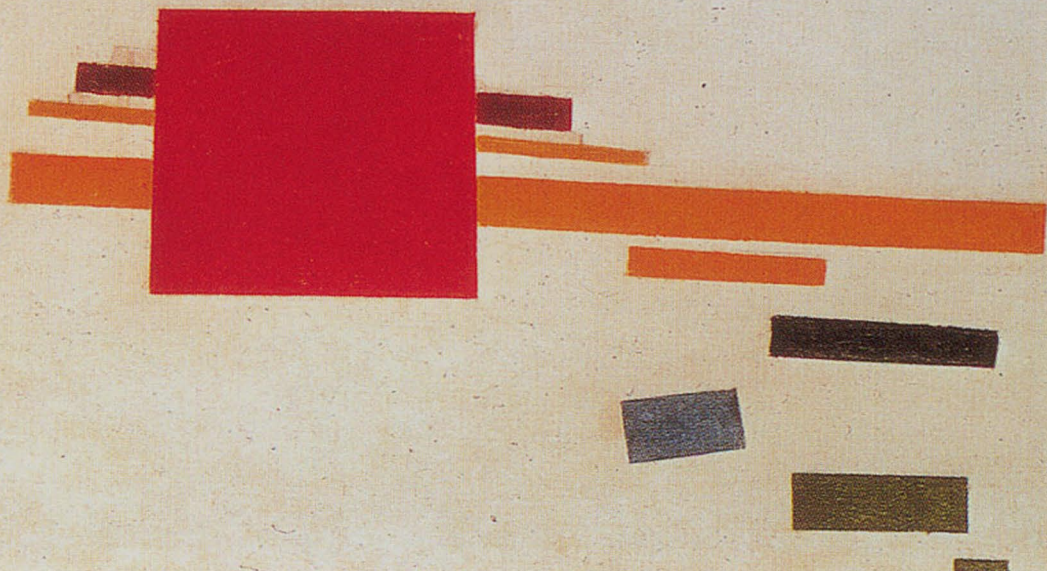


FORM & PROBABILITY

JIM SCHOFIELD



Form & Probability

Special Issue 7

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Form and Probability : *Introduction*

This Special was a commendable task!

It was intended to reveal the nature of statistical and probabilistic Law as a special type wedded indissolubly to experimental evidence, and the revelation of this was to be a plank in the final and complete criticism of the Copenhagen approach to Science, as put forward by Bohr and Heisenberg. And it is a contribution to that objective! But, it certainly isn't, as yet, part of a comprehensive argument.

It got deflected into absolutely necessary component issues, and diligently followed various lines, that were revealed as having to be solved to have any hope of completing the full task.

In such crucial reversals of methods a whole range of component issues have to be addressed prior to a final integration: The terminally ill but not yet dead semi-copse has to be seen to its final demise, before we bury it for ever!

I am sure that this offering will energise others, as it has this writer, for the task is essential, and the rewards will be prodigious. Sub-Atomic Physics was wrecked upon the rocks of real Qualitative Change and the emergence of Levels within the development of Reality. And such problems (in all areas of Science) will only be properly addressed when the problems raised in this area of Physics are finally solved for good!

Jim Schofield June 2011

(231 words)

Aggregates & Averages

(Multiple Contending Simultaneous Relations)

Having established that the usual methodology of scientific experiment and measurement, in addition to revealing dominant relations, also controls both the overall Context AND bundles any remaining parallel perturbations into “random noise”, we *must* extend the analysis further.

Indeed, the crucial related area must be where the essential laws are NOT single, revealed relations in the above sense, but situations which are produced by multiple roughly equal, yet contending factors, so that they produce averaged, overall laws. For such are clearly legion in our world.

Indeed, our normal methodology has always been to overcome such complication by assuming Plurality, and dividing such unhandleable situations into separate handle-able Parts. But that methodology is NOT always possible, for many of these situations are *intrinsically* opposite to that situation. For while they assumed that the situations were produced by the addition of fundamental laws acting together, many of these new situations *only* appear in these complex situations. They produce not a mere summation of underlying laws, but a new sort of overall law.

NOTE: Though there are more than one kind of such “overall laws”. Some are the outcome of multiple events (such as random collisions), while others are due to the *mutually determining* actions of various factors.

Indeed, a scientist like **David Bohm** (at least at one period) thought that **all laws** were of this nature, and even postulated an “infinity” of levels as an alternative to the favoured “reductionism to fundamental laws” approach. Laughlin also considered such laws were important, and even categorised their appearances as actual Emergences. But, to put them in the same category as the Origin of Life on Earth seems to demote the latter, rather than promoting the former. I believe that perhaps his position in such things was determined by the phenomenon of First Emergence.

This sort of event is established if one does imagine that Reality actually evolves, and probably started with **no** Laws of Matter, as Matter did not initially exist as such. With such a conception of the Changes in Reality, there is no way that you can have such multiply-contending situations, but as things gradually came together (aggregated), such situations could finally occur for the first time ever. Such occurrences would be rather like an Emergence in certain basic ways. They would, without doubt, establish new entities, properties and Laws, which are the main features of true Emergences. But, there would be of a different “order”, because they could be repeated easily at different times and places, and would have NONE of the world-changing potentialities and *prohibitions* that are the vital characteristics of the more significant Emergences, such as that involving the first appearance of Life.

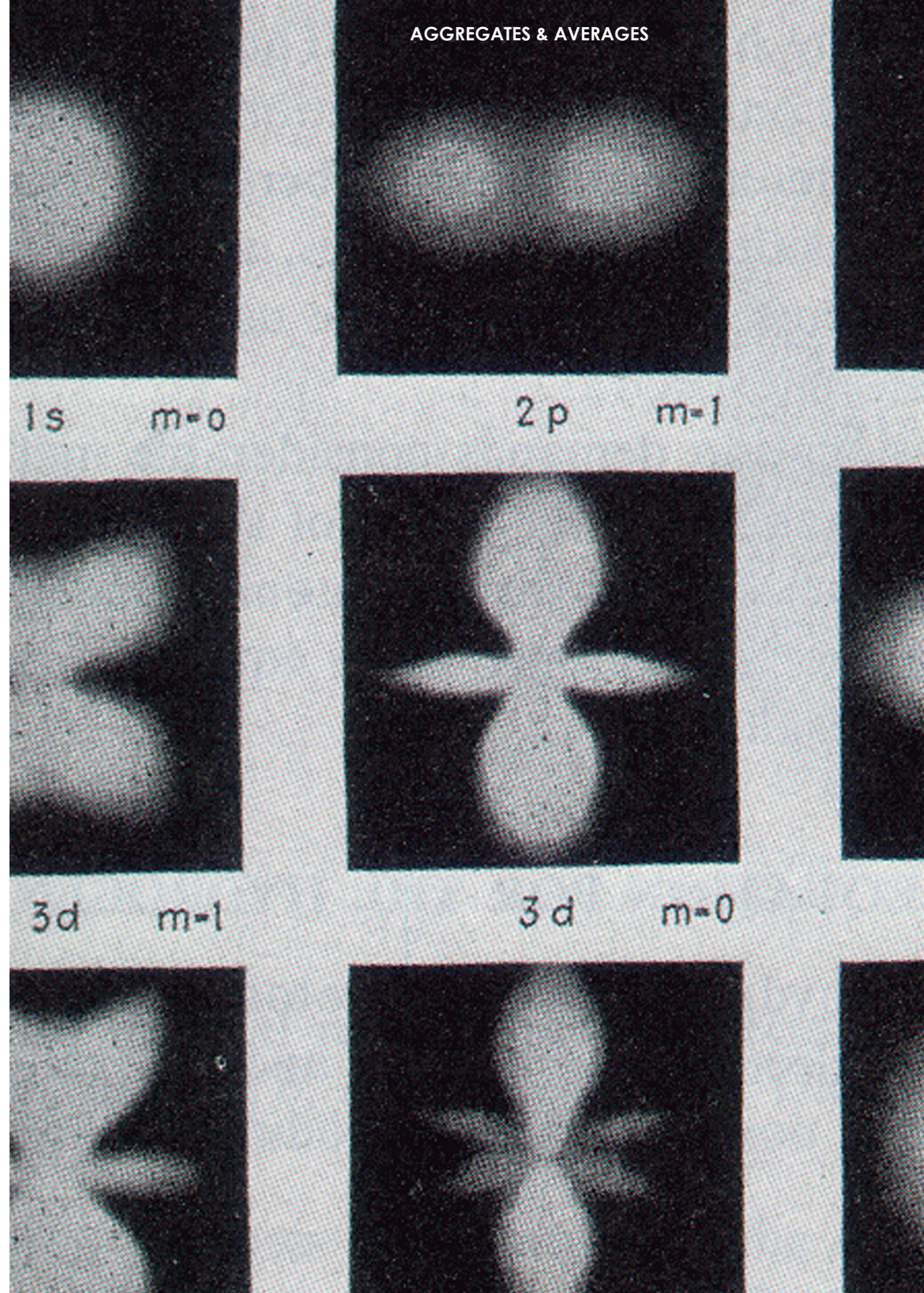
Whatever their place in the overall Emergence spectrum, they are certainly very important in the conceptions of Reality generated by Mankind’s activities and studies.

The careful analysis of the usual scientific methodology has revealed that such an approach both *empowered* his us, and *disabled* Man’s understanding of Reality.

It was *empowered* in stable situations where dominant relations could be extracted and abstracted into equations and used successfully in purposive activity based on predictions.

It was *disabled* in unstable situations where Change was paramount, and the pluralistic concentration on Parts led to Man seeing NO discernable elements, be they entities or laws, that could be used to deal with the obvious rapid turnover in situation.

AGGREGATES & AVERAGES



Now, it is in dealing with this Black Hole of Change in our methodology, that we must attempt to re-equip, and an important area must be in the precise area of multiple, contending factors, and how we deal with them.

It does NOT seem an impossible task either, because the studies into normal scientific methodology did also reveal how minor sets of such contending factors were effectively dealt with there by treatment as “random noise” and the use of averages. Of course, that treatment was in order to ignore these factors, whereas we must be attempting instead to *reveal* them. Nevertheless, we can draw a great deal from those methods.

A particular piece of work (by this author) worked through a supposed Emergence, where such minor ignorable contending factors could be seen as GROWING in significance gradually, challenging the prevailing dominant relations.

Now, if these were continued to be dealt with in the usual manner, it turned out that the observed effects would seem to be of large random events of ever increasing magnitude. At first glance, these seemed to be zig-zagging towards absolute chaos.

This turned out to be wrong, however, but it was an unavoidable conclusion if the many contending sources were totally unknown. In fact, the result of this turmoil was always the emergence of a new Level, where the old methodology could again be used to reveal new dominant relations. But, it meant a complete re-orientation. New entities, properties and Laws meant that researchers had to start again from scratch at the New Level and effectively establish a New Science. The Emergence of Life produced the Living Level, the Science of Biology had to be constructed as a new Science of Living Things.

There is a crucial area that is certainly connected to these researches, which MUST be tackled NOW! It is the chaos embraced by the scientists of the sub-atomic area, who have found the above mentioned random events, and embraced them - dealing with them solely by well established mathematical means related to the Theory of Waves.

If I have this right, these scientists are working AT the boundary of an Emergence, where the laws of individual elements, such as electrons, come up against the Emergence of a New Level.

It is a classical situation in that beyond the chaotic transition, stability and the usual approach is again possible and the normal methodology can be resumed. BUT, at the transition, what were multiple, contending, but also invisible, factors start to predominate, and with the particular chosen focus of the scientists, these are seen as inexplicable.

They have, however found mathematical ways of dealing with the situation, in ways related to averaging. They can deal with the available extracted data using probabilities extracted from previous data, and embodied in Wave Equations of Probabilities. These probability equations allow accurate predictions to be possible.

But, they are focussed precisely at the boundary. They didn't KNOW the contending factors, and knew of no way to discover them. No dominant relations seem to be available, only these multiple and unknown contending ones. So they felt that explanations in such circumstances were impossible.

So it is clear why our priority is to study such multiple, contending situations *generally!*

Even if we do manage to get somewhere in this pursuit, it does not mean that we will replace the methodology used in sub atomic physics, but we WILL replace their incorrect and disabling philosophy. For this latter abandons Explanation as self-kid, and embraces ONLY mathematics as the sole source of “understanding”. This has led to an enormous degeneration in Science at this Level with innumerable speculative fantasies at every turn. The reason for a comprehensive treatment of contending elements is to EXPLAIN exactly what is going on, and to demolish the erroneous standpoint of these scientists.

And, we will also equip Science to begin to tackle these important situations wherever and when ever they occur.

(1,219 words)

Chance and Change

Though Chance and Randomness seem to be closely related, they are unfortunately also frequently resorted to as the actual Agents of Qualitative Change, and even of progress, but that is certainly a step too far.

Of course “chance” implies that the result of such an occurrence can even be “anything at all”, and such a characterisation *could* include some advantageous result just as likely as some disadvantageous result, so by making use of this presumed possibility, along with vast numbers of such chance events, the possibility of progress is included, even though the odds against it would be colossal.

For, by definition, Chance and Randomness possess no preferred direction: they are assumed to occur in every possible direction (and roughly equally). So, the direction that emerges from a “chance happening” is presumably from some multiply-affected, complex condition, though exactly what the subsequent effects might be will be totally unpredictable, and at best could only be given some very long odds for any particular case.

Frankly, such a position is an apology for a cause, and should be given NO credence whatsoever. That is NEVER the reason for a particular line of development, which invariably MUST involve not merely a chance sequence of events, BUT some **positive feedback**. All occurrences that do not possess such a possibility both come, and indeed go, with the same rapidity, and leave no discernable trace.

Such an alternative is not only an exceedingly wasteful engine for progress, but, if I may be allowed to say so, also a very stupid suggestion too!

It invariably leads to fairy-tales involving monkeys, typewriters and the Complete Works of Shakespeare. What a basis for such an Event as the Origin of Life on Earth, or even its subsequent Evolution. Indeed, the odds against any particularly constructive direction being “by chance” the one that was chosen is NOT just down to the odds against that particular single outcome, but *each and every* subsequent selection over the whole developmental path. And as has already been pointed out, not only does Reality move in very different ways, but the conception of the purely random event is a total Myth – an invention by Mankind solely to fill that defined need: it never exists as such in Reality when development is involved, and is only even roughly approached in totally static, non-developmental situations.

When development occurs, there is indeed a **selection**, which does lead to significant change (no matter how small). But such a change does NOT just deliver the situation back into a similar lottery of another totally random situation. For such would always and ever get nowhere, ever! The changes that matter are always part of a possible sequence, **not** a totally random selection of entirely unconnected events at all.

As has been demonstrated in the *Theory of Emergences*, the creative milieu in which progress occurs is one in which the detritus of innumerable prior developmental successes are those which make up the “random mix”, and as such are a million miles from any old, totally unrelated set.

So, that does not gel at all well with the usual idea that constructive chance processes happen with absolutely NO reason, and can be anything at all. It may sound plausible, but it is in fact pure invention. Its attractiveness is that you do not have to *explain* anything at all: it is clearly beyond explanation.

To believe this version of development you have to accept that Man and Consciousness will appear given enough Time and Pure Random Chance. What utter Rubbish!

(596 words)

Extracting Minimal Form? (Investigating the True Nature of Statistical Form)

What exactly is Probability?

One route to answering this question is to take examples from what is ostensibly **Ideality** – the World of **Perfect Form** inhabited solely by Mathematics, and develop from these some kind of a formal system.

For example, if we study **perfect dice** or absolutely **physically identical playing cards**, we can work out various probabilities – and these are undoubtedly **formally correct!**

But, how usefully precise, in the Real World, is knowing the exact probability for predicting a single event outcome, when the theories are ideal rather than based on concrete data? They are frankly useless in the vast majority of real World circumstances.

If you have an acceptably reliable probability system for some game of chance, you don't use it to bet on a given precise outcome of a single event. You use it to give you the **best strategy for betting** on the outcomes of a large number of such events.

Alternatively, based on a rich experience and analysis of many of your own past games (in tennis, for example), you may “know” the chance of a certain stroke, in certain circumstances, succeeding compared with the chance of an alternative stroke, and by “playing the percentages” this allows you to always choose the stroke with the best probability of success. Yet even there you need lots of evidence to give you these percentages, and then lots of action in the current game for this policy to give you the best chance of succeeding over the complete game.

And of course, it assumes that your percentages are always true, and that is almost never the case.

So, at best Probability is *only* about the soundest policy over many events.

And how do we get most of the probabilities that we need?

Can some researcher discover them and deliver them to someone else to use?

If the events are dice throws with both perfect dice and a guaranteed repetition of the throwing involved, we can work out the probabilities successfully, so approaching such perfection in that circumstance is perhaps possible, and transferable.

But, such is a very artificial situation and rarely crucial in the real World.

Indeed, in the vast majority of cases in real situations such perfection is impossible. So in those cases we gather the wherewithall to enable us to calculate probabilities NOT theoretically (as with dice) but **experientially** by repeated experiments. We find the probabilities by multiple measurements of a set of events.

Now, these two alternatives are very interesting because the former theoretical approach requires “**perfectly equal chances**” of basic events, and uses this perfection to generate more complicated cases – like throwing 2, 3 or 4 dice and requiring the probabilities of the various possible scores.

But, in truth, it is never “of this World”: it requires a perfect World as the ground for such required results.

Now, as it happens there is such a World – **not** anywhere physically, mind you, but it is available!

It is the World of Mathematics: the study of Form *in isolation* from Reality!

And for many millennia, Mankind has been transferring these kinds of problems into this perfect World of Form alone, because **there** such perfect requirements are feasible.

Euclid's Elements was not about our World, but about a system within this Ideal World, which I insist on labelling it for what it is – **Ideality!**



It is not a total fiction, of course!

It is an idealised version of our Real World, with absolutely everything removed except Form! And in many problems, that turns out to be quite sufficient. The solutions in Ideality are close enough to those in Reality to be a great help in solving many real World problems.

A triangle's angles do (mostly) add up to 180° to a reasonable degree of accuracy. (It is only on a Global scale that they can in fact add up to 270°.)

So, when we use Probability we are always deep in Ideality.

In fact, it is our frequently used "safe-house", when presented with situations, which are so clearly deterministically impossible to explain that they don't compute. So, we either *idealise* the situation in order to get probabilities, or make many, many measurements to give the same sort of statistical basis for *overall predictions*.

Clearly, not all situations are amenable to this kind of treatment. We may still take many measurements in most circumstances, but frequently all of these can cluster around a single result, so then we use these to find the average, which eliminates the random noise blurring a clearly single result.

But, the probabilities route is when various different outcomes are possible, and we require a good idea of the various chances for each.

And, as you might expect, when it is evident why this is the case, we (as in the dice example) calculate them theoretically. But, it is in the majority of cases, when we have NO idea of the causality involved that we usually take many events, to see if they do display patterns in the outcomes. Many such efforts will not deliver satisfactory and useable results, and we have to abandon that methodology. But, in a holist World surprisingly many phenomena do indeed deliver some sort of pattern, and whenever such are discovered, mathematicians can invariably find-and-fit such a "theory" for pragmatic use. It is not a scientific method, but a pragmatic and formal solution. It does not deliver causes, they can be of many kinds, even with a single Form, but it can deliver prediction without any necessary understanding.

Now, what is gradually becoming clear is that our **pluralist** method of tackling problems in the Real World is flawed in that it is analysing it into Wholes and their constituent Parts: the means to a comprehensive explanation is sought by going from the Whole to its Parts, and from those onwards in the same way, traversing a series of levels down to some basic entities and fundamental and eternal laws.

We call it **Reductionism!**

And the cause-and-effects links throughout constitute a Laplacian Determinism.

But such straight-through determinism is **never** possible!

Though locally, and for short sequences, the method is valid, it is not infinitely true, nor will it continue right down to its supposed fundamental bases. Indeed, it only really works in quantitative areas, where Plurality is close to being true.

As soon as **Qualitative Change** is involved this approach is simply wrong! And as this seems a substantial failing, we have to wonder why it ever works!

Now, we have become very good at dealing with **Stability** – when pluralist conceptions suffice and changes are largely quantitative (especially if we obey the imperative, "Wait for equilibrium to become established before measuring!") And as the periods, which we call stable are in force for the majority of the time, we can do a great deal with a pluralist methodology.

But in all of Reality *over an extended Time*, there are other changes, which ultimately and inevitably occur in short interludes of Major Qualitative Change – termed **Emergences** – revolutionary transformations occurring in which whole new Levels of Reality appear. Clearly, such Events greatly affect our pluralist methods that take no account of such developments of its Wholes and Parts.

Indeed no one doubts the Key Cases. **The Origin of Life** from non-living Matter is an event everyone agrees *did actually happen!*

And the first appearance of **Consciousness** must also have been the result of such a major transformation too.

Now, this may seem very interesting, but scarcely of relevance in the current discussion.

But it certainly is!

Indeed, it is precisely what we have to attempt to transcend the inter-Level Boundaries by using probabilities.

NOTE: when addressing the Origin of Life on earth, many investigators try to deliver this by their normal means, but cannot achieve it without resorting to probabilities. Let us look briefly at the usual argument.

They see chemical reactions that occur both in non-living circumstances and also, and indeed crucially, within Life. They therefore need to explain how the appropriate reactions come together as a different system, and therefore deliver Life from its components.

To attempt to see how this could have occurred, they list all possible reactions that could have occurred on Earth immediately prior to the Origin of Life. Now, there are colossal numbers of these, and they not only have to be adjacent to one another, but somehow form temporary (not-yet-living) associations, while other essential reactions are come across and integrated in. The whole Emergence of Life is put down to TWO processes

1. The chance coming together of necessary reactions
2. The stability of all intermediate non-living phases while the full set of necessary reactions is marshalled by requirement number 1.

Various things must be said about this conception.

In requirement 1, by **random chance**, the elements must come together.

How do they work out how likely this is? They assume that all possible reactions are equally likely (untrue!), and then with this vast total work out probabilities as (for n total elements a chance of 1/n for each) they then work out how long it would take for all these chance events to occur and for the full set to have simultaneously happened as required. They then consider the Age of the Earth and when life seemed to have started and see if this gives them enough time.

Is any of this valid for our discussion above? The answer is "No". Life could never happen by chance no matter how long you give it. They use the argument of monkeys and typewriters and the complete works of Shakespeare produced by chance as an analogy.

Yes, it is a valid analogy. Both are totally impossible. Not, long odds, for their reasoning is also flawed, but totally IMPOSSIBLE!

So, we have a technique, which can deliver a kind of prediction from either an idealised theory, or from multiple measurements, and, of course, pragmatically such is acceptable when accurate prediction of results is the primary objective. But, it is rarely explanatory. It is a placeholder to fill gaps not yet understood, but amenable to such techniques. We must next investigate exactly where we use this methodology and why it does work in many areas of Reality.

(1,710 words)

The Origins of Probabilistic Form

What is Stability? And how does it gel with a holistic idea of Reality? The former seems to imply an unchanging, indeed static, state, while the latter implies constant and affecting changes of the relations of everything with literally everything else.

So, they do seem to contradict one another!

Now this conception of a holistic World as one in which Everything affects Everything else, means that such influences cannot be all one way! Indeed, the usual assumption is that they all have effects in different and contending directions. So, such a situation has to be one of constant change, and this could, overall, amount to a cancelling out of these changes, or alternatively they could accumulate so that the situation as a whole will become something else.

The classic form is that this produces cycles of changes, and can deliver recurrences of past situations at regular intervals as time passes.

As qualifiers to this overall idea, we usually imagine constituting sub-systems as Random Chance Effects, which though, in particular circumstances *locally*, can have a dramatic result, **overall** they generally have **no** significant, persisting effects.

But, clearly such an overall situation is **not** the same as Stability! For the latter is always a conservative system, which when somehow moved away from equilibrium, immediately and proportionately *acts* to restore that balance. Stability is not “dead-on-the-slab”, but constantly maintained in its balanced state, and we usually term that maintained balance **Equilibrium**.

Implicit then, in the idea of Stability, is this active self-maintenance. It clearly involves Negative Feedback as its mechanism for maintaining the situation, as whatever the direction of disturbance from its Rest State, active and proportional forces are always elicited, which always bring the situation back to its status quo. So, though very different, both conceptions are not normally conceived as *evolutionary*. They are both, though in different ways, systems that do not imply maintained directional changes of any sort and at any time.

NOTE: It is also worth mentioning that exactly the same Stability also *guarantees oscillations*, whenever the returning forces overshoot, so that the return-to-base is not immediate, but takes some time to settle down.

But, such cannot be the natural state of Reality for it is certainly not a totally static system: it definitely changes *as a whole*, and indeed develops over time. It may appear static over short periods, but as soon as longer periods are investigated, development is always present. It could (and indeed should), be typified as a system of constant change and even development.

NOTE: Clearly, though we conceive of such ideas to help us understand Reality, they are always somewhat simplified, and though this certainly helps in many individual cases, these conservative overtones do not help when the occurrence of general distinctive and directional change is actually the persisting case. Neither help in coping with real Evolution – in fact with these conceptions it doesn't even exist!

So, the question arises, “How can Stability and Progress both be true?”



THE ORIGINS OF PROBABILISTIC FORM

Would not each and every change away from current Stability be acted against and stopped to maintain the current status quo?”

How can there be an overall system, which does *both* of these contradictory things? . It can only be that any real system doesn't do both simultaneously. We recognise phases or modes and consider them as general and persisting cases, and these have to be alternating modes of Reality. And to correct these updated versions of both Holism and Stability are necessary, which turn out to be important Phases in a more complex overall development.

The commonest and most easily discerned mode is undoubtedly **Stability**, which persists for long periods, yet within it there has to be great local variety, and by far the most significant type of counter-process has to be those which are dissolutive – dismantling sorts of processes, which, if they could dominate would generally and inexorably move all forms of current Order towards Total Chaos.

And such a tendency is indeed noticeable within stability, and embodied by Mankind in the famed **Second Law of Thermodynamics** – the perceived general and unstoppable “drift” towards total Disorder. But if it were always there, it would prevent the maintenance and certainly the development of any Order, and Reality would be always in one great and inevitable slide towards Chaos. And that is certainly **not** the case! Such a law does not always dominate! What order there is will normally be actively maintained, and this dissociative process is usually local and temporary.

But that begets the question, “Why is this?”

It must be the case that stable, overall systems exist because they can *counter* such effects. Indeed, the evidence seems to be that all “alien” (from another system) opposing processes are always acted against, whether they are deleterious or progressive. Now, this, as stated here, still seems to ensure the permanence of a current Stability: but to reveal that this cannot be true, we have to ask, and answer, how any Stability “came-to-be” and whether it is ever *complete*?

The answer is that Stability seems to arise naturally out of a certain *kind* of **Chaos**, while dissociative processes arise proportionally out of the present degree of Order. There are NO dissociative processes in Chaos, as there is nothing to dissociate. But total Order is never achieved, and all aspects of it will elicit their own potential dissolution.

With a mighty mix of primary processes of all possible kinds, there will be a natural competition for the same resources between different processes, and in such conditions, those processes, which are *mutually conducive* will (along with their partners) proliferate at the expense of *mutually contending* processes. Order is a natural consequence of such totally random mixes – *when without any constraints*. But, as soon as such Order begins to build, there will also be amplified processes, which can feed off such processes, and these will tend to dismantle any islands of Order that have been achieved. This “get-nowhere” balance is however **not** the only possibility. Ordering systems can also “pick-up” *selective deleterious* partners, which both benefit from their parent processes and yet dissociate any “outside” opposing processes acting against that Order. Thus persisting Order is only possible if, in addition to its sets of mutually conducive processes, it also incorporates its own “defensive”, self-maintenance processes too. Though Second Law type deleterious processes are always present, they do not dominate, because of the self-defence processes of each persisting Order.

Indeed, following the described ideal conditions for the development of Order, there will always be a tendency for an oscillation between developing Order and its dissociation. But, there will initially be a general drift towards increasing Order, as each ordering “zig” will persist longer than its opposing dissociating “zag” until the oscillation is finally terminated at a certain **threshold** with an establishing, relatively permanent new Level of Stability.

Now, once more we seem to be back in a permanent situation, for, once achieved, it seems inconceivable that anything other than this achieved Stability could affect the situation.

But that is not the case. It supposes that such systems are *complete* and unchanging, but that turns out to never be the situation. What has happened is not the achievement of a Buddhist-like Nirvana, but a far-reaching, yet not infinitely persisting, Stability.

In spite of its seeming permanence, the situation is certainly not frozen into a final and unchanging form. It is still full of activity and changes continue even after this new Level has been established and the overall conditions involved gradually change, until the acquired stability is increasingly undermined by more effective dissolutive processes. Finally, at a very different and crucial *trapdoor threshold*, it becomes insupportable and dives into an accelerating positive feedback collapse, and the overall dissociation of the complete Level is unstoppable. Everything seems to be cascading down to a total and utter Chaos.

But, was that not our **starting point** for the natural growth of Order?

Now the result of such a trajectory must be long periods of Stability punctuated by short interludes of major Qualitative Changes – **Emergences**. And these are not what are usually considered to be their natural form. Indeed, such events are always initiated by major cataclysms of dissociation, followed amazingly by vigorous ascents to new forms of Order, via an alternation of proto-Levels and consequential dissociations culminating finally in a new and stable Level. Yet in spite of being THE places where everything is significantly changing, these interludes are remarkably short compared with the periods of stability. Indeed, with most past-occurring Events, the actual transitions are impossible to discern, and the sequence seems to be entirely of a sequence of periods of Stability only. This being the case those considering this trajectory naturally looked to explain a succeeding period of stability directly in terms of its predecessor level, and in this they will always fail.

But, of course, the understanding of **Emergences** has to be the key to understanding development. The essential processes for change are NOT there within Stability, and only actually appear with the cataclysms, which occur in Emergences.

The other surprising things about these revolutions are that though each delivers a higher Level with many new features, these Levels are always extremely conservative in nature. The one thing that they do NOT promote is more significant Qualitative Change. For such are suppressed in order to maintain the current Stability.

The clear proof that these phases do happen is available in the one form of Emergence that we can actually live through and observe in detail – in Social Revolution.

As distinct from what many advocates of Revolution believe, these Events, though they do deliver a new and better stability, are not conducive to further developments at all, but rather the contrary. Revolutionaries like Trotsky were moved to insist on the necessity for activists to subscribe to a policy of Permanent Revolution because of this.

Now, the general Theory referred to here, has been laid out elsewhere in this author's *Theory of Emergences*, but it had to be re-iterated here, because of the many impasses produced by these Events became increasingly evident as the Sciences established wholly *within* these Stabilities attempted to carry their causalities through these Emergent boundaries and found that they could never succeed.

Now, this paper was commenced with an objective, which has not, so far been addressed.

The title *The Origins of Probabilistic Form*, which defined that objective, has certainly not yet been delivered. Yet a great deal of absolutely necessary groundwork has certainly been put in place. Clearly, the task is to go from the new dynamics of the alternating Phases of Development of Reality to Mankind's various simplifications in its attempt to explain this complex process. And what must be addressed in this chosen context is how Man uses Probabilities and Statistics, when strict deterministic methods fail, and crucially when transitions between Levels of Reality occur interrupting the assumed reductionist sequences of explanation, yet methods only suitable for within-Level causality are illegitimately shoehorned into these transitions. Following papers will (hopefully) fully address these points.

(1,838 words)

Probabilities in the Copenhagen Interpretation of Quantum Theory

Now, the series of papers on Stability, Emergences and Probabilities in Natural Law were actually triggered off by the “principled” abandonment of deterministic equations necessarily coupled with an accompanying holistic explanation of Classical Science, and its replacement by a rejection of all explanation, and the replacement of deterministic laws by probabilistic laws in the sub-atomic realm.

With this dramatic change a major question was certainly left “hanging there” – demanding a full explanation of this major switch in the long-standing philosophical standpoint of all Science. Heretofore, Science had always required causal explanations for everything that happened in Reality, and these were, after this counter-revolution, no longer considered to be either available or even necessary. It constituted a major step backwards to what can only be described as an older purely idealist position.

So we must ask, “What was the basis for these probabilistic laws when dealing with phenomena in the everyday World, but seemingly caused by processes in the sub-atomic realm?
Could all these areas of scientific methodology be linked?”

Now, what was possible was that investigators having descended through a series of causal reductionist links in connected phenomena (within a given Level of Reality), had arrived at a boundary into the sub-atomic sphere of phenomena, which seemed to bring the possibility of a continuation of these methods to a full stop. What kind of boundary could this be, and how might it have such remarkable effects?

Now, the first principle of an Emergence is that they cannot be predicted from phenomena and laws at the prior Level, and perhaps even worse, that new laws emerging for the first time at the new Level, were also immune from explanation or derivation via such prior certainties,

Now what made these discoveries hard to understand, was that once wholly ensconced within the new Level the old type of causalities were always available once more.

Within Levels causal reductionist sequences were often reliable, but attempts to transcend a Level boundary with such transitions proved impossible.

Reductionist sequences were OK right up to the boundary, but were always stopped dead there. We just could not continue with our universally reliable methodology through such transitions.

Thus crucial questions, which were positioned at such boundaries, and attempted to explain across them, invariably failed totally. Vital questions seemed unanswerable using our normal methods.

Perhaps the Key Case has to be the multitude of serious attempts to explain the Origin of Life on Earth, from the vast number of totally reliable physical and chemical laws derived for the prior non-living realm. Similar breaks are evident at other such boundaries – for example when considering Thinking and Consciousness in the Human Brain, the efforts to do it using Neural Nets (and other investigated systems) have failed repeatedly and absolutely.

Indeed, in this latter case, the abandonment of answering “Why?” for the much easier question of “Where?” has now taken over completely, and current studies deliver only an improved **Geography of the Brain**, without any “on the ground” explanations whatsoever.

But, it was always thus!

Many times in the past at different Levels of Knowledge and expertise, the scientists have failed to explain “Why?” and have invariably switched to “Where?” – even suggesting that the shape of the skull had been determined by what (and hence which area of the Brain) had enlarged to cope with certain tasks.

The situation in the search for the Origin Of Life has similarly changed into “Where?” it must have happened, and both “Why?” and even “how?” have been sidelined.

PROBABILITIES IN THE COPENHAGEN
INTERPRETATION OF QUANTUM THEORY

From the sound suggestion of the Primaeval Broth of shallow tropical seas, the failure to solve what had actually happened impelled the researchers to *change their ground*, to where they could speculate without fear of contradiction. The “Black Smokers”, “subterranean damp rock matrices”, and various extremophiles of diverse natures have allowed the question “Where?” to substitute for the real scientific questions, which have stumped them every time.

In addition the “mainly speculative” area of Cosmology has found it impossible to cope with the clear evolutionary development of the Universe without introducing crucial Universe changing Events, which could only be **Emergences**, though most scientists involved still hold onto being able to trace a pure reductionist path throughout this process.

And, let’s face it, almost all such Emergences could never have been observed, as WE hadn’t evolved yet! So, the major route can only be what the participants insist is “informed speculation”, and what makes it so is the extrapolation of laws at other Levels all the way down to the most primitive basic entities and laws. So in spite of a clear multiplicity of Emergences they assume that all of these will be cracked using their usual methodologies.

There are, however, Emergences that have been experienced and even studied by people appropriately equipped with a very different philosophical, and hence investigative, stance. They were, of course, the Marxists.

Marx’s philosophical heredity is well known: he was a student and later a dedicated disciple of the philosopher Hegel, who realised that Change, and in particular, Qualitative Change, was not being addressed by either academic philosophers or scientists, and was clear what he had to do to remedy this major hole in logical methods.

He defined the necessary area very clearly as the Study of Qualitative Change and he was clear that the crucial area was in the *emerging of entirely new things* – a process that he termed “Becoming”. And he was clear that this had to be developed in a basically scientific way.

He named his required area **The Science of Logic** and counter-posed it to the **Formal Logic** of the two groups mentioned above.

But, where was he to look in order to see and extract these very different processes in Reality?

He could only conceive of one place – *in our own Thinking*.

And as no one else was likely to cooperate, he decided that he could only investigate in detail his own Thinking, with a view to seeing how new ideas emerged and concepts grew.

And it must be said that in spite of the evident subjectivism and idealism that was unavoidable by such an area of study, he nevertheless made significant gains. But he could not complete his objective. Though he did extract a few, it was obviously almost impossible to extract the crucial generalities from the Thinking of a single individual, and even more so when the investigator was also the subject of his investigations.

It took his best students, the so-called Young Hegelians, to transform his position and validate his methodology, by rejecting Idealism and turning instead to Materialism.

As Marx said, it was necessary to “stand Hegel upon his head, or rather on his feet”

And Marx’s changes also transferred the main area of study away from Human Thought, to a much more potentially objective area – Social Revolution.

With this new standpoint, a whole range of fundamental changes had to happen.

Michelet had already started with his *History of the French Revolution*, and this great work outlined what a Materialist Conception of History actually was, and so Marx and his colleagues (including Engels) began the stupendous task of applying the gains of Hegel’s Dialectics to many different areas of study, including that of Revolution itself.

It was clearly paramount to begin to understand what was going on in such remarkable Events, if only to see why they so often failed. They were, of course, not natural occurrences entirely for there were always involved both conscious and active, opposing forces, and the outcomes were therefore never predetermined.

It was clear to Marx that the new “logic” was applicable to all human Thinking and studies of Reality, but the manpower available was sorely limited. Nevertheless he studied Mathematics, and Engels wrote extensively on Science. In his pamphlet, “*The Part Played by Labour in the Transition from Ape to Man*” Engels made contributions many decades ahead of the academic experts in that field. And ever since, many others, (who did not necessarily agree with the Marxist political agenda) were increasingly converted to the Dialectical Materialist standpoint (though they rarely called it such). But they did recognise the crucial Events of Major Qualitative Change, which came to be called **Emergences**.

There were areas of study where such Events were indeed unavoidable.

In Geology and Evolution, nothing could be explained without these Turning Points in Development. Darwin was very early in grasping the alternative view of development, and geologists were always miles ahead of their Basic Science colleagues. Wegener proposed his Plate Tectonics, and was universally rejected, but he was right!

And now current studies in these disciplines are regularly turning up new appropriate evidence for Emergences.

Even Miller’s famous attempt at explaining the process leading to the appearance of *amino acids*, in his attempt to throw light on the Origin of Life on Earth, were of this alternative mode of addressing such questions.

Now, with such a weight of evidence, we have to state a series of absolutely certain conclusions:-

1. Emergences are indeed the Turning Points in all Development.
2. The Study of Qualitative Change is now crucial in many important areas
3. Could many anomalies and impasses in Classical Science be due to attempts to causally cross the boundaries between Emergent Levels?

Further papers will follow, as the main objective has not yet been reached, but it will be, fairly soon.

(1,568 words)

Wave/Particle Duality? The Idealist Myth

When the assumption of Quanta for Energy was carried through to all other areas of Sub-Atomic Physics, all sorts of **solutions** to *some* intractable problems, plus new **impasses** for *others*, arose.

Perhaps the most intractable cases of the latter were the discoveries that certain entities could act sometimes like particles, while at others like extended waves.

Clearly, such alternative aspects of a single truth were, and still are, impossible! For with a particle everything is concentrated into a very limited volume, whereas in a wave, we have (theoretically) an infinite distribution of that exact same entity. What were we really being offered?

It was clearly two alternative and mutually exclusive models that “worked” each in its own particular circumstances.

Now, such impasses are not new. Frequently, in a not fully understood area of Reality, scientists could, and frequently did, deliver such contradictory models. But, their advantages were admitted to be purely pragmatic, and everyone expected that a deeper **understanding** of the area under investigation would ultimately transcend such dichotomies with an integrating and more correct alternative. “It has always been thus!”

But, this particular dichotomy was indeed a “corker”!

How could the one ever be converted into the other, and what integrating alternative could incorporate both? The answer was almost unavoidable – it couldn’t be done!

That surely is the only honest answer, and this being the case, it must mean that we are leaving something crucial out of the conceptions and assumptions that we are applying, thus making an overall and correct explanation impossible!

NOTE: And, of course, that is true, not only in this particular case, but actually in the vast majority of Science. For we, as an absolutely essential and consciously chosen technique, do indeed leave out a large number of factors whenever we set up our experiments to find essential relations.

We feel that we **have to** construct carefully designed Domains, which eliminate the effects of some factors, and hold others constant, while eliminating others by averaging.

We effectively “tailor” the situation expressly to reveal, as simply as possible, the required relation. And this decision is based upon the principle of **Plurality**, which sees every **Whole** as composed of **separable Parts**, and hence legitimises the “tailoring” described above. There can be NO doubt that what we find is true for the Domain, but what about unfettered Reality, or even other, and very different, Domains?

Indeed, if a particle cannot be transformed into a wave, then it must remain as a particle (though we may have to update our simplified model), while the wave must be based upon **something else**, which is intimately, and indeed causally, related to that original particle.

Perhaps the idea of the particle is crucially flawed too, of course, for in order for it to be intimately related to something else, it cannot be the simple “billiard ball” conception that we know and use. It **must** be a great deal more than that, and form intrinsic relationships with other things with a very different nature.

[Perhaps Plurality is wrong?]

Let us assume that the above statement is true, and that both are always present, but that one rather than the other is affected overtly and significantly compared to the other in various different circumstances, so that observers only see which of the two is currently observably dominant.

NOTE: Remember the previous note about our pluralistic tailoring of Domains!
Would not such adjustments, indeed expose the dominant and suppress anything else that might be around?

Then, as the “observed switch” between particle and wave took place, the investigators see the particle as “becoming” a wave, and vice versa when the observed phenomenon appears as the opposite.

Now, all this is, of course, pure speculation, and, as yet, cannot be called a real alternative. So, such a possible alternative explanation has been tried by this author in his quite different explanation of the **Double Slit Experiment (with electrons)**, and a coherent explanation achieved without recourse to the nonsense of the Copenhagen Interpretation being necessary.

What was there suggested was that Space itself was “paved” with “Empty Photons”. So, what are these hypothetical entities?

These were conceived to be like ordinary Photons, which contain E-M oscillations, but were *here* actually empty of these contents.

Any source of E-M oscillations near to such an Empty Photon could induce it to absorb a quantum of the energy and thus contain a quite normal E-M oscillation within itself. And in the same way each “filled” Empty Photon could in the very same way transfer its oscillation to another adjacent Empty Photon.

Clearly, continuing sources could elicit waves in the “paving” of these stationary Empty Photons to actually propagate the disturbance across Space. The Speed of Light would be simply the speed of induction from one Empty Photon to another directly adjacent to it. Clearly, such a speed could only be a constant, and such propagations could never go above that limit.

Yet the Photons would no longer have to move!

A quantum of E-M energy could move from Photon to Photon - looking very like a physical projectile, though only the disturbances would be moving. Clearly when the final Photon was adjacent to something, which could absorb it, its whole quantum would be transferred. With such a “paving” present, *moving, negatively charged* electrons would also induce E-M oscillations within all Empty Photons, which were close enough to it in its trajectory.

Now, the immediately generated propagations in the “paving” would move swiftly ahead of the slow moving electrons, so that subsequent movement of the electrons would be *through* these waves, which the electron itself would maintain by its constant interactions with Photon after Photon!

Clearly, the waves would reach the slits first and go through both, so that on exit the two emanations would both diffract and interfere, setting up an interference pattern in the “paving” beyond the slits.

All this would be established long before the first electron reached the slits, and it could go through one or the other (it doesn't matter which), and after diffraction on exit the electron will encounter the interference pattern.

Naturally a charged particle will be affected by its route through the pattern, and if it encountered a maximum patch it would be deflected, while if it only passed through cancellation patches, it would carry on straight through. It is standard classical Physics to work out from this how the electrons will be affected, and the pattern produced at the detection screen will exactly conform to this.

Yet, the reader might be even more surprised to learn that it matters **not at all** that this is exactly what happens or NOT. But, it quite indubitably demonstrates the more basic point that we must go beyond the magic electrons sometimes acting as particles and at others acting as waves.

We have surely at the very least demonstrated that an unobserved and intimately related second entity, occurring along with the prime entity (the electron) could indeed make a significant effect that could not be explained by particulate electrons *alone*.

So, the question is immediately posed, “Is it reasonable to have a magic electron which switches between focussed particulate entity and an extended wave-like structure?”

For the Copenhagen School to insist this shows that they had other ulterior motives for their new standpoint. They wanted to continue with their totally equation-based pragmatic interpretation of difficult phenomena. They *needed* to abandon Materialism for an alternative in which disembodied laws determined Reality completely. They wanted the doable ground of Idealism for Science.

(1,252 words)

Doubling the Abstraction?

What happens when our Source is itself an Abstraction?

Now, quite apart from the explanatory ideas already dealt with in previous papers, there is another side to the Copenhagen approach to Science. Even though it insisted upon the use of Equations as primary, even their standpoint could not *find* in the evidence they usually required, the usual deterministic equations, but they did find alternative forms, though it involved a series of crucial changes in standpoint and method.

They used the already developed area of Statistics and Probabilities, but in an entirely new way. For instead of their equations being derived from data from the real World to produce deterministic equations that could deliver predictions, they dramatically changed the mode entirely.

They used already existing Wave Equations, but NOT deterministically to deliver actual individual events, but instead to deliver probabilities of sets of those events.

Now, before we proceed with the “New Order”, we must recollect how such mathematics had been used in the past. For centuries in areas where individual events could **not** be observed, statistics and probabilities were used quite effectively. But the bases for such used involved a series of sound principles and assumptions, which meant that overall features could indeed be predicted accurately, but what was crucial as a basis for such methods, was that these things took place in decidedly stable circumstances, which DID NOT change the context at all.

Now, a crucial discovery, in a much wider range of Reality, has been the revelation of the occurrence of **Emergences**, in which whole New Levels of Reality could be created and be stable enough to persist.

To get a handle on what these were, we need only mention the one, which is indisputable – the Origin of Life on Earth. Clearly, that Emergence was no repeatable everyday process, but a positive revolution, which did indeed create a new Level of Reality. Crucially, it was later proved that direct causality chains across this Boundary were impossible! It was indeed a discontinuity, and ALL our methods assumed both continuity and causality, because they had been derived ONLY *within* Stable Levels.

Now, when considering what the Copenhagen School were doing, the question has to be asked – “Could it be that these scientists were actually attempting to predict across such an Emergence Boundary?”

Now, with the conceptual groundwork already considered, we have to attempt to describe exactly how probabilities could be used in attempting to cross the boundaries of Emergence Events!

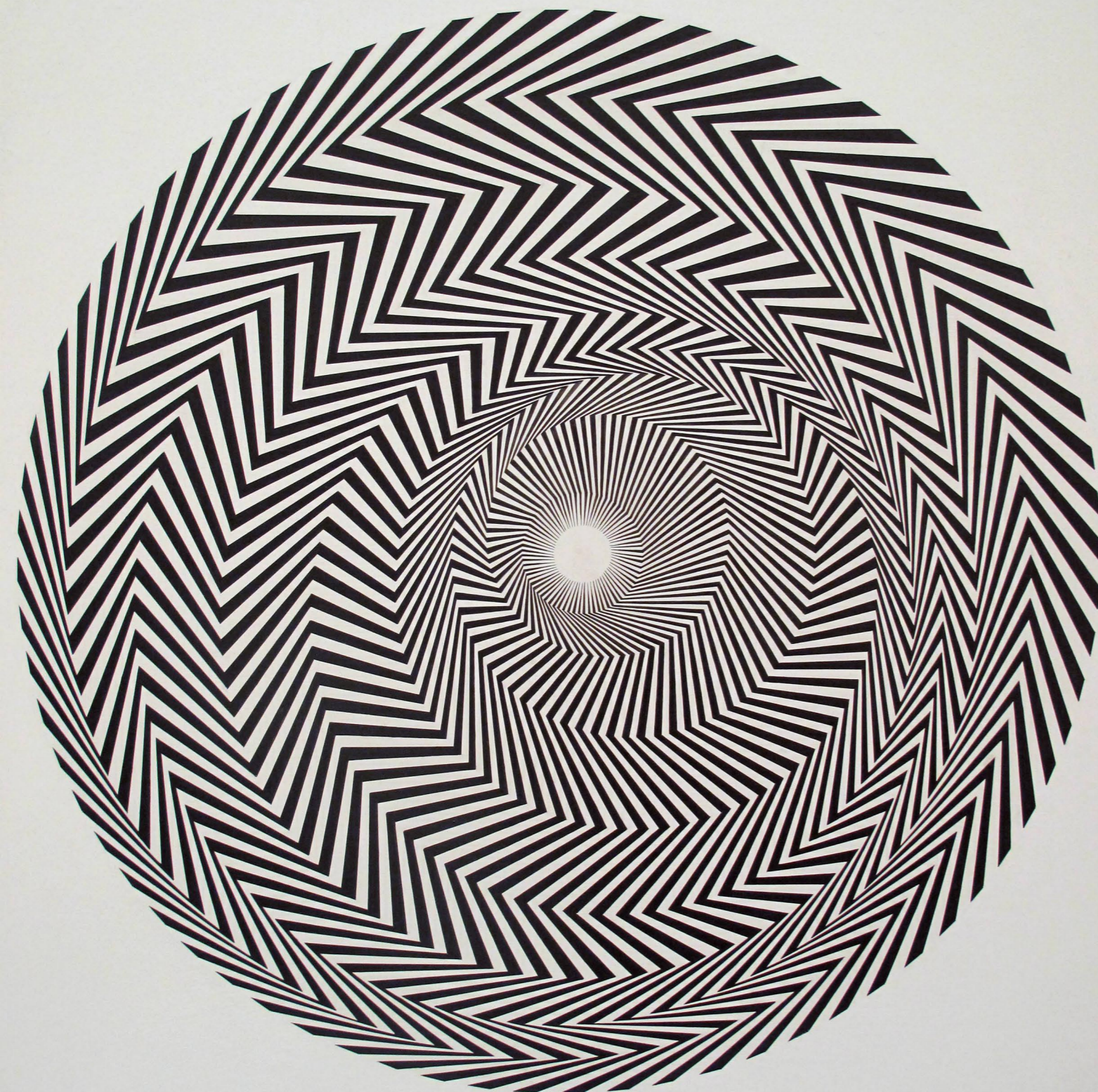
In one sense, such methods are ideal, because they do **not** require any causal reasons for the results predicted: like all equations they are only about Form, but in such cases – *overall* Form compounded from any sub events and processes. What is really involved is Form and nothing else!

Indeed, the crucial example of this methodology has to be the Copenhagen Interpretation of Quantum Theory, which explicitly prohibited any attempts at causal explanations as pure speculative invention, and insisted instead that ONLY equations (formal relations) could be validly used.

NOTE: It is worth spelling out what they were doing with this standpoint. They were abandoning scientific causal explanations for purely formal patterns.

Their causality became – “Obeys this pattern!”, which is not Science, but idealism, for it makes a disembodied abstract relation into the actual *driver* of part of Reality. If that isn’t Idealism I don’t know what is!

Of course, Most equations are determinate forms, which can indeed deliver predicted outcomes of particular individual events, but even these kind of equations turn out to be impossible in the special general scenarios that we are currently considering.



For here, even the equations do not deliver that feature. Instead of giving explicit individual predictions, these consider situations as a whole and over time!

So, NO particular predictions are possible, and instead the equations involved deliver only probabilities!

Now, there is nothing new in that, but in prior uses of these ideas, there could at least be an **accompanying explanatory narrative** as to what was actually going on which made coherent sense of it!

But, just such a narrative was barred by the founders of the Copenhagen Interpretation.

In a way, their sort of formalism is *doubly abstracting!*

The first and universally applied abstraction is when data is fitted to a general pre-existing abstract form, effectively taking a generalised equation with both variables and constants, and determining the latter, by substituting known measured data into such equations, and by this means finding appropriate values of those constants. Thus the general form is converted into a particular version “tailored” to given sets of data.

These variables would all be measurable from a given experimental set up, so the final equation will allow prediction of values, if the other involved values are known.

But, that is not what we get with probabilities!

The variables cannot be predicted in individual circumstances because there is NO clear determinist form of equation, as in the “single abstracted form”. What can happen, even with all inputs available, is **not** a single outcome, but instead a range of outcomes, and the new kind of abstraction provides a formula, which will deliver the *probabilities* for each possible outcome,

Even in classical Science related methods were used, but usually they were necessary because individual cases were too numerous (not to mention too onerous) to both calculate out and then combine to give a given overall outcome.

Overall Variables were considered instead!

These were things like **Pressure** and **Temperature**, which could be dealt with by various “summing” means. And some of these Overall Variables could turn out to be single-valued in given circumstances, and these could be treated in the usual deterministic way and be the elements in normal deterministic equations: they were often the earliest discoveries in Classical Science.

But, even these were not about what was required in the newfound areas of use.

In these particular outcomes were important, but undeliverable by deterministic means.

All that could be calculated were the probabilities for each of a given set of overall possible outcomes.

Thus this was *then* a second order abstraction! Some complex articulations and changes were not discernable or measurable, but in-total, overall results could be calculated as probabilities. Some general, second order Form was applicable, but clearly there was absolutely NO chance of a meaningful accompanying narrative: too many unknown sequences of processes and multiple phases were taking place, which we knew absolutely nothing about. But they were such as to deliver this new form of order.

Now, it has to be stressed, that the Rubicon had been crossed, not, of course, to new wondrous fields, but on the contrary, back into the primitive land of pure inexplicable pragmatism.

Thus at this vital juncture in the development of Science, these reactionaries were choosing these second order abstractions, moving them even further away from concrete ideas of what was actually going on. They were able to simply leap across the creative gulf between the Old and the New, without understanding a single thing about what had been involved.

But, to them, it didn't matter, because they had ceased to be scientists, and had embraced instead Technology, which does not concern itself with explanation, but ONLY with prediction and the consequent ability to deliver without understanding.

Now, perhaps for the first time, this was not merely a mistake that would be remedied by others. The Copenhageners heartily condemned true scientists for “never being right”, and fought against all who attempted to continue along that line.

And at the **Solvay Conference in 1927**, they emerged victorious. They defeated **Einstein** and many other both experienced and aspiring scientists, by beating them with their own contributions. Einstein's most prestigious contributions were also essentially formal, but he did seek scientific explanations for everything. And, of course, the mediocrities present would always support the formal approach: it was what they did already – any fool can find a formula!

NOTE: Now it is essential, at this point, to explain that some of the forms used in this new method had been employed previously in standard Classical cases. For example the Wave Equations, when used classically did indeed give concrete values for given times and positions.

But, in the new use **NO concrete wave phenomena** were actually required or necessary! The Wave Forms used were not about wave phenomena.

But, they proved well-suited to deliver probabilities.

They were in fact second order abstract forms!

Now, this must be the crux of the new approach, for NO explanations as to why this use worked were ever made available. It just did work!

Purely formal derivations were possible, of course, but they were NOT *causal explanations*. They were considerations totally limited to Form alone. They were about Ideality (the World of Pure Form) and not about Reality.

All sorts of attempts were made to ground the new Physics, but all fell to the ground with one contradiction after another. Explanations, in such Emergent episodes of Change, were impossible *by our usual methods!*

Now, if the assumption that these cases were attempts across an Emergence Event boundary, then this failure is quite easily explained. There are no guaranteed continuing entities and laws across such a boundary. In terms of prior existing entities and laws, there could be no formal link directly to entities and laws beyond such a boundary.

Why?

It is because the Event is a Revolution. It involves a complete dismantling of the Order of the previous Level, down to almost complete chaos, and then a multi-phase stop and start competitive, and creative Ascent Phase, at the end of which, when a new Level of Stability has been established, the Key entities and laws are quite different! There can be NO continuity between the Levels (in the way we conceive of them) in the areas being studied.

So, when scientists attempted to smoothly link, via causal formulae, across the chasm, it didn't work. In a sense they could only measure in the new realm to find new entities and laws, and thereafter try to construct statistical-type links between the old regime and the new data. Naturally no direct causal forms were available, because there was NO completely unbroken continuity across the gulf.

In fact the characteristic nature of the Event was the conflagration of destruction, followed by the Phoenix of new creation.

How could you shoehorn that into a formal equation of deterministic type?

NOTE: In order to take this further, we will have to talk about Abstraction and Form. There is a trajectory across the Episode that we call an Emergence: what appears on the other side is not totally unknowable. Indeed, Revolutionaries do have objectives working within a Social Revolution, and struggle hard to see some of these implemented. But, it isn't a precise Science at all. It is always a *dive* into a wholly new Ocean, where you first have to learn to swim again, before you can strike out for achievable objectives. But, Mankind developed his assumptions and methods, based on acting solely within the commonest state - that of Stability, and clearly his set of methods would not be adequate to the wholly new ground. Though achievable (sometime) the methodology of traversing an Emergence was not in their hands, and hence, the whole system developed could not deliver within these major Turnovers.

NOTE: If this is considered hard to take, may I suggest a close look at the many attempts to explain the Origin of Life on Earth? The very same problems are evident in that task, to what we are considering in the boundary between the Sub-Atomic and the Atomic Levels. And clearly, no one has even delivered a single step in this crucial transition. Many instances wholly within the prior Non-Living Level have been revealed, as have some following the Origin – actually in the Evolution of Life, and not part of the actual transition at all. It is a very revealing area, and was the main basis for most of the ideas expressed here and in a whole raft of related papers and theories.

(2,008 words)

The Problem of Theory : *Preface*
Whole mutually determined Paradigms
Rather than separable explanations

The difficulty with this current research, is that it is not concerned with tackling a single isolated problem, but indeed a whole nexus of inter-related problems, none of which has been as yet satisfactorily addressed, and hence certainly not integrated into a comprehensible Whole.

There are:-

- the crucial study of Qualitative Change as distinct from Quantitative Change
- the revelation of why long periods of Stability alternate with short episodes of revolutionary transformations
- the confusion of Form and Cause

and, of course, many others.

So, in each and every attempt on the area, the researcher was, quite rightly, impelled to follow a glimpse of something that clearly presents itself as relevant, even if it does not directly answer his currently identified purpose.

It cannot be helped!

And, of course, each gain only highlights the revealed yawning gaps, still remaining to be addressed.

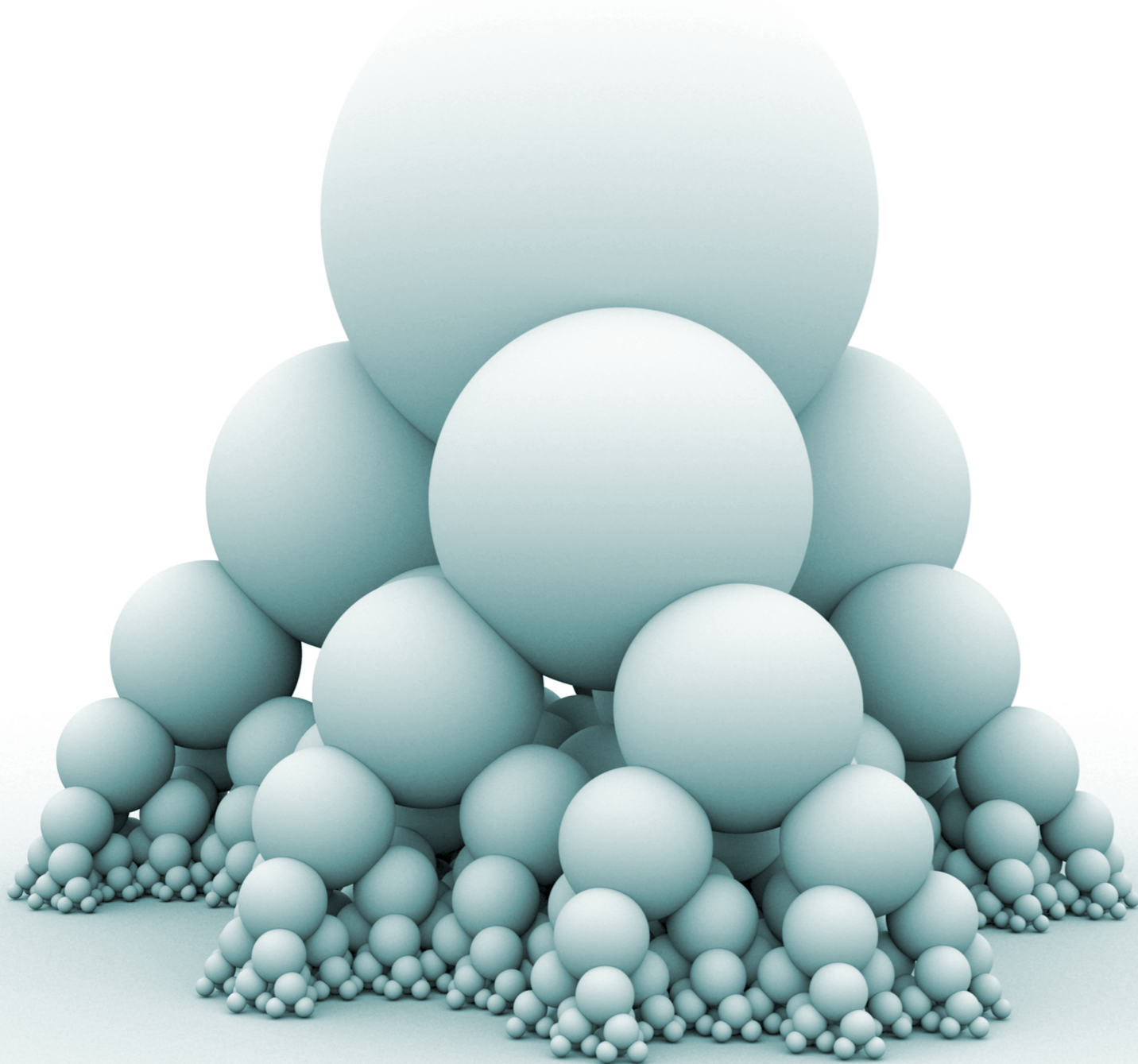
A clear example is revealed in the paper entitled ***Form and Cause*** (the last paper in this issue), which purports to tackle the actual causes of Form, and never gets near answering that question. Instead, it is necessarily diverted into other quite valid questions in related areas.

But it does show how such studies can (and will in the end) reveal the area as a coherent and comprehensive set of features and causes, and real solutions to such problems are NOT built brick-by-solid-brick, but are more like juggling jelly and keeping it balanced! All factors must be integrated into a mutually meaningful Whole, or else what has been revealed is mere Technology – useable fragments of partial truth ***without*** Understanding.

I therefore proffer this as a preface to the following short series of papers, collectively entitled ***The Problem of Theory***.

(292 words)

THE NATURE OF PURE FORM



The Nature of Pure Form

The essence of the “scientific” form of Idealism is that it is **Form** that is considered **primary**: abstract relations (or laws) are said to **determine** the nature of each and every phenomena in concrete Reality!

It is easy to see how such a view could become established, for when Man discovered exactly how to extract relations from Reality, and condense them into succinct mathematical formulae, capable of delivering **reliable predictions** of behaviours in explicit circumstances, he naturally believed that he had arrived at the very **driving essences** of such phenomena – the “guiding hand” (in an reflection of his **own** volition within the World).

And, in the limit, such an attitude, if it was the task of a seeker after Truth, would be concentrated upon the nature and properties of such Form: and therefore that person should **then** be most accurately described as a mathematician rather than a scientist!

And though such is surely an inadequate position to take, it still poses important questions as to what it is that actually determines such Form.

Of course, the straight forward (and correct) answer is that it must be concrete Reality itself in all its multifarious entities, forces and interrelationships that must be the real source, but you can see the difficulties even there. For we must then find all Forms within the seemingly infinite complexity of Reality itself, which seems itself to be an infinite task.

Yet, what is actually discovered is that all Forms are actually universal: they recur all over the place in wide and unrelated areas. Forms are indeed ubiquitous, and all types recur, so there must be a reason for that!

Now, scientists do attempt to understand the world primarily by studying it. They always begin by engaging first in the most careful observation of some aspect of Reality, which thereafter, by various means of isolation and control, they can manipulate in different ways and measure systematically to reveal what appear to be the most crucial relations involved. And it is these isolated and extracted relations, which are then turned into abstract symbolic forms.

Yet though we may **seem** to be taking a materialist standpoint, and employing a materialist approach to have ultimately arrived at an abstract relation, what we have in hand at the end is actually merely an example of Pure Form! It may well hold in the given particular case, but, in addition, it invariably turns out to be applicable in many different situations. And, in all of these applications, it is extremely useful to us in manipulating aspects of the World to our needs and consequent intentions. We can use such relations to both **predict**, and also to also **produce**!

You can see why the idealist standpoint recurs constantly.

It reflects the nature of Mankind, who constantly interacts with the given environment to not only survive, but also to prosper. Their own purposive actions are carried over into the clearly directed processes that were regularly being uncovered, and not least because of the universality and coherence of most of their findings. Blind, undirected and mechanistic alternatives did not appeal to a purposive Mankind!

Consider the consequences if Mankind had only merely observed and “explained” the world, without the carrying out of the series of revealing interventions, by which such relations were obtained. They would surely end up as mere speculators as to why things were the way that they were.

And clearly, in this complex world, there would be as many examples contrary to their “explanations”, as there were confirming them. Indeed, that was the situation for most of the long History of Mankind: Science is a very recent invention!

The sophisticated experimental process, with *isolation*, *control* and *systematic intervention* did indeed allow reproducibility of evidence, and solid useable laws too.

Yet, on close inspection of this powerful and useful set of techniques, which we collectively term **Experimental Science**, we do, in carrying them out, have no choice but to make drastic and affecting changes to the situation under investigation.

What we therefore study, and indeed **solve**, is **not actually** the same thing that happens in totally unfettered Reality: it is, in fact, the study of a constrained and modified area!

It is like a study of the Weather in a devised and contained apparatus, compared with the real Weather in unfettered Reality. At best such farmed circumstances only deliver a particularly limited view, even if it is remarkably productive.

And when the whole World of these Forms is studied from the point of view of concrete, unfettered Reality, it is immediately evident that the former is a grossly simplified and restricted view of the latter.

Euclidian Geometry does not exist *as such* in the real World, but it was, nevertheless, a mighty step forwards! Why?

It clearly dealt with *something* that was **in** concrete Reality, but it certainly wasn't **all** of concrete Reality. We usually say that mathematicians isolate and then study the Forms of Reality and NOT its **content**! And, this turns out to be its major strength!

But, the more we study Reality, even those parts, which seem to conform to some major Forms, we invariably find more and more different forms. And we appear to be taking such Forms from Reality at a series of very different **Levels**.

And talk of Geometry of the Euclidian type when dealing with individual elementary particles becomes entirely inappropriate. We selectively filter out and extract *slices* of a deep, complex Reality, which then displays its own Forms.

To complicate the situation still further, NO extracted Form from a particular isolated and controlled area (or Domain) of Reality is unique! Indeed, the very opposite is true – it is likely to appear all over the place and crucially at very different Levels too. Form is certainly Universal, and hence cannot be causal: all identical Forms are NOT caused by the same things! But as **Gödel** and **Turing** showed, these Forms do NOT constitute a complete, coherent, calculable and self-consistent system. Try as they might, even studying Mathematics alone entirely separate from Reality, serious and intelligent researchers like **Russell** and **Whitehead** could not “do a Euclid” on Mathematics *as a whole*: they could not turn it into a single, overall system.

Clearly, the objective of mathematicians – to make formal laws *primary*, had to fail with this revelation! Any primary mover of Reality of this type just had to be all of these things, otherwise it certainly wasn't the prime mover.

But, there is another way of looking at the whole question of Reality and Form!

It must start (materialistically) from Reality itself being primary, BUT that source, unlike a Formal System, does not have to be wholly self-consistent! It could, on the contrary, be full of contradictions, for it would not have to be always **the same**! It could involve myriads of strands of **Development**, each and every one of which being initially governed by the conditions that produced it, and in which things were NOT eternally constant but could involve at times the creation of new entities and the laws to relate them.

Thus, this form of Reality would never be wholly pluralistic, nor would it be unchanging, it would invariably be composed of such multiple strands.

Instead of trying to analyse everything into Wholes and their constituent Parts down ultimately to fundamental entities and laws from which all had come, we would instead be forced to see Reality as composed of a multi-strand set of hierarchies of development which contradicted one another. Indeed, such contradictions would be seen as the actual **engines** for the creation of the wholly **new**. For, crucially, development was NOT mere complication, but real evolution, involving dramatic revolutions of change.

Our analyses (based upon the pluralist assumption) would only take us down to such contradictions, and would never allow us to transcend them! We would be stuck, because we were trying to “square the circle” – that is to see all phenomena as explicable in terms of a strictly pluralist sequence of cause and effect. Now, if this is true (it is the holistic view of Reality), it would transform what Form really is, and it would not be the Form we were looking for.

Form would constitute unchanging patterns only within any given stable Level!

It could not, by itself, ever explain the various *transitions* to new Levels. It may appear once a new Level was established, with the same Forms as in all previous Levels, but it could never traverse the actual creative change in Level itself – occurring only within the episodic **Emergences**.

If we were to address the Forms that occur during the Creative Phase of an Emergence, they could not be anything like those we have used in entirely stable situations. For one thing, they are not **static, unchanging patterns**, but *Patterns of Qualitative Change*.

Form would be about how things change, and would certainly never involve *only* bottom-up causality. Indeed, the essence of such changes is that they restructure the ground as significantly as the content of a process, Form in Qualitative Change is of a different Order to Change within Stability (which is invariably quantitative change).

(1,529 words)

THE FORMS OF QUALITATIVE CHANGE

The Forms of Qualitative Change?

If the preceding papers in this series do indeed set us on the right path, we must therefore reassess Statistics and Probability as Mankind's failed attempt to bridge the unbridgeable in a purely formal way. For implicit in statistical forms, especially when based only on empirical evidence, and no preceding theory, can never *explain* anything. It is **the** most formal method of prediction without involving any understanding whatsoever. And when we choose to use such methods when encountering an Emergence, then we are trying to look at evidence from one side of an Emergence, and from such actually predict – not straightforward determinist results, but instead very general, overall quantities on the other side.

We have, therefore, in such an effort, been forced to resort to these techniques because our carefully isolated and extracted determinist formulae simply cannot traverse such a gulf, for the necessary conditions for those relations *no longer even exist*.

They are constrained to pertain *only* within their own stable Level, and there to be valid *only* in their own constrained Domain within it.

So as with our “beloved” *Second Law of Thermodynamics*, we have to move up several gears, and look down across that transformation for something that appears throughout!

The answers are usually the most general “conceptions”, such as Entropy and Energy. But it has to be said, if our normal restricted-to-Level deterministic Forms are (as they certainly seem to be) incapable of *explaining* phenomena, and instead only describing it and succinctly encapsulating it in abstract Forms, then these overall, generalist Forms will certainly be even more useless in the crucial task of **Explanation**.

You only have to ask this requirement of the Second Law to find the irrefutable answer: *such “Laws” can explain absolutely nothing*. They cannot even be explained *themselves*!

Why is there a Second Law?

Clearly, the imperative for these “super laws” is, as always, Pragmatism! In order to proceed with concrete tasks something will be necessary to guide such actions. It will not matter that no *accompanying explanatory narrative* will be possible: we can put that down to the congenital inadequacy of Mankind to conceive of things wholly beyond their experiential ken!

(359 words)

The Origin of Forms?

Let us suppose that the Early Universe was incredibly simple, indeed, wholly formless, and composed of merely small basic particles and energy (or even Energy *alone*). [That is, after all, the consensus among modern cosmologists]

But, if that were the case, we would have a problem, for “Where does Form come from in such a scenario?” As materialists we can give no other answer but, “From the concrete material of Reality!” But, we are assuming the very simplest possible Origin, with literally NO initial Forms apart from those fundamental entities and any relations that come along with them.

So, where was the necessary Form to **guide** any future changes? It surely must not yet exist! So, if this were the case, we must allocate it in some way, but *surely* only after new, more complex arrangements have occurred? And though we would like to limit what made these more complex things, entirely to the handful of possible causes available *before* their emergence, we would have to admit that the very presence of new persisting entities would somehow and always “Change The Game!”

From the onset, top-down causes would be involved along with the usually conceived of bottom-up causes. Form must emerge along with new juxtapositions, and thus the environment not only of the New, but also of what remains of the Old, will have been changed, and also modified what was possible for everything currently existing. Of course, to even conceive of a Beginning, there must have been an initial Event – a Prime Cause, so whatever was the constitution of the Universe prior to that Event, IT must have affected what already existed in a new way.

We must, however, put aside what caused the Event itself, but whatever it was, IT must have produced the Event and along with it its initial **properties**. Now clearly, to be the Beginning of the Whole Universe, such an Event was so singular and enormous that it is reasonable to assume the simplest of elements initiated upon a wholly new course with one Almighty Kick! Indeed, modern cosmologists are always talking about gravitational aggregation being initiated by some shock wave from an explosion, which assumes some sort of semi-permanent balance of forces getting nowhere, until an external shock of some magnitude terminated that equilibrium and allowed a locality lacking in that prior equilibrium.

And any new persisting things would inevitably be both local, and locally and particularly caused, so in very different places, perhaps different new things might emerge.

Now the main assumption in such a scenario is that these new persisting things must “fit in” better than those that preceded it, otherwise they would certainly have perished and the old “better” entities continued to dominate.

Now, if the New were indeed better, they would rapidly proliferate at the expense of the Old, and what was local would grow to reach other areas, where, perhaps, different, more complex arrangements may have occurred.

The situation then differs from before, for *both* the New arrangements – they encounter each other for the first time, and two possible outcomes are likely.

And these two could be either mutually conducive (in which they would cause each other to proliferate further), or they could be mutually contending, in which case they would certainly limit each other’s further expansion.

THE ORIGIN OF FORMS

Also, in the conducive circumstance, the possibilities for further associations may well appear, and new entities come into being.

Now, this rather sketchily outlined trajectory of development (clarified in much greater detail elsewhere) is here introduced to help us to address the true origin of all Forms. From these considerations it is obvious that Form grows with the evolution of Matter, and is determined not by eternal-external causes, but by modes of co-existence, of aggregation and of development. You are asking a different question to the “Why?” asked about qualities and properties: you are instead concerned with the “Why?” about quantity and shape in given circumstances.

If this is true, how could anyone place Form as the veritable Source of Everything?

On the contrary, it is Everything, which is the Source of Form. And clearly, Everything is NOT billiard balls on a table, with a very limited set of possible interactions. Everything is capable of Evolution and changes as its mutual interactions increase in complexity.

And the Universality of Form is also explained by this source of Form. As it is about aggregation and shape, these can recur not only in different alternative lines of development, but also in the same line at a series of different times and even different Levels.

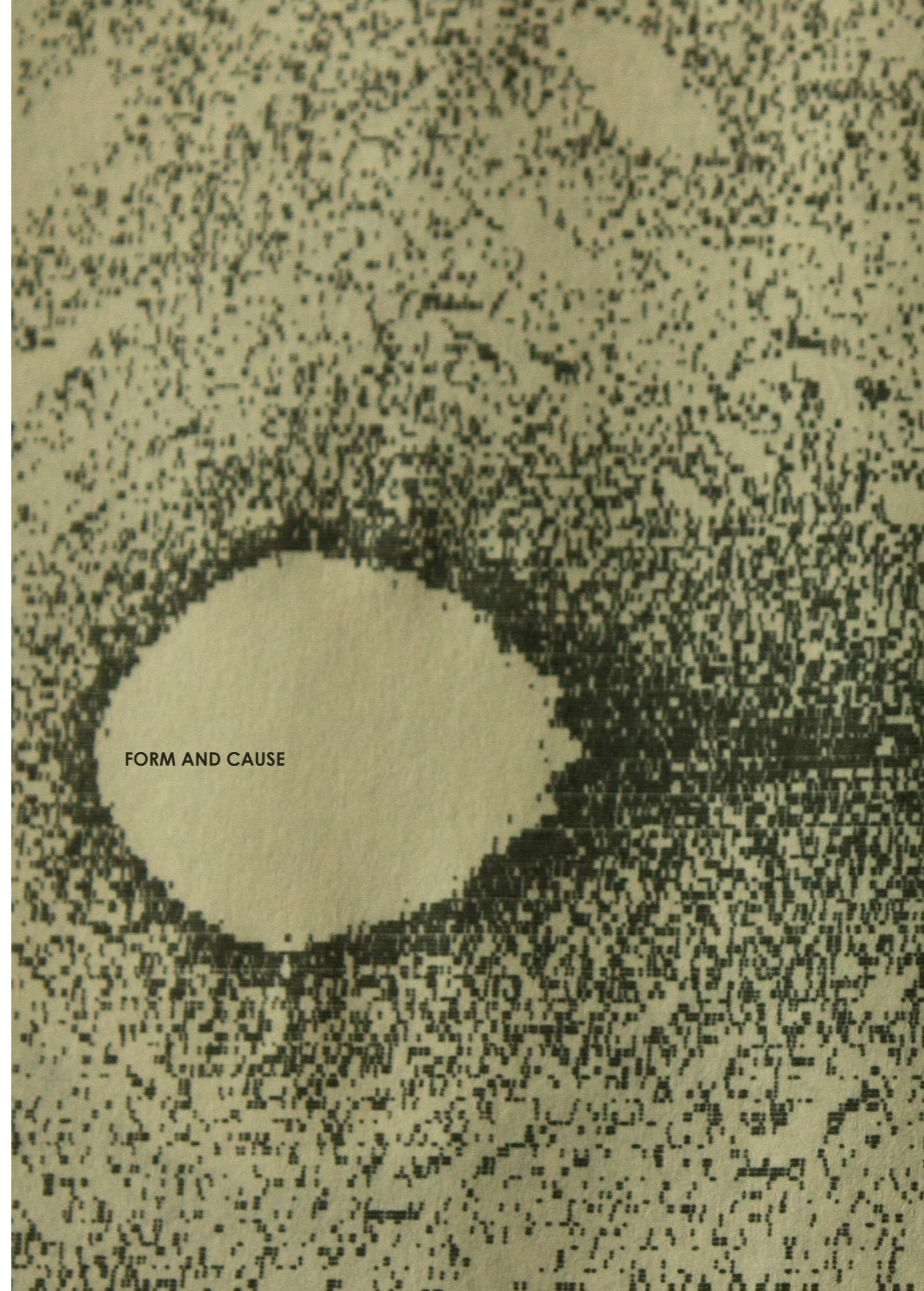
And this concept of Level will become increasingly important, for though any new Level will still have innumerable potential developments *in a formal way* available to it, such systems will be mutually dependant upon all elements within it, and there is no rule, which allows infinite development along a particular line. Indeed, what is much more likely is that once embarked upon a given line of development, it will intrinsically have *a limit to its proliferation of Forms*, AND even on its continued persistence. Indeed, every single line will always outgrow its bases, and will ultimately be increasingly undermined by dissociative processes.

This implies that though all qualitative changes in a very primitive Universe, will happen very easily, as it gets more and more complicated, change will be more and more prevented, and the system will tend to stagnate – to stop getting more complex. And under such circumstances, the possibility of the increasing effects of the dissolatory processes could (and in the end always does) bring about a cataclysmic collapse of the whole system.

It is in such circumstances that Emergent Events occur, which will radically alter the situation, and begin to construct a new Level on a new basis. And when such a system is sufficiently self perpetuating a new Level will have become established.

The most renowned of these in our knowledge was undoubtedly the Origin of Life on Earth from non-living Matter alone.

(1,005 words)



FORM AND CAUSE

Form and Cause

*NOT the cause of the phenomenon,
but the cause of its Form*

Perhaps we should start by explicitly comparing the causes of phenomena, with the causes of their Forms? Clearly, they will occupy very different realms: the causes of phenomena must be concrete causes within Reality and reflect its Necessity, whereas the causes of Forms will reside wholly within that World of Pure Form alone – Ideality, where the necessity of the relationships of Patterns will be the determinators - the necessity of the “pile”, and **not** what it is composed of!

And, this separation is imperative, for things, which are quite unrelated in Reality will turn out to have exactly the same Forms. Form is Universal, but **not** essential!

So, we must first notice the nature of the universality of all Forms: for they recur in many very different areas. But the causes of Phenomena are always particular, and when they recur, we are actually seeing the same concrete necessity again, but in a different place.

Clearly, the two are indeed different and must NOT be confused. And this is more important today, particularly in the realm of Sub-Atomic Physics, where essential causality has been abandoned for appearance alone - for Form. And such a change involves the Form becoming the cause of concrete phenomenon!

The advantage of Form, when it is known, is that it allows prediction to be employed successfully. It is **evident Pattern**, which allows prediction: you can successfully predict outcomes, even when you have absolutely NO idea of the concrete causes involved. The ancient Egyptians predicted the flooding of the Nile with great accuracy, and even noticed its synchronisation with the stars in the Heavens, but they had no idea of its cause. Such a position is Pragmatism writ very large!

In contrast, the virtues of Cause is that it throws a penetrating light upon phenomena, revealing their inner workings, and allowing the possibility of actually **explaining** not only **this** phenomenon, but indeed many others by **analogy**. One explanation can beget many others, in such ways, and, even more importantly, also allows, and assists, the integration of explanations in a given area into some sort of coherent Whole. The theorist can dig deeper and understand vastly more than any keeper of records!

The differences were perhaps most clearly encapsulated in the design of the DC3 aircraft in the Second World War by the Americans. While J.R. Mitchell probably spent a decade on the **Spitfire**, winning three Schneider Trophies in the process, the DC3 had to be achieved in weeks! This had to be done very quickly indeed, because of the heat of war, absolutely NO time could be given to the development of Theory (Understanding). To vastly truncate the development process, they decided upon a wholly pragmatic approach. They designed the aircraft beyond their current understanding, entirely using speculative ideas. They threw it into the air and it crashed!

They analysed the crash and redesigned the aircraft. Once more it was a failure and again bit the dust. But with each failure they had more data and **constructed** data-based formulae from that. After many iterations and prodigious expense, they finally ended up with a truly great aircraft, which was used all over the World for many decades with great success and safety.

BUT, they couldn't, from their success, use their knowledge to build another design, with different purposes, and this was because they had no real understanding of why their DC3 was so good. They had not developed any Theory whatsoever: they had an extensive set of Forms, which fitted THAT aircraft **perfectly**, but NO other!

They never could build on that success. Neither could they resort to the same methods for all new aircraft, because the costs were prohibitive.

NOTE: Yet they did get to the moon by very similar methods!

The opposite case was surely exemplified by the Anglo-French development of the faster-than-sound **Concorde** airliner. This was developed step-by-step, with the development of Theory as paramount. The process did take a vast amount of time compared with the pragmatic alternative, but the understanding that came from that approach was applicable elsewhere. They gradually understood more and more about the realm they were attempting to conquer.

The airliner was finally produced, and was, and still is today, the most advanced airliner ever built. Neither the American, nor the Russians were able to compete.

In such areas Theory will always beat Pragmatism, not perhaps in a given **particular**, but always in **general**, because it informs all subsequent related tasks, whereas pragmatism is a short-term, one off method for beating the opposition at all costs.

Now, if this is true, how can we compare scientific philosophies based upon these two alternatives? Well we can!

The pragmatic route is called Technology, while the theoretical route is termed Science.

Now, I must finish with an apology! For the originally stated aim of explaining the origins of forms has not been delivered. Yet once more the justification for conclusions has been confirmed, but the subtle and important source of form as such remains to be tackled!

(852 words)