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Words **Jim Schofield**
Design **Mick Schofield**
Cover **Michael Coldwell**

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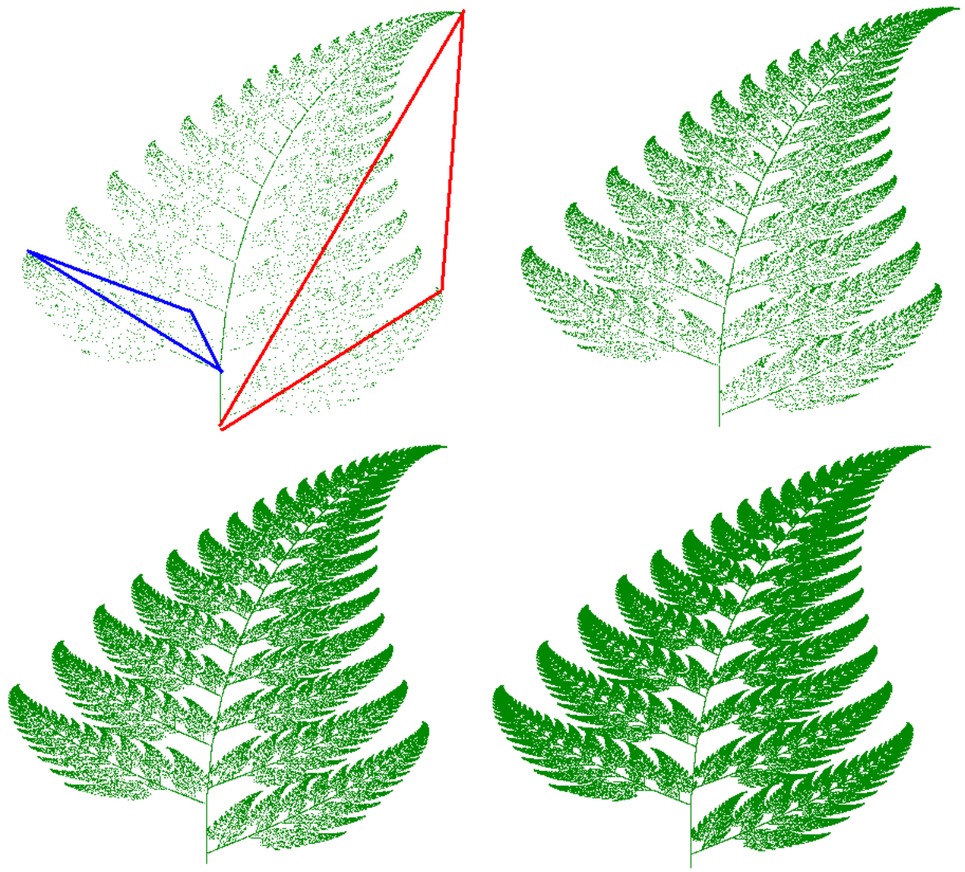

Issue 39

Philosophical Papers

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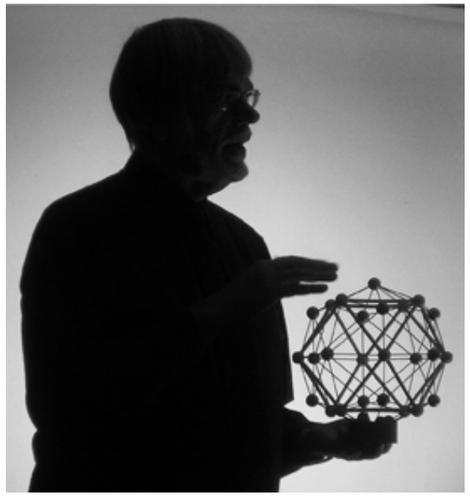
Introduction:
knowledge & understanding



Welcome to the 39th Issue of SHAPE Journal, a kind of review of how far we have got in describing and assessing Man's struggle to understand his world.

It has not been a straightforward history, for Man had had to literally change the world in order to make any progress in understanding it, or indeed, any progress in understanding himself. But in making that significant progress, it has been undoubtedly a heroic trajectory!

It is very important at this stage that a difference between *Knowledge* and *Understanding* be established. For, the latter was never an automatic development from the former.

To use the common description "Man has had to pull himself up by his own bootlaces" - or to use V. Gordon Childe's appropriate title *Man Makes Himself.* Attempting to understand the world has not been at all easy, and perhaps surprisingly, has been predicated upon just how successful Man has been in more everyday tasks of survival and even prosperity. For, his basic general method was initially to grasp whatever was to his advantage, whatever that entailed, and gain himself both a measure of leisure and repose.

The brilliant ideas did not come first! For, it proved almost impossible to solve all the many problems of Mankind's usual hunter/gatherer existence, including the many seemingly unavoidable and unbridgeable impasses in his contradictory development.

For well over 90% of human history, Homo Sapiens roamed the Earth in small family groups, his most sophisticated tool being a sliver of brilliantly knapped flint. Clearly, significant developments in his mode of life were impossible without large gains in that sphere. And while there were brief interludes during that long "childhood", when he was able for a time to acheieve remarkable things - such as the cave paintings at Lascaux: they were brief and excenptional events. Something permanent in his means of life had to occur, to enable real and persisting gains.

It wasn't until the invention and spread of agriculture and animal husbandry in the Neolithic Revolution that the developments in human understanding really took off. For instead of constantly living on the edge of survival, Man could then settle and gather in growing aggregations of people.

Even then the trajectory of developement was never smooth or incremental. Indeed, it was characterised by a series of "false leads" which enabled progress to be made, but which always, in the end, ground to a halt in yet another impasse.

So this brief foray attempts to trace out the subsequent paths, dead-ends, and hopefully the way forward, from where we have finally reached.

Jim Schofield
Sept 2015

The Ascent to Understanding

Let us make a crucial assumption about Mankind's understanding of Reality.

Let us start from its undoubted successes thus far, but also concentrate upon its undoubted inaccuracies, and with the purpose of facilitating the improvement, show its true erratic path from one set of assumptions to the next. For, it has never been, nor could have been, a mere accumulation of knowledge.

Man, certainly, has no direct access to what might be called *Absolute Truth*, for two sound reasons.

First, he hasn't evolved, genetically, to have such abilities, but predominantly to survive as a hunter/gatherer, largely on the plains of East Africa (for at least 90% of Man's existence as a species at any rate).

And, second, because, being highly intelligent and resourceful he has always been able, to varying degrees, to find useable approximations and pragmatic solutions, which enabled him, not only to survive, but also to reproduce and prosper to a remarkable extent.

Over the entire period of existence of Homo sapiens, he has found ways of solving problems, not only within his persisting, but limited, lifestyle, but far more generally.

Yet as Friedrich Hegel showed quite clearly, none of his conceptions were ever Absolutely True: Yes, absolutely NONE of them was ever that!

They are, however, increasingly accurate *approximations*, but are arrived at in such a way as to always dissolve into some impasse or other, which inevitably takes inordinate amounts of time to, somehow, be either worked around, pragmatically, or transcended. And, even when he does achieve such a significant transcendence, he, most definitely, will only advance to a development, which, in turn, will halt at the next inevitable impasse, and once again come to a dead stop.

Now, in such an account as this, it must be made absolutely clear, that the process of Understanding Reality is NOT merely only about the solving of everyday problems – for with these he has always managed to make progress - for Mankind has always possessed an amazing pragmatism. They have always been able to find some sort of way! But, what are not so well developed, are Mankind's concepts of Reality, and his place within it – his Philosophy!

His grasp of the nature of Reality and even of his own species, has involved a much slower progress.

In a sense, the evident side of Man's intelligence is shown in his successes, say, in politics, where it isn't a profound understanding that leads to winning, but knowing how to manipulate people to your own requirements. And, that is, of course, very different from the objectives usually accorded to Science and Philosophy, though never completely attained.

So, what this paper will begin to address is exactly how people *think about things*, and find pragmatic ways of getting around many problems, and how, these methods fail them in the more important questions in Science and Philosophy, and more generally, as *Understanding*. For, there can be no doubt that they do!

The presumptuous writer of this paper, feels he might have an inkling of the problem. It comes from a lifetime as a scientist, a teacher, and also even a sculptor and a Marxist political activist. And, these varied contexts, at many different levels, have recently opened a few crucial doors to what might be profoundly significant.
Let us see what they are!

The most significant processes developed by Mankind have undoubtedly been **Simplification** and **Idealisation**!

These have certainly empowered people in finding ways to solve problems for centuries, by actually seeing them in much more helpful ways. For, they began a process of getting an initial handle upon the nature of various, more accessible aspects of Reality.

But, at the same time, they have also, as an unavoidable part of the process, diverted Man from dealing with Reality-as-it-really-is, and instead enabled the extraction of only a partially true set of conceptions, of areas

of Reality, which were much easier to handle and use successfully. Nevertheless, these "handy-short-cuts" had the crucial feature that Hegel discovered of never leading to Absolute Truth, but instead delivering artificial constructions, similar to Reality, but incapable of being developed beyond a certain limit. These processes of Simplification and Idealisation did indeed reveal something of Reality, and, indeed, something that could be successfully used, but what was delivered was always both partial and distorted, and would always, in the end, lead to a seemingly terminal impasse, which often wasn't transcended for literally millennia.

Of the 200,000 years of his existence, Man was a hunter/gatherer, using only chipped (knapped) flint slivers for some 180,000 years of that history. Do you doubt that he had reached some or even many impasses, in that time, so that developments were severely limited for the vast majority of Man's existence? Yet, it was also during this same period that that his species spread to literally all parts of this World, and survived in all of them, and even flourished in most of them!

Now, there has to be something about Reality itself, which enabled Mankind to learn to solve everyday problems, for most of what he has always been doing (and still does today) is the solutions of diverse problems that other animals are unable to tackle.

But, we always see Man's thinking from the high ground of the last period, which has lasted, at most, around 20,000 years. And, we never answer why, with basically the same brain and genes, it took Mankind so long to begin to climb that final slope to get to where he is today. It is the intention of this thinker to try to tackle that important question, and see what the answers mean for the future course of Human Thinking!

Now, the question has to be, "Why do Simplification and Idealisation work?" Why is such a process productive, for it sounds like it is most likely to be groundless speculation, while it actually does indeed (if in halting steps) take us ever closer to the unattainable absolute?"

Let us start with the first of these:-

Simplification
It is, in fact, surprising that Simplification works at all! Just making something simpler than it actually is, shouldn't work!

Unless, that is, the process reflects something actually existing in Reality - and of course it does! What Simplification reveals is not an essence but a natural *Dominance* - by ignoring all but the most evident contributions to a situation.

And, such Dominances are, indeed, present everywhere. Now, to understand that this is so, we have to think holistically! We have to consider real world situations as being composed of multiple factors, which can compete with one another, as well as cooperate or complement one another.

And, in such a melee, the mix will not remain the same: it will move towards some sort of stability, in which the various contributing components come to a balanced state, which usually has the form of various clearly dominant strands, with still existing, but subordinate strands present too.

IMPORTANT NOTE: Clearly, choosing a Dominance as the characterisation of that state, is THE simplification. And, it will be useable in the right context. But, it will be like taking a still picture of a moving process: it will lose, completely, the dynamic contributions that will, in the end, cause it to change dramatically.

So, simplification works well in *persisting stabilities,* and it is even useable in momentary stability within a changing situation. But, it can never include the intrinsic dynamics of that change. That is its limitation!

Now, the most common uses are those frequently made by ordinary people, but scientists use aimed-for situations, which they are confident they can control and use effectively.

One favourite is the so-called "random mix", where the majority of the many contributions tend to "cancel-out", and a General Summed Law is then easily discernable above all others!

The more common case is one in which the stability is created by a particular mix arranged for to give a certain factor clearly dominating.

But, if they are conducive to simplification, conceptually, and experimentally, the conditions of an investigation can be purposely optimised to reveal that dominant factor above all others.

Indeed, I call this the *Farming* of a location or Experimental Domain, when it becomes the ever-present basis of the general scientific experimental method.

The great value of this version is that not only can the dominant relation be extracted, but also used with confidence, IF AND ONLY IF that dominance-containing situation is to be effectively and reliably maintained.

Let us now go on to the second of these means:-

Idealisation
Now, this process, though glimpsed for millennia, was only grasped firmly by the Ancient Greeks, and in a particularly restricted area, which we now call Mathematics.

They noticed Patterns and Forms in Reality, and cleverly extracted them in a very different way to simplification. They initially did it by drawing them in an idealised way! Now, what does that mean?

For example, a roughly round thing somewhere in nature became something very different, while maintaining the noticed pattern as the most important thing! It became a *perfect* circle!

Drawing was the transferring process, because it used lines, considered to be of zero thickness – just conveying the shape and nothing else, EXCEPT, of course, that "roughly round" became ideally circular! And, a crudely 3-sided field, say, became triangular.

The Greeks realised that with drawing, a perfect (ideal) version, could be used, and investigated for its properties. It "clearly" was taking idealised versions, so that they could be investigated, whereas the real, rough, and always complex real forms could not. This study of Ideal Geometric Forms exploded, and in a relatively short time, actual Mathematics was being studied, and the properties of a wide variety of shapes were being investigated and their Laws revealed.

NOTE: Indeed, it was also the basis of Idealism as a Philosophy, in which the ideal forms were seen as the essences of Reality, then made the way they were actually seen normally, merely by the complication of many of these ideal components in different amounts.

Idealistically, they were seen as the sources of all experienced Reality! And, all this was achieved, by merely modifying concepts into *ideal versions*.
A line had zero thickness.
A dot was conceived without any extension.
- and, of course, many more!
Thinkers, in this very tidy area, could concentrate upon certain features, to the exclusion of everything else, and find their formal relationships.

So, more generally, it was to become a method in General Thinking also, and situated a needed understanding into considering the interactions of certain ideal forms and factors. And, it can be seen how this too gelled (at least approximately) the actual condition out there in the World. It, certainly, makes certain idealised features available for study.

Though, these two methods did not reveal Reality-as-is, they certainly could, in particular conditions, approximate to Reality in useable ways. But, such was never the route to Absolute Truth.

It was a trick which could allow predictions and even use, in given constructed and controlled contexts, but, philosophically, it led in the wrong directions and assumptions for really delivering Reality-as-is. The proof of this is clearly seen in the most advanced discipline based upon these methods to a remarkable extent – namely Science.

Now, Science, quite properly, has been celebrated for its sound *materialist* stance. And, that aspect of it, particularly in the investigations of Reality, is indeed valid. But, overall, Science only managed to continue to develop by being an amalgam of three distinct disciplines, all of which had diametrically incompatible premises.

Now, this sounds like a contradiction in terms! How on earth could incompatible disciplines be "mutually beneficial"?

Well, a set of related disciplines gave a means of working around the unavoidable impasses. They made this possible by allowing switching of your ground, whenever a problem was encountered!

Let us see what these main components of Science gradually became.

First, we have the basic materialist stance – investigating objective Reality for the answers.

Second, we had the formulation of results, gained by measurements of reality into "idealised forms" – taken from Mathematics.

Third, we had the well-established pragmatism of the hunter/gatherers (Man's "natural Mode") – "If it works, it is right!"

These three, in spite of their differing premises, managed to deliver, between them, a means of making progress by switching methodologies "when necessary". It really did deliver a means of continuing to make progress.

But, of course, it still contained within it innumerable contradictions, which would ultimately and inevitably bring the whole monolith to a halt!

NOTE: For to make these switches, the user had to also switch his premises. For example, in switching to mathematical forms (equations), he had to idealistically have these determining what was going on. A peculiar "facing-two-ways" standpoint grew up, which would ultimately founder upon the rock of this total incompatibility.

Now, that major and inevitable crisis has finally and irretrievably occurred. In fact, it occurred almost 100 years ago, and it, as you might have guessed, happened in the most fundamental of the sciences - in Sub Atomic Physics!

The simplifications and idealisations began to come to grief in that area of Physics, with the arrival of Quanta – descrete gobbets of totally disembodied energy. Various major problems – namely the so-called Ultra Violet Catastrophe and the Photo Electric Effect could only be explained in terms of the energy involved being in these finite gobbets – the quanta!

And, as researchers chased these entities further, it became apparent that that the usual premises that were behind both Particles and Waves were clearly inadequate. For, seemingly, the same entities appeared to act sometimes as particles, while at others, like waves! No solution was found, and a truly major Crisis in Physics ensued.

It hammered on for several decades, until Bohr and Heisenberg put forward their "solution".

It amounted to "Stop trying to explain these phenomena, and, instead, be totally satisfied with the formulations", which they had constructed that seemed to fit both types of instances. They had used Wave Equations, which in the past had showed the physical extent of a distributed wave, but NOW, they were to be used in an entirely new, and definitely non-physical way.

They no longer describe a physical wave, but instead cover the same sort of extensive field with an associated set of probabilities that the "particle instantiation" could be in, for all those covered places. It isn't a wave, but a wave-like distribution of probabilities, almost as if some sort of wave were indirectly controlling the positions of the "particle form", when it was extant.

Now, exactly what they do is crucially important, because it can NEVER position the particle-form (when IT exists). Because of the way it is constructed, it can only be a sound predictor, when used over sufficient such instants, for statistical overall calculations to be available. And, there is nothing in physical theory either of Waves or of particles to establish this as correct. It is a classical mathematical form- yet another frig!

No, believable physical explanation can be aligned with this frig, so no explanation is possible! It does, however, conform to the pragmatist principle -"If it works, it is right!"

But, even after all this invention and data fitting, there are still further actual anomalies, which make no sense at all. Then began a wholly new "speculative form", and given the name "Wave/Particle Duality", which effectively had the "entity" sometimes acting as a particle, while at others is described as being a Wave, and the switches between these incompatible modes being delivered by the probabilistic Wave Equation. Indeed, in the famous Double Slit Experiments, just attempting to measure the particle (or the presence of a wave) is sufficient to precipitate the conversion between the two states.

Now, it is worth explaining all this, as clearly as it is possible, with such tricks, because, this very researcher has explained everything that happens in all versions of these experiments merely by introducing a universal substrate. Every single frig of the Copenhagen stance on

this Experiment falls to the ground, for it can be clearly explained physically. Yet, this Copenhagen Revolution led to the End of Physics, as the theories of Reality, so it had to have the above demolition of the Copenhagen account, and a full physical explanation to replace it.

There are still important questions to be answered: for example, "Why did their equations (in the overall way that they used them) actually work?

By now, the readers of this paper might well be in a position to proffer a suggestion themselves!

Could it, by any chance, be to do with simplification and idealisation? I think it could! And, could it refer to the Random Mix, and statistical methods, as described earlier? It could indeed!

You have to remember that Patterns and Forms in Reality are universal, they recur all over the place, but they are never causal! In fact, they are caused by substances and their properties in Concrete Reality, at a variety of different levels and contexts. But, it is the nature of Reality, which regularly produces the same patterns in many physically unrelated areas. It, most certainly, is NOT the other way round.

What Bohr and Heisenberg did was to match mathematically known forms to phenomena in a unique way – a way incapable of causal explanation, but a way that worked! It was a way-out means of relating forms to phenomena, but, in doing so, it blew apart the continuing co-existence of the contributing, contradictory disciplines making up the classical view of Science.

And, the admission of that death was indeed a revelation, but not yet, as was claimed, but a Revolution!

For, by sticking to JUST idealist formulae and pragmatism, they threw the theoretical baby out with the dirty bathwater. Sub Atomic Physical Theory became, on the one hand just a subset of Mathematics, and, on the other, as a set of pragmatic processes that they could get-to-work! But it wasn't that many! Indeed, it really dwindled down to ONE – smashing particles in High Energy Colliders became the primary tool

And, it had the advantage of continuously adding new particles to juggle within a small Particle Zoo!

Clearly, some profound solution to this retreat had to be found.

But, literally centuries of the multiple contributing disciplines delivered conceptions that were contradictory and had to be pragmatically navigated around to find solutions, and adding to this the Copenhagen stance made the requirements for answers truly enormous.

So, instead of the centuries-old compromise of switching-to-alternative-premises, at each and every impasse, an attempt had to be made to replace not only the Copenhagen Idealist retreat, but also those centuries of compromise too!

Yet, the clearly possible alternative – *Holism* seemed to offer NO reliable and extendable experimental methods, nor any sort of means of isolating and using idealist laws, as the old multi-basis, pluralist stance had provided.

Mankind seemed to be confronted with the biggest problem yet!

The task amounted, from the bottom up, to both devise and then establish, a system with a philosophic stance and a scientific method, to address ALL aspects of what to date had always been done, entirely pluralistically, and by switching premises. It would certainly be a major task!

But, it is already underway. Clearly Copenhagen had to be destroyed, and, in addition, the historical pragmatic amalgam of the three contradictory and contributing disciplines revealed for what it was, and by what it had to be replaced by.

Several steps on this itinery have already been addressed and successfully delivered. The infamous Double Slit Experiments have been explained fully, without any recourse to Copenhagen, and even Quantum Entanglement is close to being consigned to the scrapheap of failed theories.

Also, scientists like Yves Couder are developing a new type of experimental method, which the writer of this paper has termed "Constructivist".

In addition a wholly new design of Stanley Miller's Experiment, which managed to automatically produce amino acids all by itself – the building bricks of Life, which, for the first time, enables the inner processes to be revealed in an entirely new holistic st up.

The next period will see an intensification of the battle, which has now raged for 88 years (since the Solvay Conference), and the defenders of Copenhagen (on which literally thousands of careers have been built) will defend themselves to the last.

The sooner the better is my response!

Mathematical Chaos
(or real emergence?)

Introduction:

Who says Philosophy isn't important?

The total chaos that currently infects Mathematics and Sub Atomic Physics (plus a tidy overflow into Cosmology to boot) is a symptom of disciplines without a sound philosophical base, which have been taken deep into explanatory dead-ends!

The following paper attempts to tackle these problems via a range of Philosophical bases.

The trouble with mathematicians, and for that matter, also with mathematical physicists, is that they model real Emergences in a dead-end way. It is because they put their trust entirely in purely formal, and pluralist equations, as the true drivers of Reality. They, therefore, throw away the physical entities and their causal effects as mere invented self-kid, and instead trust the purely formal, those both simplified and idealised reflections of Reality – existing only as such in Ideality – which we call Mathematics. And, though this signals an incipient major crisis, which is ignored, so that the process generally ends there, with a Singularity or even an Infinity at its extremities.

But, even at best, such reflections are mere adjusted snapshots, standing-in for real ongoing processes in Reality.

So, such an approach can never, in the slightest, deal with a dramatically transforming Emergence. At the best, it is only the new, produced situation, as a consequence of the Emergence, that is dealt with, but in the very same way as the one before the transforming cataclysm.

Clearly, such a switch tells us absolutely nothing at all about the turbulent and violent Event that produced the new situation! It is, therefore, a crude and retrospective way of positing past experience into such a major crisis and collapse – without any understanding of that creative phase at all.

Yet, in limited situations, something can be done, even when strapped into that old inadequate harness.

The English physicist Fred Hoyle showed what could be achieved with his remarkable Evolutionary Development of Stars. And, what a remarkable story it was! In his contention, the Universe was "originally" limited to literally a single element – Hydrogen, which under the right circumstances, would aggregate into an ever mightier , local concentration. This would continue until the heat and pressure caused by an enormous number of high speed collisions, led to the onset of Nuclear Fusion.

Hydrogen nuclei (protons) were fused together to produce Helium nuclei with a certain loss of matter, which had been turned into Energy. And, in the confines of the heart of that body, accelerating chain reactions occurred, vastly multiplying the production of energy from matter.

But such events don't continue to infinity, for with the pressure outwards due to this production of energy, yet that of gravity acting in the opposite direction, an ultimate Stable State would be reached, and the expansion would cease, at a balance between these forces. A star had been born!

But, this Event was more than a mere containing reaction to an explosion: overall it had been a classic Emergence.

Something entirely new had been created out of literally nothing – mere Hydrogen gas and absolutely nothing else: Yet, it was a cataclysm of immense proportions and resulted in a veritable beacon pouring out vast quantities of energy into Space!

And, that wasn't the end of the process. More stars all over the universe similarly burst into life, and though they would survive as such for billions of years, Hoyle was able to explain their subsequent History too.

After a long period of ongoing stability, and a constant outflow Energy, the available Hydrogen nuclei became insufficient to maintain that situation, and Gravity wins and causes the star to collapse. The star falls inwards, at an ever increasing rate, until the resultant heat and pressure at its heart is sufficient to cause the product of the first phase, Helium nuclei, to themselves fuse into higher nuclei, again with lost matter as another consequent production of energy. The predictable chain reaction, then produced another vast outward flow of energy and another balanced stable state with the opposing inwards pull of Gravity.

Clearly, the original Emergence, though it seemed to produce an eternal stability, did nothing of the sort, and again the insufficiency of the necessary nuclei would in time generate yet another Emergence, transforming the star into yet another Beacon of energy.

Now, this would continue until the usual pattern became these long interludes of Stability, interleaved with short and violent Emergences.

Now, this same pattern had been recognised as the usual one in all occurring Emergences, and happening at every possible level. It established a new kind of scientific explanation, differing markedly from the prior paradigm, and with *Qualitative Change* at its turbulent heart.

The simple pragmatic switches, ignoring all inner processes of the crucial transforming Events, just wouldn't do any longer. The old ignoring of Emergencies had to end.

They were clearly the drivers of significant change, and to ignore them committed so-called Science to being limited to being the Science of Stabilities only.

Now, Hoyle took his history of Stars even further until, indeed, the usual pattern ceased with the production of Iron nuclei by fusion. Thereafter, there was another period of stability, but it was terminated by an almighty collapse of a very different form. This time there was no recurring following sequence. Without any doubt, the biggest type of explosion within a Universe occurred, which we call a Supernova.

With such a gigantic explosion, all the elements from Iron upwards were created at the same time. That was the death of the star, yet the beginning of everything else that follows in our Universe. For, without that super Emergence there would be NO Planets, Moons, or even Cosmic Clouds of matter. Literally all subsequent developments in our Universe depend on such star-deaths!

But, let us be very clear, Fred Hoyle was very unusual.

He wasn't an incrementalist: he knew that simple quantitative changes couldn't automatically slide over into the wholly new!

Mechanistic Quantity into Quality was nonsense.

All creation comes out of a crisis, which becomes a total collapse, and only then, radically changes everything in a relatively short interval of cataclysmic upheaval.

Note that, on first occurrence, an Emergence produces things, which cannot be predicted solely from its prior states. Single reductionist causalities are simply inadequate to explain such crucially transforming events.

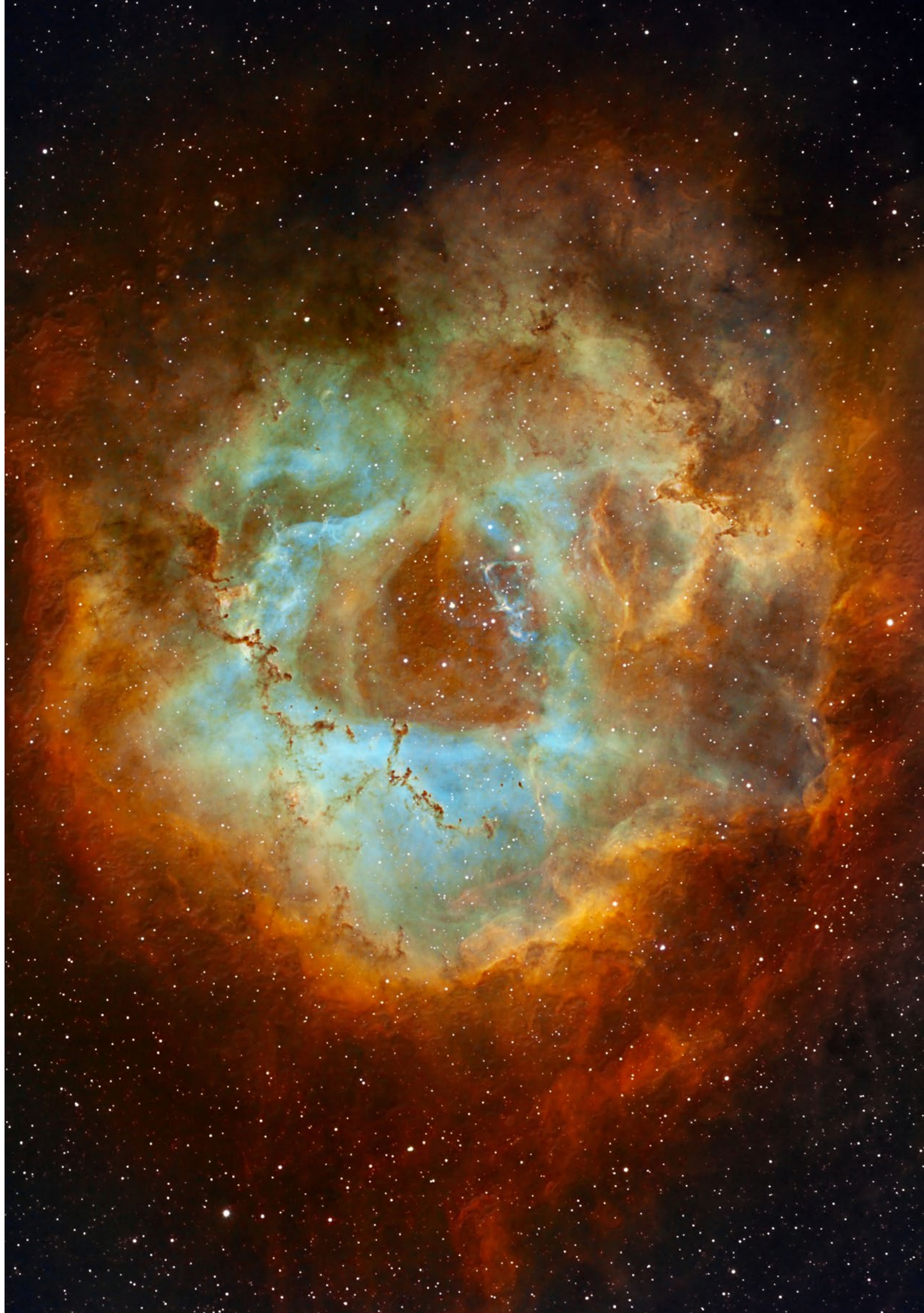
Now, though formal equations can be produced to cover the processes and even the continuing stabilities of this remarkable sequence, such purely formal relations cannot themselves either explain why things behave the way they do, OR, bridge the clearly key transformations.

The nearest Mathematicians have got to these crucial Events, is in what they term Mathematical Chaos.

And, as with all such extensions to Mathematics, these interesting forms are no longer descriptions of Reality, but frigs –delivered by pushing the usual forms not only beyond their normal circumstances, but also beyond their valid formal manipulations.

Mathematics is generally about Stability, and equations that are achieved work well only within the strict limits of that context. And, when these are exceeded, the equations produce nonsense – they actually blow up!

But, as has become the norm in Mathematics, the applied mathematicians seeking easier ways of getting results, began to push Mathematics beyond its limits and effectively find ways of de-stabilising the equations to encroach upon the borders and nature of complete collapse.



The most productive was to change equations into iterative relations, which actually broke steadfast rules in traditional Mathematics, and, in so doing, took the situation further into the region of collapse,

Now, we have to be very clear what was being done here.

None of the crucial processes involved in the collapse were included in these processes. So, they were certainly distorted versions of the original stable condition equations. But, they could rig it to give some idea of a still-continuing contribution from the original equation, BUT, of course, without anything necessary to deliver what was really happening, and all the succeeding phases of complete collapse and consequent re-establishing of an entirely new stability.

I am no longer a full-time mathematician, but I have worked with a world class expert on his researches for a couple of years, and he produced iterative versions of the Van der Pol model of the Human Heart, which I was able to explore graphically on his behalf, and in state diagrams, and produce both fibrillations and even terminal Heart Attacks.

Clearly, a fundamental premise of Mathematics had been transcended, and what we were doing was in new territory.

It certainly was far from being an accurate model of what was going on in an Emergence, but it had extended the borders, somewhat, by using one known state to find another, and so on, which enabled this extension a little further out.

It still blew up, as traditional Mathematics did, but gave a little more before it too bit the dust. By frig-like means a temporary analogistic model had been made available.

But, it was never the beginnings of a purely formal solution: it delivered slightly extended death throes only! At best, it gave extra information upon the collapse involved, but nothing about any following Emergence.

Now, these techniques were totally unreliable.

By chance, mathematicians had noticed that these mistaken methods occasionally produced glimpses of something similar to real world events, so they began to study them, in earnest, and they revealed that they were of two types. First – Diverging – so that repeated use just sailed off ever more quickly to infinity. And - Converging - which, when repeated, homed in upon a certain value, which, in certain problems such as the solution of difficult equations, and hence can be extremely useful.

So, long before the advent of Chaos, these tricks were becoming important in the solution of equations by pragmatic methods.

Tests for divergence/convergence were developed to see what likely frigs could do for us.

You have to remember that mathematicians are NOT scientists. They are much closer to engineers, with the credo, “If it works, it must be right!”.

So, in their pragmatic hands Mathematics was constantly being extended into new, previously illegitimate areas, but used pragmatically to get solutions to equations that were not available by other purer means.

NOTE: As they say, the “Proof of the pudding is in the eating”, and all these force fitted extensions, could only survive within the much tighter definition of Mathematics, by sets of “Rules of Thumb”, which were extras and nothing to do with the original Simplification and Idealisation motive, that arrived at a system – Mathematics, conforming to Formal Logic. These additions, were turning it into a patchwork of non-conforming extensions – force-fitted by extra Rules.

This attitude has led Mathematics into being “all things to all men”, and extending well beyond its original aegis to include operators and other similar areas.

Of course, such extensions, beyond the original formal limits, ensured that Mathematics could never be wholly consistent, coherent and comprehensive. And Mathematical philosophers, like Russell, Goedel and Turing certainly realised that.

Nevertheless, the majority of mathematicians couldn’t care less. They were committed pragmatists and could find solutions “beyond their remit”, if the traditional, “pure” areas of study failed.

Now, all of this has assumed an even wider significance due to the now, 100 year-old Crisis in Physics.

For quite different reasons, triggered by both the Ultra Violet Catastrophe and the Discovery of the Quantum, Physics with its centuries-old compromises began to collapse.

For, since its very beginnings, it had been an amalgam of materialist physics, mathematical formalism and pragmatic technology in use, where problems were switched between specialists, in each of these areas, to finally effect a “solution-for-all”.

But, the new crisis was revealing contradictions and anomalies all the time, which just could not be “switched over”.

So, a significant group led by Bohr and Heisenberg had proposed an abandonment of all physical explanations in terms of substances and their properties, and, instead, a total reliance upon formal equations as the only trustworthy link to this new “Reality”.

Clearly, with the above discussion on the amalgam that is now Mathematics, it was a case of choosing either the Devil or the Deep Blue Sea.

Now, this universally-believed-in Copenhagen Interpretation of Quantum Theory has led Sub Atomic Physics into a worse mess than it was while the classical three-way amalgam was considered adequate. The switch to a single basis of mathematical forms, did not, and could not, solve the problems. Indeed, it led to ever more contradictions, and in the end it became yet another extended “branch” of Mathematics.

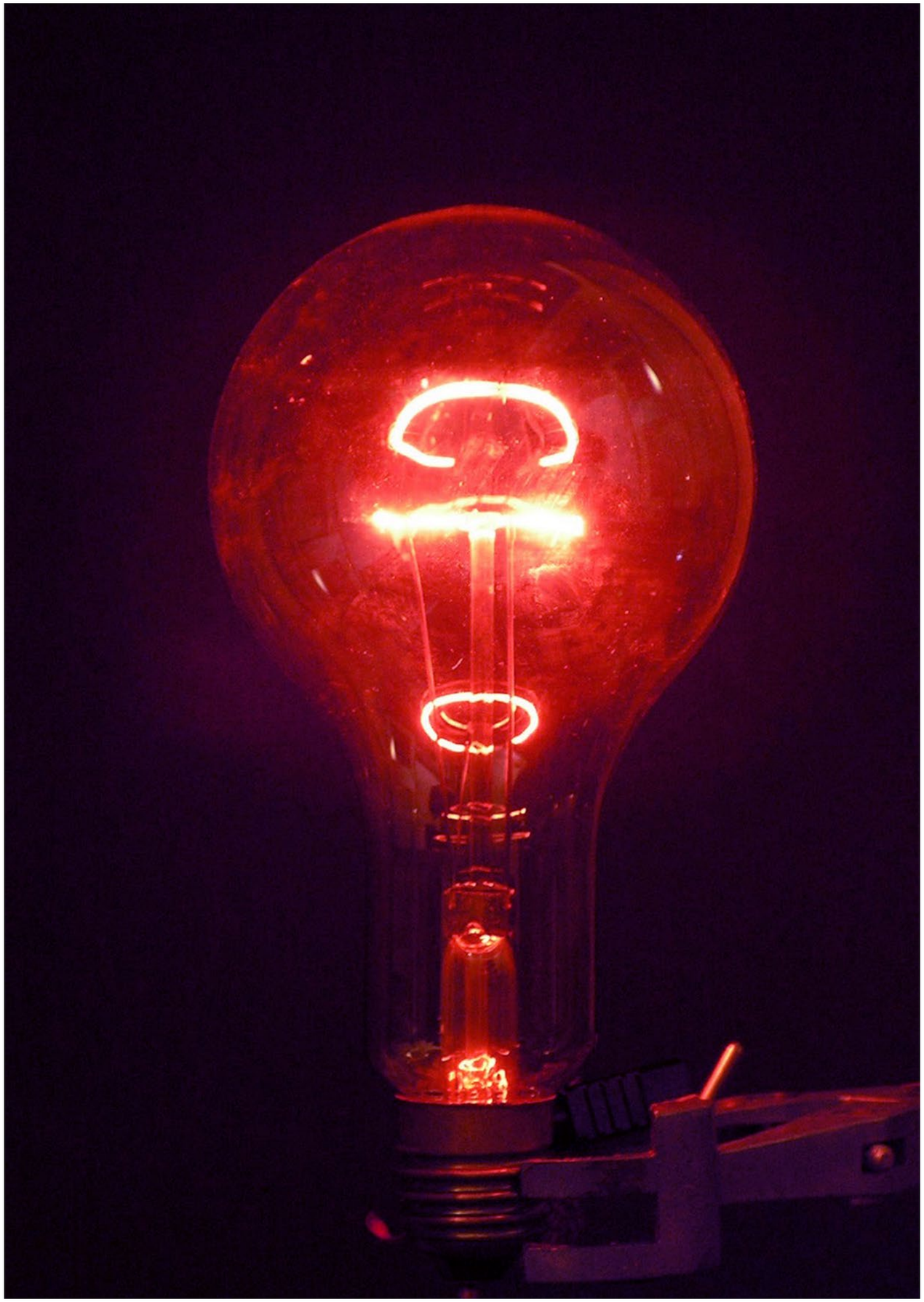
Yet, the lack of any physical explanation was so debilitating, and the necessary use of things from concrete Reality still so perplexing, that the clear lack of any way to understand things was filled with what can only be termed pure speculation.

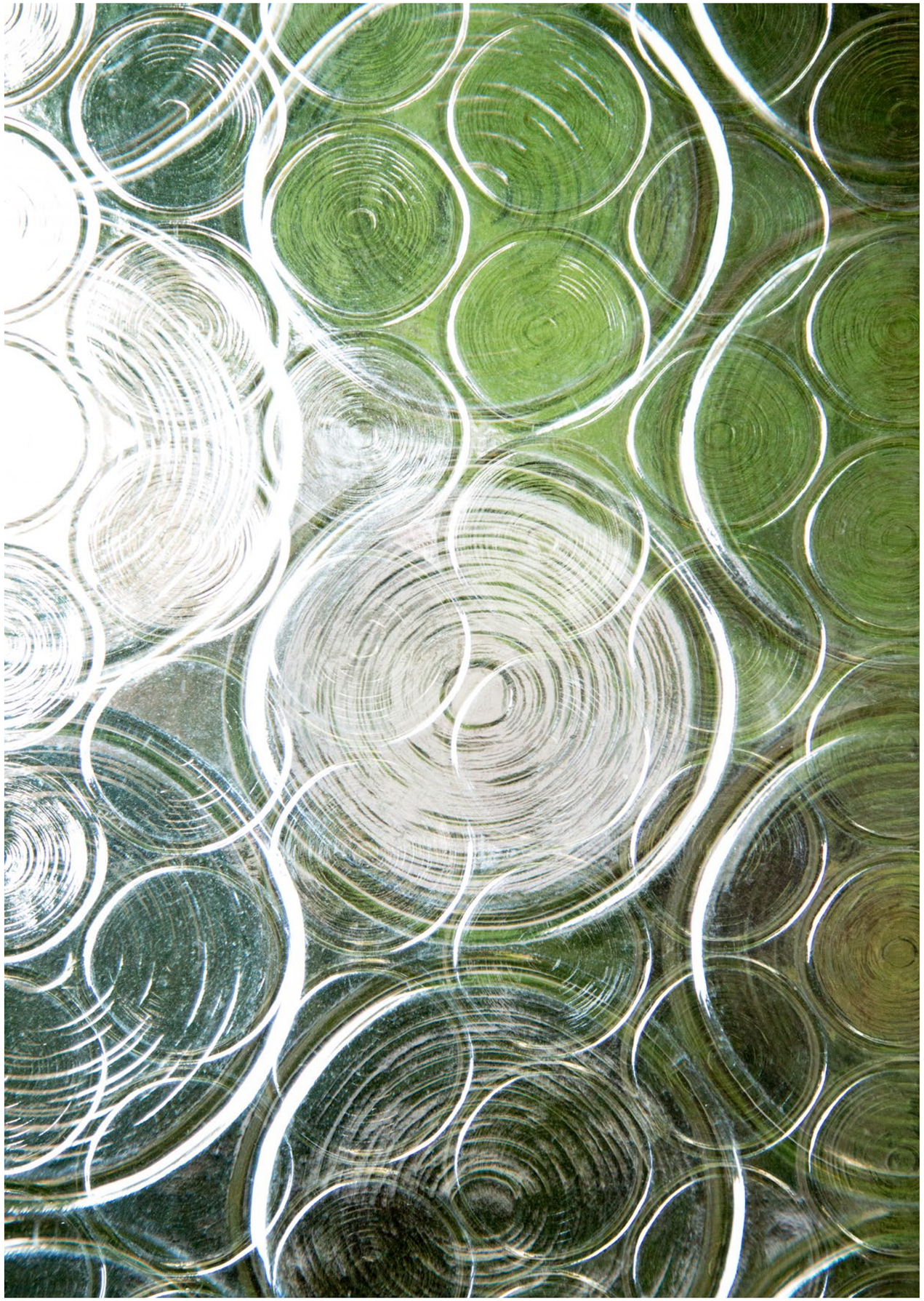
The String Theory developments, things like Quantum Loop Gravity, and ideas like the Multiverse, were both clearly neither provable nor useable, and the now total lack of material confirmations meant that the supposedly supportive “theories” became ever more weird and unbelievable!

The mess that has become Mathematics was now fully infecting Sub Atomic Physics and pulling it down too.

So, clearly the philosophic stances in Mathematics and Physics cannot be maintained as they currently are.

The way forwards has to be philosophical. And the first step must be the replacement of the pluralist position by a holist one. But, such a radical change will have repercussions throughout the whole enormous area.





Finding the Holist Path
the necessary revolution

The Ascent to Understanding explained just how Mankind got to its current position, and how that history, and the various contradictory premises that were involved, could only lead to a major new and even bigger crisis.

But, this next step, as Hegel would have theoretically insisted upon, would have to involve the complete revelation of the currently inaccurate premises – all of them basically active over several key disciplines. And, on the basis of that comprehensive critique, that all of them should be replaced by wholly superior alternatives.

In addition, the general Principle of Plurality, at an even more basic level, would have to be shown to be both wrong and misleading, and its direct opposite – Holism, instituted as a far superior basis, and begun to be established as the new basis for the premises required, across the board. This paper is a contribution to that task.

The alternative holistic view to the usual conception of Reality changes our conceptions radically from the still widely incumbent pluralistic view. For, though the latter simplifies Reality by holding things still, in order to attempt to analyse and understand them, the former is essential *developmentally* – for it attempts to tackle things on-the-fly, and hence conceives of things in terms of their incessant and multiply-caused changes.

Of course, both of these standpoints are man-devised approaches, and neither delivers the full situation in its actual states and their developments.

But the universally employed "holding still" has the greater number of pitfall, as well as being by far the easiest to employ, compared with the "follow-the-movement" approach.

So, long before we attempt to transcend this Dichotomous Pair of approaches, we must see just how biased our usual conceptions are with the current dominant pluralist approach

Clearly, the holist stance arose to counter the more obvious pitfalls of this pluralist approach, most clearly portrayed by Analysis – to begin to understand how a living creature functions, you must first kill it (which will, for a time, at least, stop all changes), and you then can dissect it, recognising the various parts, as you reveal them, and naming them. Such an investigation can go all the way down to the skeleton – and, as this can be put back together with a stand and connecting wires, to allow a study of how it might work.

No one can doubt that such a process will be very informative, and that a great deal of knowledge can be amassed by such an investigation. It can even help doctors to appropriately deal with broken bones effectively by being aware of what supports what, and how strong they have to be. But, of course, it says very little about the living animal!

Nevertheless, the accompanying, pragmatic assumptions, of "no change", can approximate in many areas to the Real World (the skeleton being an excellent example).

The crucial error is that the Real World is seen as being driven by fixed, but extractable Natural Laws, and the study of Reality is then dedicated to finding these vital Laws, as the bases for all phenomena.

Now, the reason that we may well, with justice, support this idea of fixed Natural Laws, is because, over small time intervals, it is actually reasonably true! For, though Reality develops, it does so at various levels, and at very different tempos.

So, if we extend our periods of study to billions of years, developmental change is seen as occurring "all-the-time". Whereas, if we consider a millionth of a second in a high speed accelerator, all the naturally-occurring components are seen as constant entities, only changed by the occurrence of dissipating collisions. And, even these, artificially-caused dissociations are predictable. But, such time slots could never deliver, in any way, the actual evolution of matter, which certainly must have occurred historically.

Also, Mankind gradually learned how to keep studied situations as unchanging as possible, in order to study them (though, like dissecting an animal, it too also stopped all natural, incipient and qualitative changes).

We call this important activity Science, and it is the basis for all production in the modern World. But the fact that Man is both intelligent and pragmatic, means that he both devises these methods of investigation, and uses what he finds out effectively. Yet, in spite of these methods, no one insists that "nothing changes". Everyday experience proves that it certainly does!

The life of every human being is clearly one of constant change and even development, as well as the unavoidable march of time and increasing old age, deterioration and eventually of course – death!

But, the crucial trick was to see such changes as due to fixed Natural Laws – indeed, a multiplicity of them, and a complexity of mixes with different relative amounts of various sub-sets of these fixed laws. And, such a stance can be made to work - but only by isolation, filtering and control!

If we control our areas of study – removing as many of the present components as possible (without losing the studied functionality), and keeping the remaining essential conditions fixed, then we can reveal individual Laws which are the same every time such experiments are repeated in exactly the same way. The truth is that identically maintained circumstances do indeed produce the very same laws. But these are consequently not fixed laws!

So, in production, as long as we always control the necessary circumstances the remaining laws present will indeed be fixed, and enable dependable predictions and productions.

This methodology caused Mankind to see things entirely pluralistically, and this means that all phenomena are seen to be the result not only of a mix of fixed and separable laws, but also an essential and maintained set of circumstances too.

Clearly, such laws are not general truths, but are always predicated upon a precise and necessary set of conditions for them to hold.

Clearly, the continuing pragmatic success of this approach has also engendered the belief in the Principle of Plurality, which instils in our Scientific Method the belief that it actually reveals fixed Natural Laws as the truth of a phenomenon (though only one-at-a-time, and in appropriate conditions).

Thus, this Principle is taken as validating the usual pluralist stance! So, if "laws" merely "add" or "complicate", then the assumptions about fixed Natural Laws are then automatically considered to be entirely legitimate. But, the proof, that this untrue, is embodied in their established method of USE, in Production. For, they can never be used in Reality-as-is!

To effectively use them, the very same conditions as were used to extract them MUST be re-established for each Law in turn. So, Production has to be a sequence of very different processes, each with its own law and necessary conditions.

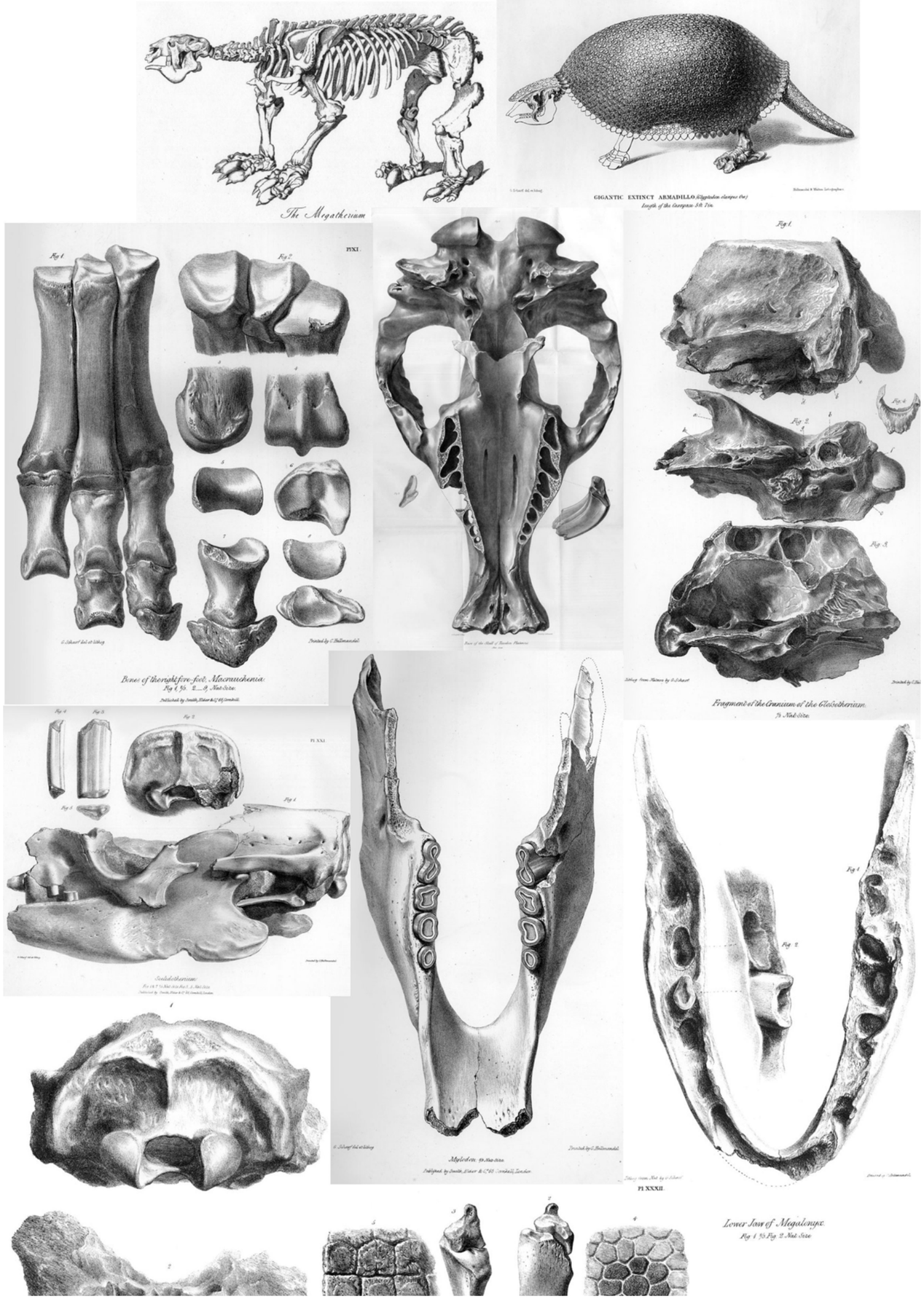
We can never cope with totally unfettered Natural Reality with this method!

Now, this short paper is not a full-blown treatise upon Plurality and Holism, for that is available elsewhere by this author. So, we will not go over the same ground again, but move on to the next consequent area delivered by that all encompassing critique

Now, having severely criticised the universally applied Scientific Experimental Method, we must now address an alternative, and to get a handle upon that we have, at least initially, to assume the very opposite of that rejected stance: we have instead to assume the Principle of Holism. We must address a constantly-developing Reality, holistically.

And, at the beginning of such a new approach, we must choose a much longer period to study, which will in contrast to the limitations in our literally tiny periods, seem to be composed of almost constant changes.

It is, therefore, obvious that the first subscribers to the alternative were the Geologists – the students of the very rocks beneath our feet! For, they not only reveal such change, but also, remarkably, were able to document, by fossil examples, literally the whole development of Life on Earth, from the earliest single celled bacteria to the Flora and Fauna of today.



Later on it was the astronomers, who had no choice, because of the constant speed of light, for wherever they looked, it was also always some particular instant or other of the past that was being seen. But, this also meant that in looking to different distances away, they were also seeing different times in that past, and could, via comparisons, be able to piece together overall developments, from currently visible examples of the processes involved. Now, because of the truly vast distances involved, what was seen was of moments from large periods of time, and some developments, such as the actual life histories of stars, it was possible to make the first moves in understanding our universe.

Perhaps, the most significant general extraction, from such diverse evidence, was the extrapolation, backwards, to arrive at what appeared to be a common origin of absolutely everything – the fabled Big Bang!

Now, along with such evidence from astronomers, the development of Life-on-Earth, found in fossils, was able to begin to link the two developments.

And, in the middle of the 19th century Darwin and Wallace even managed to explain the Origin of Species of living things, as an understandable process too.

The possibilities for an holistic alternative were certainly there, but, in truth, the simplest version of that alternative was not supported completely by the available evidence. Indeed, even in the best sequences of reliable evidence, the significant changes were certainly NOT happening all the time.

Evolution seemed to vary in tempo, and sometimes apparently come to a halt, only to start up again, sometimes at incredibly high rates, in specific short interludes.

Indeed, remarkably, the pluralists have been able to maintain their stance right up to the present day, by merely assuming the accumulation of tiny increments under fixed laws, were the causes of the changes.

So here, we will, as promised, first investigate the simplest version of Holism to see just how closely it relates to actual Reality-in-Development. Holism states as its defining Principle that, "Everything affects everything else" And, the consequence of this is that even the "Laws of Nature" effect one another, and different mixes of these supposed laws will produce different results, NOT as a mere addition or complication, however, but as a an actual modifying of the factors involved.

The dividing into separable fixed laws is really an artificial product of the methods we use. In fact, in the given circumstances of a particular phenomenon, what we have is a combined and mutually-determined overall director of what then ensues. The overall law is a product of the mutual modifications of all the factors involved! They are NOT just a summation of fixed and eternal separate laws.

So, our method of separating a real phenomenon into individual experimental Domains, each of which delivers a single, separate, fixed law is "killing the living and developing Reality" to keep it still to reveal the lifeless bones that remain, which deliver Form, but never the intrinsic causal processes of change.

Clearly, just adding the "bones" together, even in the correct order and connections will NOT deliver the "living" Reality.

It will at best be a sequence of "dead as a doornail" instants, each with NO involved, producing history, and NO general, predicting future.

Productive use of such "Laws" is like a factory production line, merely getting in one step, what is required for the next, but with NO overall intrinsic and connected, trajectory of real processes involved, as it would be in Nature.

So, if we are to get any sort of handle on Reality in a real, holistic way, we must consider a very different scenario.

The simplicity of Analysis into totally fixed and separated parts will need to be dropped. So, to get anywhere at all, we must consider how the various factors (basically the substances and their properties) actually affect one another in real-time. It may seem an impossible task, and when happening at certain short interludes, when it really is "Everything affecting everything else" simultaneously, which we call an Emergence, when the task becomes incredibly complex, but more generally such Revolutions are not the case, and it is possible (to an extent) to trace some individual interactions, which occur without major overall transformations.

NOTE: The experiments by Stanley Miller attempting to reveal the holistic processes occurring in the Origin of Life, and actually succeeded in producing amino acids, and those of Yves Couder, which produce his famous "Walkers", are both very good, if initial, examples of holisitic experimentation.

And, developments of both of these have been re-designed by the author of this paper, to take things further.

Now, the reader will see in this yet another reason why the pluralist approach has lasted so long. For then, small-scale changes can be simplified into a pluralist approach, especially if conditions are controlled to limit things substantially. And, a sort of trajectory could be constructed out of pluralist results. Of course, though those will give some sort of approximation, it would most certainly be still most misleading, if it wasn't for the earlier establishment within stable circumstances for a particular imperative to become dominant.

The real problem is, of course, that real qualitative changes are totally impossible to deliver by any pluralist approach, and pragmatic humans have learned about the major transformations from real world experiences, and merely "switch-in" new, more appropriate laws, when a key parameter passes a certain threshold value.

No reasons are involved: it is a pragmatic switch based upon experience only.

So, such a means of coping with real qualitative change is NEVER explanatory: it betrays itself as the epitome of pragmatic construction, built entirely out of artificial steps.

Now, it was always impossible to avoid those Emergent Interludes of significant qualitative change. But, clearly, they DO NOT come from nowhere! They must be the results of certain small changes taking place within the prior and stable, overall situation which then transform into dismantling it completely, and via a whole, rapid trajectory of intermediate processes take the situation to the new place, where a very different pluralistic law, can be shipped in as yet another approximation.

So, finally, we can now concentrate upon those small changes for two crucial purposes.

First, to understand how changing seemingly small factors actually modify one another (and even seemingly dominant factors) within a stability, to produce different dominant factors.

Second, to see how those same changes, actually run-away to cause a wholesale collapse of literally all the key relations.

Indeed, in truly significant cases – like the Origin of Life, or Consciousness, entirely new "Laws" will emerge, never before seen in existence.

You will never be able to reduce these new laws to those at the lower level, because they are NOT merely a new mix of prior laws.

This is the precise point at which the pluralist approach is found wanting, for the new laws are created only out of the necessary tumult of total dissociation of the prior state.

Reductionism is impossible across an Emergence!

Perhaps surprisingly, the first steps in addressing these crucial interludes of significant Qualitative Change were tackled by idealist philosophers seriously studying Human Thought.

The early realisations of thinkers like Zeno, with his Paradoxes, was not developed into an explicable system until 2,300 years later in the work of Friedrich Hegel, who tackled emergences from a common set of assumptions of directly contradictory concepts, which were termed Dichotomous Pairs.

Now, his brilliant contribution was to realise that merely hammering away at the contradiction would get you nowhere, and the only route was to reveal clearly the erroneous premises and correct them, so as to be able to explain BOTH arms of the contradictory Pair!

Now, that was a remarkable contribution, but he didn't stop there.

He also realised that even that process would never deliver "Absolute Truth", but only better concepts based upon improved premises, which, in their turn, were bound to generate their own unavoidable impasses.

The process would have to be on-going.

Now, in Hegel's cases he was only considering what happened in Human Thought. He did not extrapolate these ideas to the development of concrete Reality itself.

That next and crucial step was taken by Hegel's best student – Karl Marx, who initially applied these ideas to Human History too, and, in particular, to Social Revolutions.

The move, philosophically, was imperative, for unlike all other interludes, of significant Qualitative Changes, Revolutions could be both personally experienced, and even intervened in.

The fact that human beings could experience all the phases involved in such an interlude, allowed the actual trajectory involved in such an Emergence to be observed, noted and studied. And, these phases might well be applicable to all such interludes at all possibly applicable Levels.

Now, the consequent History of Marxism is well known. It concentrated upon being prepared for, and appropriately equipped for actual intervention in Revolutions.

NOTE: If you are wondering why all the Revolutions of the Arab Spring failed, you have the answer right here. There were NO Marxists involved! They were not equipped to both understand what was happening as phase followed phase, and hence did not know what to do.

Hence, the next phase in this development of understanding these interludes was almost exclusively political. But, in so doing, the theory, thus far, wasn't appropriately equipped for even that task, never mind the host of other areas as yet untouched.

And, the most important one of these affecting all others had to be Science.

This profoundly important approach had to be applied in Science – to address its unavoidable Dichotomous Pairs, as evidenced by contradictory concepts from the very same premises! And, the most crucial of its limiting premises, just had to be Plurality!

As Hegel had so clearly shown, and Marx had proved to be generally applicable in all development, the impasses caused by Plurality had to be identified and transcended. And, this clearly has not been done!

Now, this particular Marxist and scientist (the writer of this paper) is currently attempting to address this vital requirement, but though it is a mammoth task some initial targets are already very clear.

The Copenhagen Interpretation of Quantum Theory had to be demolished, and the starting point had to be an alternative explanation for the ill-famed Double Slit Experiments.

Now, this has now been achieved, but it required the assumption of an undetectable Universe-wide Substrate to bring it off. And, as you by now will have guessed, it led to yet another can of worms.

For bringing in such a Substrate rendered a host of prior banker conceptions and assumptions totally invalid. It required a wholesale revolution in Science!

Just to give some idea of the problems, let us describe a few of them. The assumptions that were successful for the Double Slit, sadly said absolutely nothing about Action-at-a-Distance and Fields in "Empty Space". They were also dumb about explaining Gravity. So, different co-thinkers in America, India and France each came up with different definitions of such a Universal Substrate.

Hegel was right!

Each impasse may be individually transcended by appropriate changes to our basic premises, but Absolute Truth is never attainable. We must, instead, set our sights upon improving the amount of "Objective Content" in our ideas, and these can only be aspects or parts of the truth we seek.

But, nevertheless, such an objective assures that real progress is being made.

The most exciting development is the invention of what I call "Constructivist Experiments" as demonstrated very effectively by the French physicist, Yves Couder, who has physically transferred problems from the sub atomic level and constructed good analogues at the macro level. His approach differs dramatically from the usual experimental

approach, which is pluralist, because where that method tailors the experimental domain to limit evident factors to ONE. Couder has no target factor in mind, but in fact discovers factors, by starting at the simplest possible starting point (in fact with a single substance), and by adding only related oscillations managed to produce totally unexpected and fascinating phenomena - which appear to mirror those appearing within the atom.

The way is beginning to open up!

Join us!

Postscript:

Jim Schofield's *Theory of the Double Slit,* and his *Theory of Emergences* are available online as Special Issues of the SHAPE Journal. And, two recent additional Specials entitled *The Substrate* and *The Atom* have also been published in the same place.

But, it must be emphasized that, as a Marxist philosopher, as well as a scientist (at all levels of teaching up to Universities in Hong Kong, Glasgow and London), that philosophical stance is best revealed in many other pieces, most notably in his series of Specials on Marxism.

Reductionism or Nothing

Having found a series of explanatory connections between various natural phenomena, which initially seemed to offer an extendable method for understanding all of Reality, Mankind was loath to abandon it.

The general method became known as *Reductionism*, because, once an explanation of a given phenomenon has been successfully achieved, the next step was, obviously, to apply it again to the components of that successful explanation, and take the explanatory process down another level.

Indeed, it seemed possible that all things could be "reduced" all the way down to final, fundamental particles, and hence deliver a coherent bottom-to-top explanation of absolutely everything.

Indeed, to this day, any conversation, with a sub atomic physicist, will reveal how both he and his colleagues believe that they are working at the "Base Point" of all the Sciences. They, at the present time, are still whole-heartedly, in favour of Reductionism.

Now, this is understandable, but Reductionism isn't true!

It has been correctly described as Mechanical Materialism, because it purports to already know the unquestionably, sound route to all understanding. But, of course, it totally ignores all intrinsic development and evolution, and, most important of all, it ignores all crises.

It is too smooth and too crudely causal, resulting in a blinkered and limited view of phenomena, in that it can never ever explain the creation of the wholly new. Indeed, it is really only a Science limited to the stable periods in Reality. It enables an extremely wide range of possibilities to be explained, but only within a Stable State.

It was, of course, a remarkable discovery and method, but it is severely restricted to that version of Causality possible within a maintained stable situation. Any changes are only possible, if they are continued wholly within, and limited to ranges contained within that stability.

The proof of this is shown by the fact that every discovered "natural law" has its clear and non-extendable limits, beyond which it no longer holds.

They may appear to be eternal, of course, within long-lasting stabilities, but even there they are not permanent, for beyond the circumstances which permit that "law", there will always be a point at which it totally fails, and another "law" will replace it! Indeed, even that limit is still inside the overall Stability.

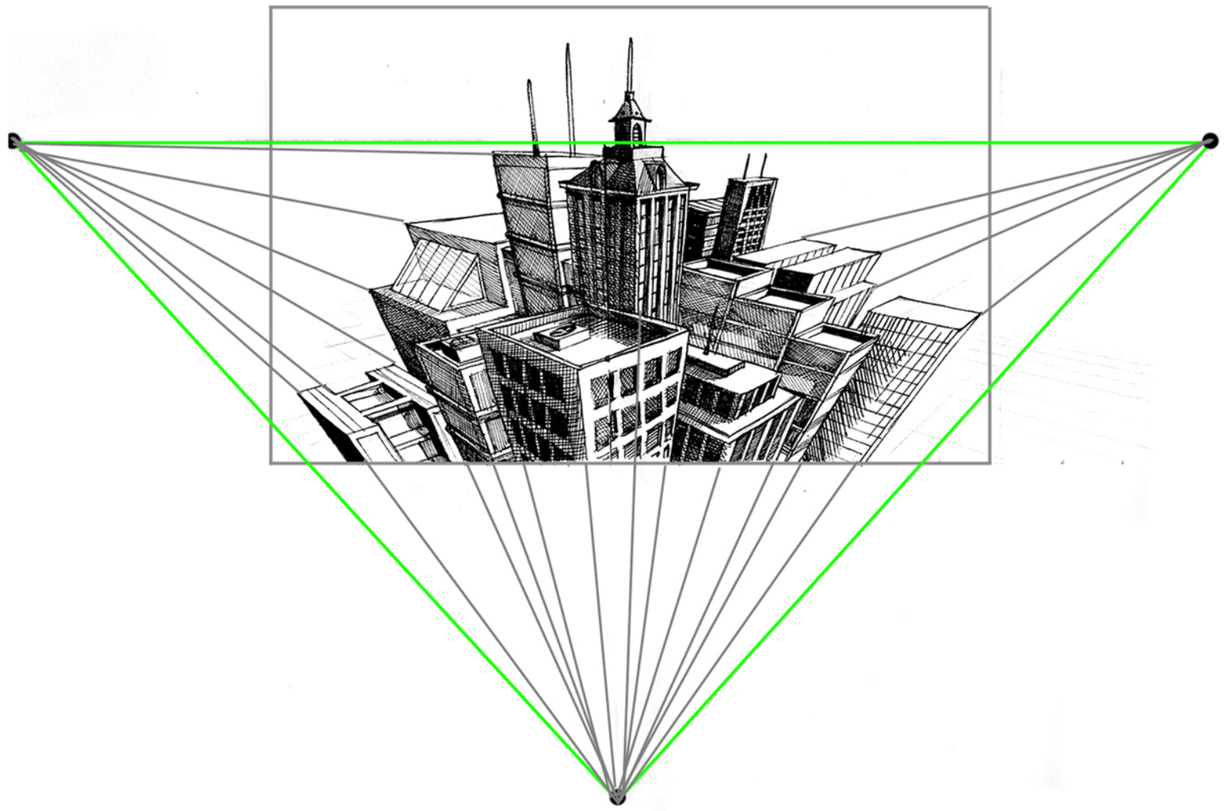
And, there is another limit at which the overall Stability itself is finally compromised, and is threatened with total dissolution. And, even this Level-Crisis is internally caused (though this can also occur due to a similar dissociation caused from without).

But, it is the internally initiated crisis, which is by far the most interesting, because it alone, leads to development over and above that, which caused the cataclysm, leading to the consequent appearance of the wholly new.

Such crises can, and indeed do, develop into wholesale collapses of a contained stability, and the dissociation of its crucial stabilising components – its internal organising and maintaining processes, which keep the situation stable. And, when such collapses occur, it will trigger off the most productive developments possible, as all previously constraining and limiting forces have perished along with the prior stability.

The following reconstructions, along with their causing collapses, are together termed Emergent Episodes or Emergences. And, the more significant of them occur in Biology, with Origin of Life, and much later, that of Consciousness. But, over the History of the Earth – some 4 billion years, they have been legion, and are THE creative processes in its overall development.

Now, none of this is addressed by either Formal Reasoning or in Mechanistic Causality, nor can they be.For, both there, and even in the Sciences, Reductionism rules OK!



Now, interestingly, Mankind has encountered many causes, which cannot be revealed, and has had to develop a method of switching between laws when necessary. And, instead of worrying about why a change has occurred, he learned, instead, to look for signals, which would tell him when to switch. In simulation programs, these hold the whole thing together, and the switch parameters, and their crucial thresholds, are gained from experience, and then used to link the straight forward mechanistic causalities together, in an unexplained, but experientially validated sequence. It employs again, of course, the primary skill of Mankind – Pragmatism - "If it works, it is right!"

But, these Emergences occur at many different Levels of Reality, and can, and indeed have, at times, produced wholly new Levels – like LIFE, for example! So, clearly, they can no longer be sidelined. They must be addressed and studied properly, and the afore-described scientific means – confined to only stable circumstances, will, of course, be wholly inadequate.

Only one discipline has really attempted to do this: Philosophy. And the major contribution in doing that was originally carried out by Friedrich Hegel, some 200 years ago. Hegel was an idealist philosopher, whose area of study was Human Thinking, and it was there that he found these interludes occurring all the time. Yet, the usual and admitted forms of thinking as both described and used by Mankind generally, did not recognise what they were dealing with when they recognised something "new-to-them". Hegel, however, studied these trajectories and discovered that all human accounts of things, suffered from the very same type of trajectories, and would, inevitably, hit major crises when the normal reductionist answers were clearly unavailable.

Some key thinkers in our history did manage to transcend these inevitable impasses, but Hegel wanted to understand the process more generally. For, no matter how many valid transcendences actually occurred, the result was never enough. Each new Level would, itself, have its limits, and would therefore encounter its own ultimate impasse. Hegel needed to find out just whether a stance had reached its limits, and he found the certain indicator in what came to be termed Dichotomous Pairs of concepts, These consisted of two diametrically opposed, indeed contradictory concepts, that surprisingly arose from the same common and hence shared ground of the offending concepts.

Zeno had pointed out just such a Pair, 2,300 year earlier, in his famous Paradoxes, involving the concepts of Continuity and Descreteness. But, Hegel was keen to expose a method to actually transcend such seeming impasses. His solution was NOT to hammer away, forever, at the Dichotomous Pair – attempting to see which side was correct, but, instead, to work to reveal the common premises of BOTH the concepts. And, by so doing, it would be possible to find the errors contained in those premises, and by correcting them transcend that particular impasse, once and for all.

Now, Hegel's discoveries, themselves, needed an explanation, and it turned out that the basis for Reductionism was the famed, but rarely stated, Principle of Plurality, while that which could deal with Hegel's Qualitatively Changing World, could only be the opposite Principle of Holism. The pluralist conceptions were always predicated upon Stability, while only the holist approach could encompass changing situations in which the completely new could occur. While, at lower levels it could also effectively deal with non-emergent, Qualitative Change too.

The next steps were becoming clear, but were, nevertheless, very daunting.

The whole of the pluralist stance, and the scientific disciplines built upon it, had to be superceded by a holistic alternative, in all the areas where the pluralist stance failed. What was needed, and is still incomplete 200 years after Hegel, is the Revolution in both Thinking and in Science to tackle literally ALL the most important questions still awaiting explanation.

Statistical Dreams
a pragmatic compromise and an end to theory?

What exactly is the field of Statistics?

Well, of course, it is used when many things are happening simultaneously, and it therefore becomes impossible to deal with *all* of the various contributions individually, so then the method is to merely address their overall summed effect, it is always the pluralist norm with simpler situations.

Indeed, it turns out to be significantly better than the usual means in many situations, because it makes for overall measurements and does not concern itself with the multiplicity of different contributions involved. It becomes a kind of "backstop" for the inadequacies of the usual pluralist approach and the two have delivered a reasonably useful pair for a very long period of time. It is yet another case of having two quite different approaches, and switching between them in a pragmatic manner, when necessary.

But, there are assumptions involved which are not always applicable, and, as always, such compromises are never the complete solution; as cases will occur which simply don't fit either method.

These usually occur, due to assumptions made about the overall nature of the factors involved - often assuming a total, perfectly Random Mix, with a great deal of cancelling-out of opposing factors, and a resultant set of overall parameters which conform to a simple pattern.

The technique involves overall relations and parameters, which can be effective for the situation, as a whole – like temperature, pressure or volume. Indeed, early, historical experiments, and the revealed laws, were those that related such quantities.

So, the usual admonishment to young experimenters to, "Stir thoroughly, and wait for equilibrium before measuring!" was a sound piece of advice (though Reality wasn't always so dutiful)! Clearly, only if the conditions approximated very well to the necessary requirements, could the measurements deliver results that could be investigated and used with confidence!

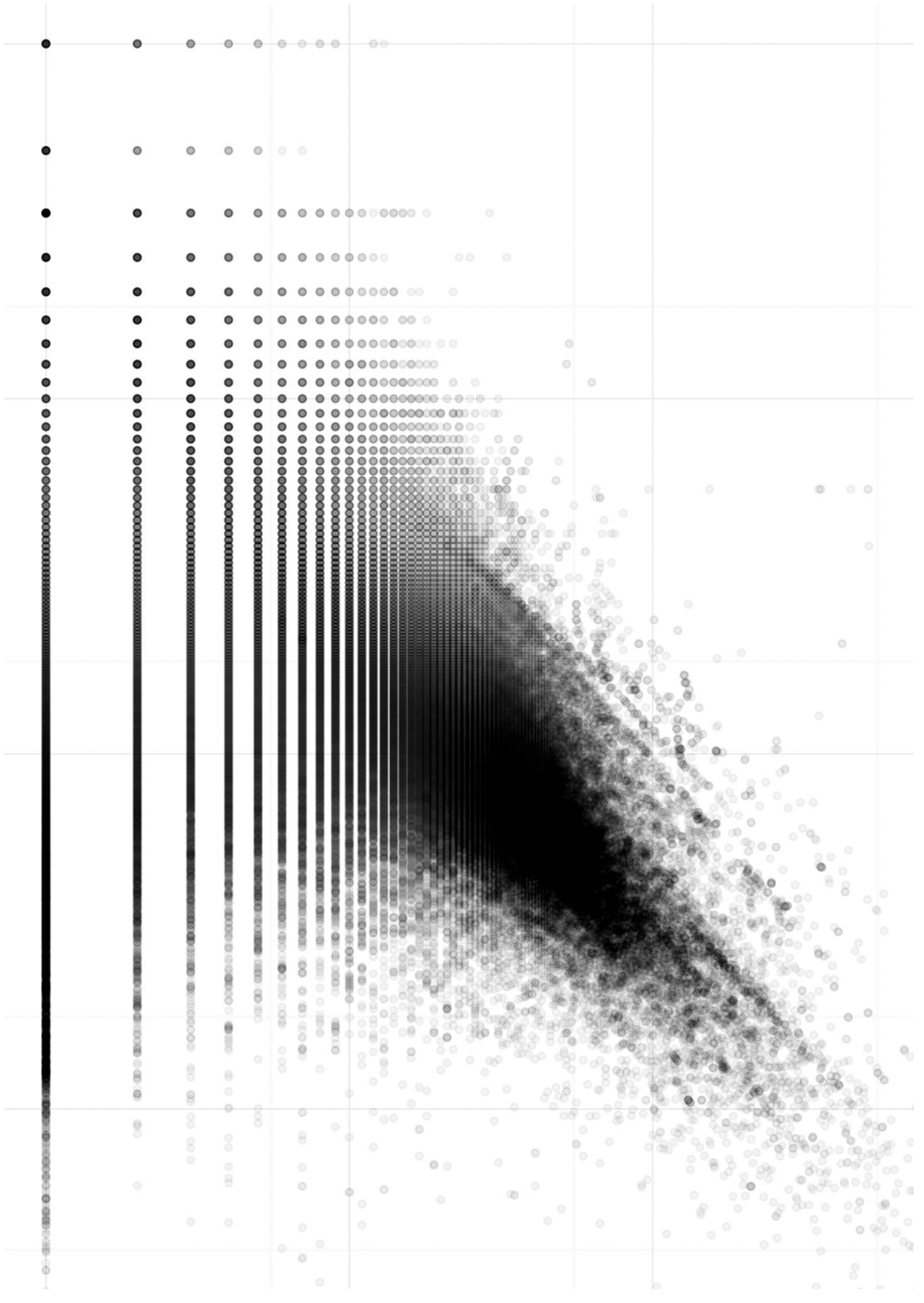
Now, such methods are in fact statistical measurements, but arranged for and taken physically, to reveal an overall effect. If, for example, individual measurements of the temperature of single atoms were possible, literally NONE would have the measured overall temperature. Yet, nevertheless if that overall temperature had been taken properly, it would accurately reflect the average temperature of all the atoms involved.

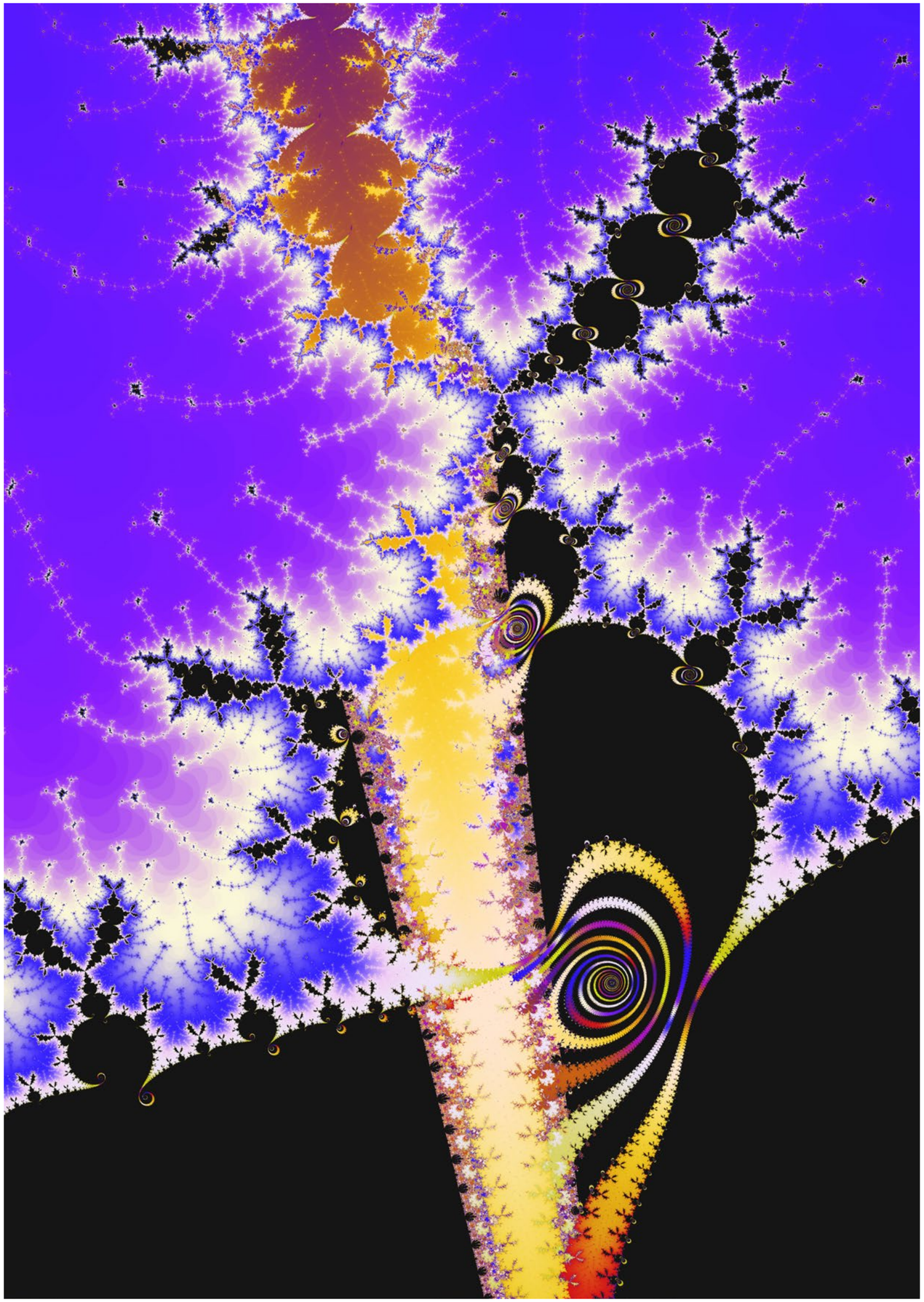
Now, clearly, such measurements were all that were available to us in the early days, but the necessary conditions were also not always possible to arrange for. So, an alternative, when individual elements could indeed be measured, was to measure as many as possible, and take their average to represent that variable for all elements, and for the whole situation.

With this method, we move to a more transparent type of statistical measuring.

Now, I will not be spending much time upon either of these types of statistical measurements. They are well understood, and have a large number of cases, and an extensive theory concerned with them.

But, I will be attempting to reveal another type of statistical measuring and consequent theories, which, though they can be made to work, pragmatically, are, in fact, wholly misleading theoretically. For these stop the possibility of physical explanation entirely, and instead, along with a series of incorrect speculative models, call a complete halt to theory-as-physical-explanation in the areas concerned, and replace that objective with "working equations" – without any explanatory account at all! They even switch their stance to one in, which it is solely these fitted-up equations that are said to actually drive the area of Reality under consideration, and totally abandon the essential attempts at ever better physical explanations.





I am, of course, talking about the Copenhagen Interpretation of Quantum Theory in Sub Atomic Physics.

Now, such an approach is both illegitimate and misleading, for it, more or less, terminated what Theory has always been – an attempted explanation of phenomena in terms of the substances involved, and their properties, and replaced that intention with merely useable formal equations.

It amounts to using universal forms or patterns as if they are the driving essences of Reality, and that is not only impossible, it is blatant self kid!

How can purely formal abstractions *DO* anything? They are only man-devised descriptions of observations, and the very same forms recur in many different and causally unrelated areas. So, how can they be the *causes* of all of these qualitatively different cases?

Clearly, such forms are merely recurring patterns –useful for prediction, but useless for explanation. They are about common appearances ONLY!

The so-called Revolution of Solvay, in 1927, was, in fact, an ignominious Retreat, abandoning real Theory for pragmatically useable statistical equations, and hence leading Science into an idealist fantasy.

Isolated Evolution?
is reality classic, quantum or holist?

There is another possibility with anomalies like Quantum Entanglement.

Let us briefly consider, as an initial model, the radioactive decay of a semi-stable element. Without any external intervention, whatsoever, a sample of that element will successively change into another by radioactive decay, until finally it will be entirely that final element.

Now, this process cannot be predicted for a single isolated atom, but only, overall, for a large number of atoms.

This is interesting, because similar things happen all the time at the sub atomic level, and these led, after the Solvay Conference in 1927, to a wholly new standpoint and methodology for this area of Physics, called the *Copenhagen Interpretation of Quantum Theory.* Similar, overall statistical predictions could be made for collections of particles (say), but NO direct predictions for individual particles were possible.

Now, let us play devil's advocate here! What physical causes could deliver such anomalous behaviours?

It seems to me, as a physicist, that something very important has been omitted from the accounts of these situations, which if included could have the effects observed.

Two possibilities are likely!

First, there could be an undetectable universal substrate, in which these things are happening, and which is both affected by the particles, but, in turn, and in special circumstances, can react back upon the causing particles. Now this line was taken by the author of this paper in his *"Theory of the Double Slit"*, and was able to explain all of that experiment's anomalies.

Now, second, there could be unseen, and as yet unknown, processes taking place within certain particles, which were NOT pristine billiard-ball like entities, but complex, multi-part systems, which though they might appear to be single fixed entities, were, in fact, nothing of the kind, and, had an inner life with its own trajectory of inner development.

Once such an assumption has been made, it becomes conceivable that such an inner structure could be suggested, and the consequences investigated. Once, more, this has been investigated by the same researcher, who devised a substrate of multi-part units for his universal substrate. He not only explained why such entities were undetectable, but also just how they could propagate electromagnetic radiation via quanta.

Now, these are recent theoretical suggestions, along with other similar, but different, attempts are also becoming increasingly investigated in places as far apart as the USA, UK. France, Russia and India. You cannot yet affirm that the best fully developed theories are available.

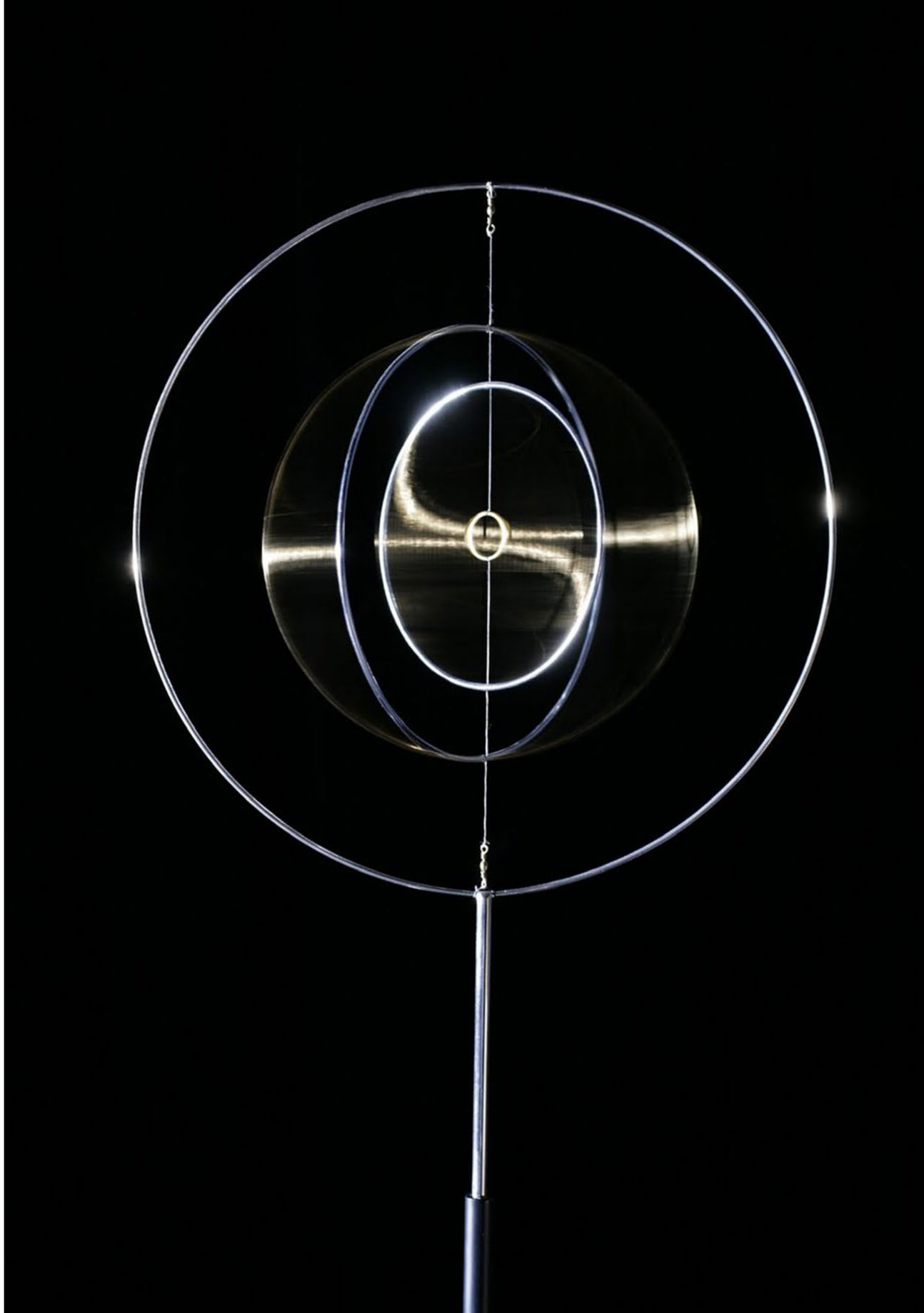
For many decades, and led by David Bohm, a version of the inner activity route was investigated, which employed what he called "hidden variables". But, you have to do more than suggest: you have to logically prove your suppositions and reveal your involved entities.

This is beginning to be tackled, as required.

The Theory of the Double Slit, by this theorist, went as far as possible along this road, by defining the entities composing an undetectable universal substrate, and their activities both in the Propagation of E.M. Radiation, and in the anomalies of the Double Slit.

Now, all this research is available on the web in the SHAPE Journal, Blog and Youtube Channel, so for the purposes of this paper, we will leave that to the reader to chase, and will continue, with the already explained purpose of this contribution.

Now, if all this is an indication of what is needed in such inexplicable cases, then there is clearly something important missing from the theories concerning the atomic nucleus in Radioactive decay. Perhaps this missing component or phase, which can be brought into the situation, will then make things entirely explicable.



Now, the radioactive decay occurs in a process happening all by itself: as its internal constitution causes it to decay over time, and for different atoms to decay at different times, shows that what is going on is an almost stable system of many sub-processes, which generally do not threaten the overall stability of the nucleus, but, at a certain point, the stability is sufficiently undermined to cause a system collapse.

An actual decay is, clearly, an Emergence within that particular nucleus. And is internally determined.

Now, we could consider other situations undergoing a totally internally determined qualitative change.

What would happen to such an entity, if it split into two components of literally identical natures? The fact that they were born simultaneously from the same source (completely consuming that source in the process), and then moved apart, suggests several things.

First, that the source was a semi-stable entity, which most of the time maintained its integrity, but at some point finally collapsed and produced these two, related particles as the result.

The long time in a stable co-existence seems to suggest that their "opposite" properties kept them together, but on dissociation, these would be evident in the properties of the separated components.

Now, are these two particles analysable into something even lower?

I would suggest the answer is almost certainly "Yes!", and that their now properties could be explained in terms of their own internal components, though normally hidden by the new particles apparent stability.

If this is so, could not very similar things be happening in both the now free-moving particles, and be in synchronisation with one another – initiated by their common birth?

Could not "Quantum Entanglement" actually be the result of such synchronised processes that switch the measured property regularly and at the same times, no matter how far apart they move?

Now, remember these particles (in at least one exemplar case) cannot be monitored, moment-by-moment. The assertion is that if one is measured, it immediately affects the other.

How do the experimenters know this?

They presumably measure the second particle. But, what if these two are regularly switching, in a pre-ordained synchrony, between the possible states? This synchrony is NOT coordinated by signals between them, but is due to their common origin and similar compositions: they change in synchrony, because of their identical forms in key areas.

Now, because of the nature of the usual Quantum Entanglement assertion – it is always about what happens to the other particle when one is measured - so, the experimenters intervention might well be when both have automatically changed (independent of the measuring), and the investigators find both in the changed states, and say that one caused the other!

What then would happen if the whole operation were repeated many times? If it was the same two particles, then each time that they were measured, they would have changes in step, so the usual magical "entanglement" could be seen as confirmed.

Yet, if in such repeats, they were always different pairs of particles – produced in the very same way, though the results may be of different states, they would still be changing in step due to internally intrinsic reasons, so the investigators will make the two measurements, and find the same relationship between the two.

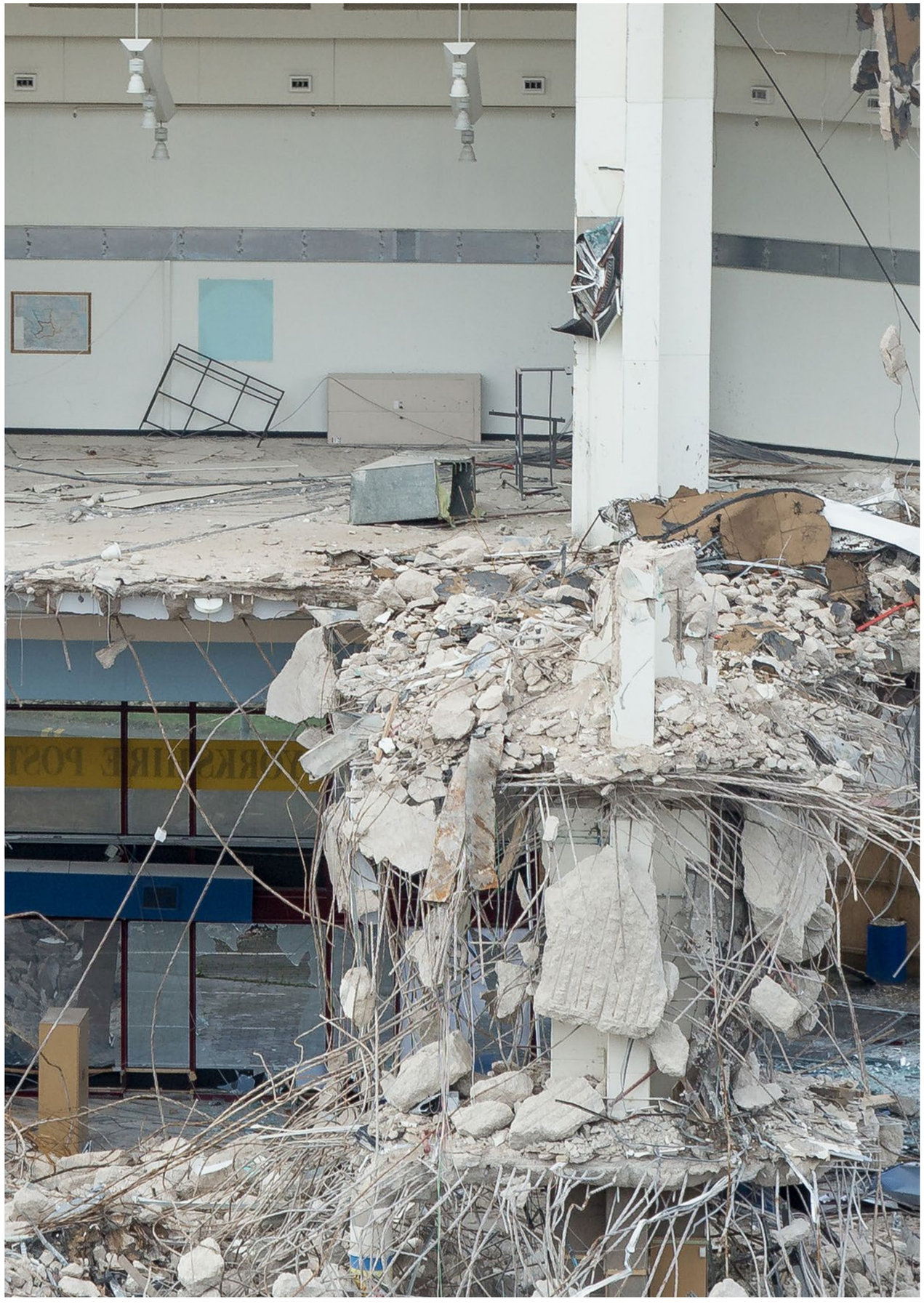
They might well still put it down to an "entanglement", but, once more, it could be the natural, in-step development as described.

Now, it seems likely, from other evidence, there is an undetectable universal substrate, which can both be affected, and can itself affect particles moving within it. The version of such a substrate, which enabled a complete explanation of the Double Slit phenomena, might be significant here too. For it was composed of undetectable particles – each composed of a mutually-orbiting pair of one electron and one positron, which could absorb energy by the promotion of that joint orbit, but could also propagate it by passing it on to an adjacent substrate particle. And, if such disturbances were split into two streams (as in the Double Slit Experiments), they could thereafter affect both one another, as interference, and even the very particle, which caused the disturbance (and insertion of energy) originally, and effect it.

Interesting, isn't it that such a case also involved the splitting into two from a single original stream?

Now, we could involve the substrate in the subsequent histories if two particles, which we currently interpret as "entangled". For, if the "quantum state" of a moving particle could, indeed, affect its immediately surrounding substrate, it could have an effect, which in time reflects back upon the state of the causing particle and cause it to flip.

And, with identical birth and history, and the same substrate, why would they not flip at the same time?



Inevitable Dissociation

From its very outset, Science embraced a substantial compromise between three different, but useful, approaches – the physical, the mathematical, and the pragmatic.

It could not, of course, have been otherwise, for the sophistication of these individual approaches were nowhere near good enough for one to encompass all phenomena with a single comprehensive stance and method.

So, Man used what he had had, which was, and still is, his intelligence, to stick with all three, and switch between them when necessary.

It wasn't, of course, ideal, but it meant that a kind of progress could be made, and though, originally, these approaches were separate, and even separately named as Natural Philosophy, Mathematics and Common Sense, they became a "kind of team" in the overall category of Science.

Now, they all had different and even contradicting premises, which did not even accurately complement one another, so you would expect an internal struggle between them, but Mankind had not only survived for a long while without any coherent "Theory", but also had actually prospered due to his strongest suit – Pragmatism, backed with intelligence, and he had for millennia been switching between incompatible methods to get his required results.

So, the unifying of three approaches, as a switchable-between-set was a natural route to take.

Battles did come, but the various differently based contributors were gradually marshalled into "complementary roles" in a very pragmatic division of labour.

So, what was termed "Common Sense" prevailed, and "when to switch" became clearer all the time, and constituted a necessary set of "Rules of Thumb"!

But, within each such sub-discipline, the very bases or premises were different, and the consequent standpoints, grew even further apart.

Among the scientists, there was an objective of "Explaining Things" in terms of the substances involved and their properties – and this gradually became Scientific Theory.

But, the mathematicians, in so far as they addressed Reality, had very different aims. They sought the "driving" Natural Laws, which alone made Reality what it was. Indeed, from the outset, these two had taken opposite stances. The scientists were materialists, while the mathematicians were essentially idealists.

So, what was the position of the third, and perhaps dominating, member of the group?

Well, for millennia, the premise, "If it works, it is right!" had served Mankind very well, and, increasingly, as more and more was revealed, the possible effective uses, in everyday life, were strong incentives for all three to work pragmatically together. For it was the products made possible, that were the most appreciated (and it was the "deliverers" (of the third category) that got the majority of the credit.

"Common Sense" has remained to this day as the unifying glue of the three composing strands.

"The tail cannot always wag the dog", however, so to discover more, the two creative branches of the triumvirate had to follow their own driving principles.So, Physical Theory developed and was always the primary source of the wholly new. And, it was this Physical Theory, ALONE, in this related set of disciplines that became the route to further understanding.

While the mathematicians increasingly followed their usual objective, which was ever-new Forms and Patterns, and this was a very different incentive to what drove physicists.

The third group took the discoveries of the physicists, and with the equations of the mathematicians, found ways to use them effectively in production and in prediction. This was very powerful - but it couldn't go on forever.

The physicists were digging ever deeper into Reality, and the mathematicians were building their own World – consisting of Pure Form alone, which was NOT Reality, but Ideality - and the argument about what drove Reality became more and more heated.

In addition, the compromised switching method, left a great deal still not yet investigated, and the physicists attempted to fill these gaps with more directed research.

A major crisis was unavoidable, and even deeper beneath all three contributing disciplines was a common principle to all-of-them, which though unifying and valuable in the initial history of the three-way union, was increasingly shown to be wrong, and would soon be shown to be so, if the digging continued. It was the usually assumed, but never overtly stated Principle of Plurality.

The assumption that the causes of phenomena could always be separated out, without in any way being distorted, had led to the possibility of Analysis, and the stringing together of chains of causes as in Reductionism to offer a unified set of causes all the way down to final fundamental particles. And, which, in addition had led to the universal scientific method of extraction and use too.

But, Plurality just wasn't true. It had been a useable myth, but as wholly new discoveries were increasingly being unearthed its efficacy was being systematically destroyed. Causes were certainly NOT separable from one another at all, and the search sought ever more deeply to answer the problems emerging on all sides broke down completely.

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