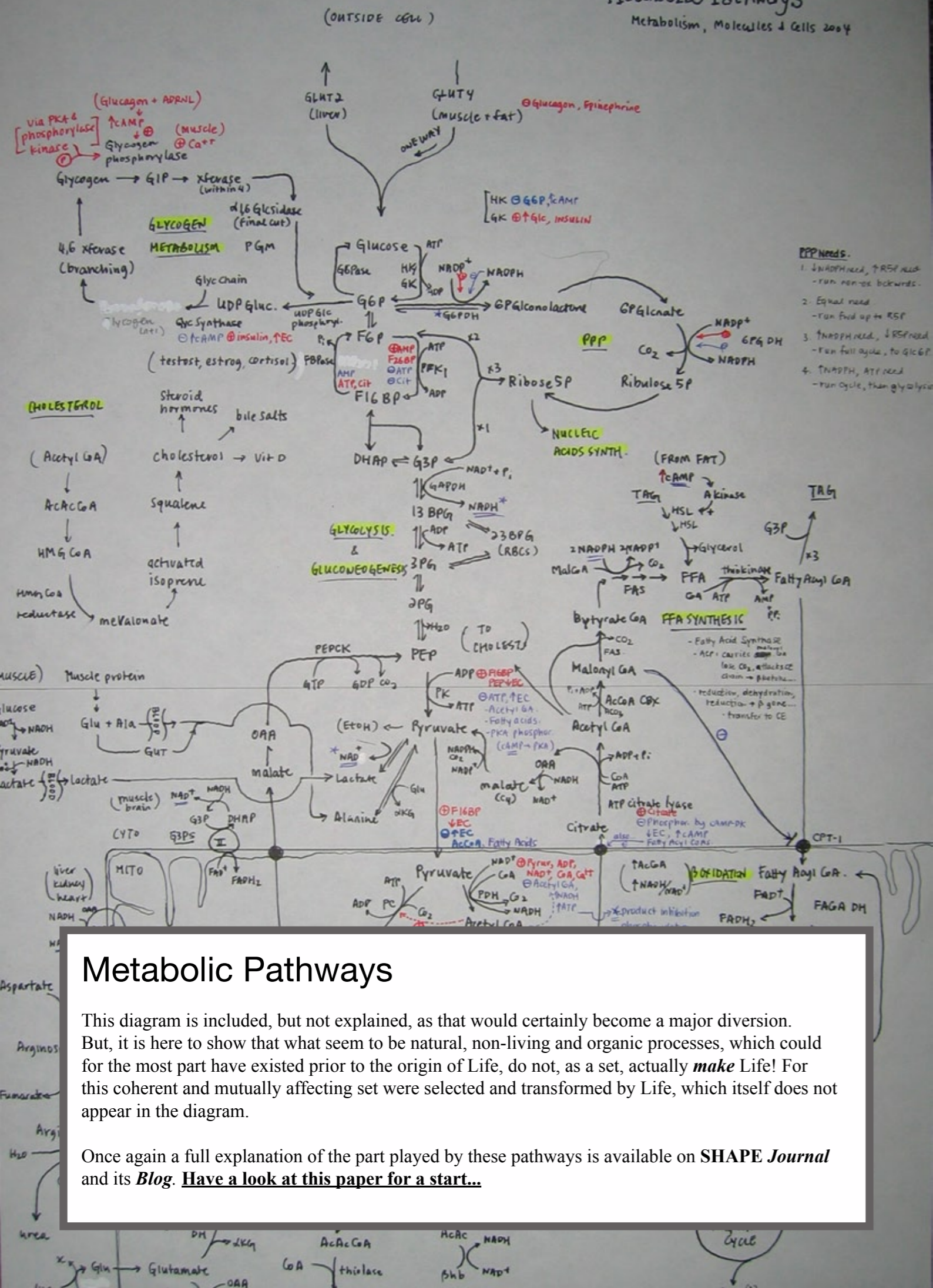
Clearly, changes that actually mattered were not those producing different breeds or variations - they remained totally within the parent species. But, when a change occurred which isolated the affected organism from its immediate relatives – some crucial and irreversible change had happened and produced the new species.



This image, from the author’s *The Theory of Emergence*, is included here without any detailed explanation. It does demonstrate, however, that suggestions for a holist attack on Significant Qualitative Change are not a mere dream, but an on-going undertaking. Considerable work has already been put into these crucial areas, of which this diagram was the culmination of one particularly fruitful investigation. To those not familiar with what is included, I must add that ideas from many different areas of Science and Philosophy contributed to the final figure shown here. The SHAPE Special *The Theory of Emergence* is available by accessing [SHAPE Journal](#)

Metabolic Pathways

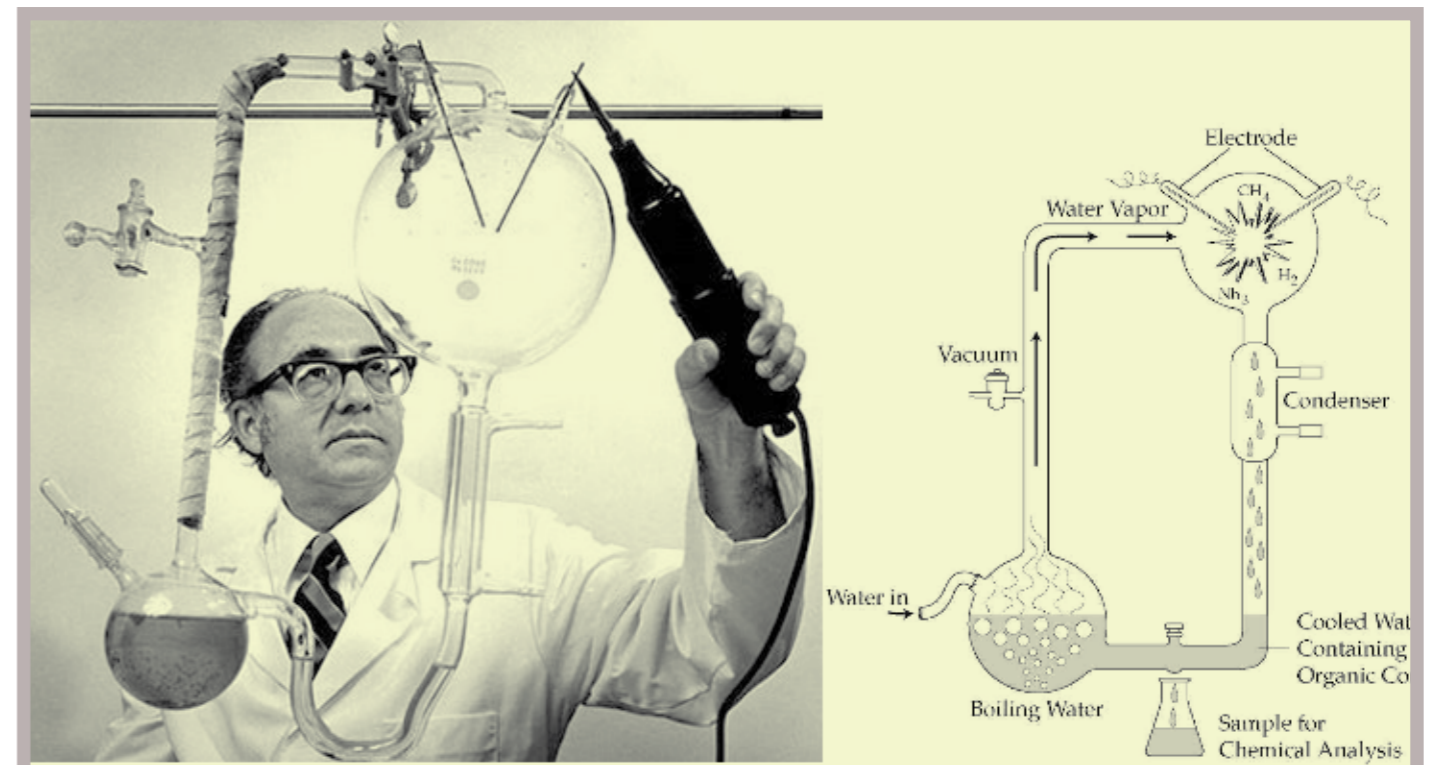
Metabolism, Molecules & Cells 2004



Metabolic Pathways

This diagram is included, but not explained, as that would certainly become a major diversion. But, it is here to show that what seem to be natural, non-living and organic processes, which could for the most part have existed prior to the origin of Life, do not, as a set, actually *make* Life! For this coherent and mutually affecting set were selected and transformed by Life, which itself does not appear in the diagram.

Once again a full explanation of the part played by these pathways is available on [SHAPE Journal](#) and its [Blog](#). Have a look at this paper for a start...



Miller's Experiment

Though sidelined by Science, Miller's holistic experiment was a revolutionary breakthrough in tackling questions such as The Origin of Life on Earth. He established that complex mixes of simultaneous processes produced things that were impossible with the usual pluralist methodology. But, nevertheless, his was literally not only the first in this area, but also perhaps the last. It did not reveal usable fragments of Reality in clearly defined Domains, and hence did not reveal enough in its then form, to allow consequent researches. So, it was merely shelved. But, the situation has changed today. For many new and powerful experimental techniques and environmental control and testing methods could be integrated into a new version of this profoundly important experiment.

No matter how many quantitative steps between these related, but definitely different, species, there had to be a significant special kind of qualitative change, wherein the continuity was irretrievably broken. So, the question now had to be, "What caused such a final boundary?"

Now, for many, many decades this was just considered as yet another unanswered problem, and would be cracked sometime in the future. But, then along came Pagel, who demonstrated, using the same statistical methods, as were commonly used to prove the old consensus view, that species change could never occur in this incrementalist way. It has to involve a single, significant event!

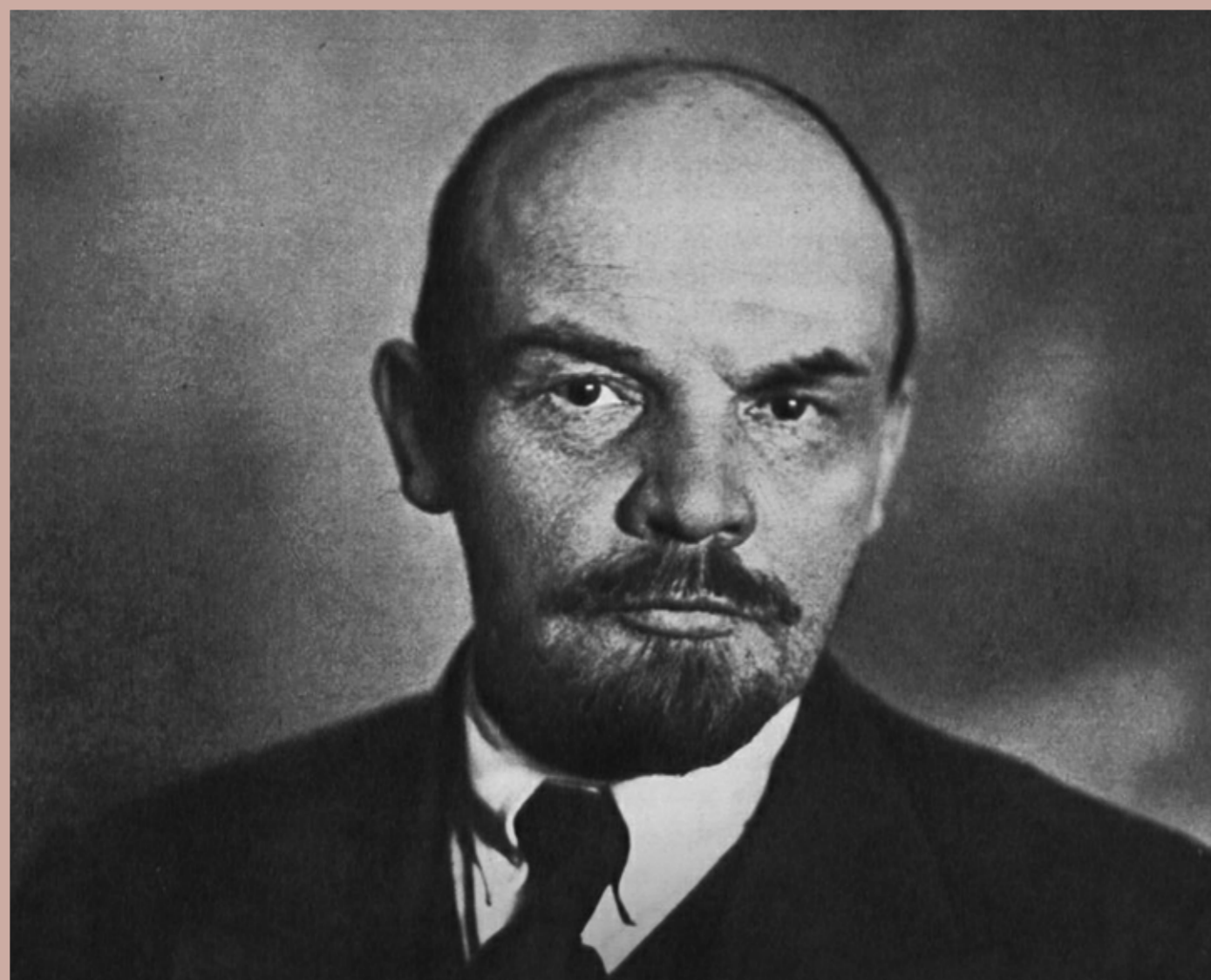
And though this was published and reported far and wide, it somehow wasn't seen as significant. Yet it was, of course, profoundly important!

And this was because its inference was that incremental changes didn't just "add up". They accumulated not to deliver a cumulative and new result, but to precipitate a major and much more profound change, and it was this singular change that both established the

new species and banned reproductive compatibility with the prior species. This type of change was not as trivial as changes in appearance or even size, but was truly profound! This change was like a one-way valve that could never be traversed in the reverse direction.

And though we now know what kind of labels to apply to this sort of change, and called it a genetic mutation-by-chance, it was a mere place-holder for the real transformation which had to be the culmination of a complex, yet very fast, totally revolutionary change. Once again a description of a result was claimed to be the explanation of a cause. I'm afraid not!

So, what kind of research would have to be undertaken to address such crucial Events? It had to be of a very different kind to the usual scientific approach to experiment. Whereas those standard methods always involved the careful construction and maintenance of an Ideal Domain, designed to simplify a situation and reveal, as clearly as possible, a single, pure version of one of the relations involved, that would certainly defeat what was needed here.



A Worm's Eye View

The basic assumption behind incrementalist explanations is that the processes involved are eternal – indeed ever –present! but differing in their relative dominances. Of course, that is certainly closer to the truth than the usual pluralist assumptions, but it omits the crucial and transforming contribution of Development. Things do change, and even transform into something else, so no system is eternal. It evolves. So what does this mean for the nature of such systems?

If a situation is composed of 10,000 simultaneous processes, but with a continually varying set of dominances, it would be inevitable that most would be invisible or inessential, and most likely both of these at any particular time, and only the dominant ones would matter. Though in a constantly changing situation, that set up could not remain the same forever. There could seem to be an apparent, inevitable sequence of Phases, and these could be seen as a wholly new innovatory development. One apparent proof of such a concept was the regular appearance of clearly evident cycles and repeats that oft times figured in the on-going processes.

But over 100 years ago, when confronted with this line by the writings of Wundt, Lenin took various clearly evident qualities in living things, and asked how this theory coped with them. Wundt was sure that they were always present, but hidden and never dominating early on. So, by carrying the argument back, Lenin forced Wundt into endowing the humble worm with all sorts of sophisticated qualities. Lenin labelled Wundt's position as "The Worm's Eye View", and buries him with the evident point that according to him Life and even Consciousness must always have been present.

For there, the overall principle was that of Plurality, which saw every Whole as composed of entirely separable Parts. Now, the alternative – designed to reveal the Transformation Event itself, had to be the exact opposite. It had to be holistic with everything included as crucially relevant! We would not be seeking an isolatable component process, but the cumulative destruction of a current stability, and its creative replacement by the wholly NEW!

Of course, such an essential set up would be horrendously difficult to both manage and monitor, but could deliver the trajectory of the crisis, and its resolution.

Now, this was certainly attempted by Miller in his famous experiment to investigate the Origin of Life. His quite different methodology was to include what current available evidence seemed to indicate were the contents of the atmosphere of the Early Earth, then to organise such a mix as "weather", with variations in temperature and consequent evaporation, flows from place to place, and precipitation of water, plus the dissolving of the gases and consequent chemical reactions. Totally hermetically sealed, his apparatus was "set in motion" and left to "cook".

Within a week, the water in his system had turned a "reddy-brown", and subsequent analysis revealed that it contained amino acids – crucial organic components of all subsequent living things.

That was a true holistic experiment, but in spite of its evident success it was never followed up. And there was a valid and important reason for that neglect. What had happened within that sealed apparatus?

What diverse processes were involved, and how did a changing context move the experiment along, not only due to multiple simultaneous processes, but overall through a series of consequent Phases?

The experiment proved that what was going on was indeed a holistic development, and it is worth briefly considering what pluralistic experiments would have been necessary to have arrived at the same results. But, as it stood, it revealed nothing of the actual component

processes, or of the self-changing environment.

"That isn't the sort of thing we do!", was the general reaction. So nobody did anything!

Now, when Miller did his experiment, he had no choice with his set up. The only way he could ensure that it was at the same time clearly holistic and unaffected by anything in the current World, was by the method he devised and implemented.

But, with the enormous developments in experimental techniques since Miller's time, the experiment could be radically re-designed and improved in such a way that the processes and Phases, through which the system passed, could be identified on-the-fly, - without affecting what was going on – gradually, with constant re-designs and ancillary investigative experiments. By such means, researchers could gradually reveal what was going on, AND, perhaps most important of all, a whole culture of such investigations and holistic techniques could be developed.

Indeed, this author has already published a suggested design on SHAPE Journal to begin that process.

It is perhaps surprising how persistent many ideas are. In spite of Miller's experiment, the necessary development of a Holist Scientific method did not arise, and though Lenin 100 years ago in his book *Materialism and Empirio Criticism* demolished the incrementalist approach to development and indeed "creation of the new" and even Pagel's proof that such a conception had to be mistaken, these ideas remained.

And, the reason was that our basic assumptions, on which such ideas were based, were never challenged within the dominant academic culture of the period.

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